The quest for sustainable access at archaeological sites:
The case of Herculaneum

Thesis submitted for
the Degree of Doctorate of Philosophy

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I, Niki Savvides, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Abstract

The ever-present conflict between access and preservation in the field of archaeological site management is examined in this thesis. Starting from the position that direct experience is essential in the interpretive experience of visitors at archaeological sites, yielding intangible benefits that are vital for public understanding and appreciation of archaeological sites as places, the thesis seeks to develop a better understanding of the conflict and whether it is possible to find a solution in order to reconsider direct access as an explicit interpretive approach in site management.

The different facets of this conflict are interrogated through an intensive exploration of the way access is managed and how it impacts on the archaeological resource at the archaeological site of Herculaneum in Italy. The mosaic floors at the site become the medium through which this conflict is explored. Towards this end, a mixed methodology for the collection and analysis of data is employed, including a visitor survey, interviews with visitors and other key stakeholders involved in the management of access and conservation, and a visitor impact assessment on the mosaics floors.

The case study suggests that firstly, physical access and direct experience contribute to the experience of archaeological sites through the provision of
intangible benefits; and secondly, that, although access does impact on the resource, its sustainability is the outcome of a series of other site management issues, all interconnected, such as maintenance, communication between key access stakeholders, visitor management strategies and co-ordination between site conservation and interpretation activities.

The research takes the debate a step forward, by revealing that access is worth the impacts on the resource as long as these are kept within acceptable limits, and as such it should thus be considered as an interpretive approach. Based on this, a set of recommendations is suggested for achieving sustainable access and as a potential solution to the conflict.

The thesis contributes to the field of site management by introducing a new perspective on the conflict, where access is seen as an advantage, with a potential to contribute to sustainable benefits and to the preservation of the archaeological resource in the long term. This perspective responds to the ethical obligation of site management to consider both the intergenerational and intragenerational responsibilities in striving to become relevant to contemporary society and attract wider public support.
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Ithaka gave you the marvelous journey. Without her, you would not have set out.
Constantinos Kavafis, Ithaka.

In Ithaka, Constantinos Kavafis refers to the importance of the journey and not the destination. Ithaka has been my long journey towards the completion of this doctoral thesis. This journey would have been impossible without the support of many people that contributed to making it a richer and memorable experience.

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1 Introduction

“Visitors and heritage have a symbiotic relationship. People need heritage to add perspective and meaning to their lives. However, it is rarely possible for visitors to directly experience heritage without causing some sort of impact, whether physical, biological, chemical, social, or cultural. This impact may reduce the quality of heritage values and the visitor experience”.

C. M. Hall and S. McArthur 1996, Heritage Management in Australia and New Zealand: the Human Dimension

“But arguably, much of the richness of architecture comes from the multifaceted way our senses respond to it, from the way it catches our imaginations, and from its emotional impact on us.”

K. Goodwin and P. Ursprung 2014, Sensing Spaces: Architecture Reimagined

This thesis seeks to gain a better understanding of the access versus conservation dilemma that lies at the core of archaeological heritage management: how to preserve archaeological sites while allowing public access. The thesis is guided by the premise that access is an essential aspect of interpretation, necessary for experiencing archaeological sites and for gaining intangible benefits, while it acknowledges the inevitable degradation to the archaeological resource that comes with access. As such, the research explores whether it is possible to resolve the conflict between the contemporary value of access and the need for preservation of the resource in a sustainable way.
This thesis is examined through a detailed case study, focused on the archaeological site of Herculaneum, in Italy. Herculaneum was chosen primarily because it offers an ideal context for exploring these issues (see 1.3). Through this case study, the research examines the context of current site management at Herculaneum (Chapter Five), the role of access to the experience of the archaeological site (Chapter Six), the impact of access on the archaeological resource (Chapter Seven), and the current management of access and visitors (Chapter Eight). These analyses form the basis for assessing whether the benefits from physical access are worth the impacts on the resource, and if so, whether it is possible to control these impacts while integrating physical access in the interpretive experience of visitors (Chapter Nine).

This chapter sets the background and context of the research, and introduces the research questions, outcomes and original contribution of the thesis.

1.1 Background and context of the research

Archaeological heritage management developed in the 1970s, as a response to the realization that archaeological sites are non-renewable resources, faced with extensive threats stemming from social, economic and urban developments, including mass tourism. The discipline began to develop measures beyond the technical means of conservation, which had defined conservation until then (see 2.1.3). However, the overall framework of site management was still largely
shaped by the “conservation ethic”, whose aim was the preservation of the fabric, as defined by conservation approaches in the early mid-twentieth century (see 2.1.2).

The redefinition of archaeological site conservation in the 1980s as the set of actions aiming at the protection of site values and significance inevitably introduced new approaches to site management (de la Torre 2005a, 5). These approaches, known as values-based (see 2.1.4), are guided by the premise that values are ascribed by people, and these are not just the experts or the stakeholders with a traditional interest in heritage, but include other groups, such as local, national and international communities (including visitors), and ethnic or religious groups. These interest groups should be considered when making decisions about the protection of sites (see 2.2).

As a result of this process, the field of site management began to address wider social concerns, such as economic development, spiritual life and social stability (de la Torre 2005a, 4). This broadening spectrum of social groups with an interest in heritage has made site management more complex, particularly when it comes to making decisions and prioritizing values and actions (see 2.4).

Against this complexity, the concepts of sustainability and sustainable development have been brought forward as a framework for assisting in the
decision-making process and for prioritizing values and consequent actions. This framework takes into consideration the sustainability of the resource and the ethical responsibility of the field of site management to respond to the needs not only of the future but also of the present, thus making the field relevant to contemporary society (see 2.6).

From this perspective, decisions about access have to consider not only the impacts on the resource and the need to preserve it for future generations, but also the benefits of access to current generations (see 2.8). This ethical obligation inevitably makes decisions about access more difficult and more complex, than they would have been in traditional site management, where decisions were guided solely by the “conservation ethic”. These tend to prioritise the preservation of the resource for future generations without explicitly considering its role in the present (see 2.1.3).

The significance of access as a contemporary value has been acknowledged in the values-based approach, both for its contribution to the visitor experience and for the economic benefits associated with it. The former has been discussed in terms of physical and cognitive access mainly through interpretation activities, as these are the processes that shape the visitor experience (e.g. ICOMOS 2008a, Jameson 2007). However, although cognitive access is critical in understanding the significance of sites, it does not offer the intangible benefits stemming from
physical access, such as gaining a sense of place, evoking affective responses in visitors and engaging and enhancing appreciation of archaeological heritage (see 2.9). The fact that humans have a visceral response to the built environment, perceived through the body and then rationalized in the brain (Goodwin and Ursprung 2014, 36), has been largely overlooked in site interpretive planning. The use of sight has been the predominant sense employed in site interpretation, similar to traditional approaches practiced in museums (Black 2005, Hooper-Greenhill 2000).

Unlike the field of archaeological site management, the fields of human geography and architecture have increasingly acknowledged the significance of experience in understanding places in the built and natural environment. Experience is seen as critical for getting a sense of place and for engaging and forging attachments with a place (Relph 1976, Tuan 1977, Lynch 1960) (see 2.9 and Chapter Six). There is a growing understanding that our interaction with the environment, whether built or natural, goes beyond the visual and necessitates the use of other senses, such as hearing and touch (Bender et al. 1997). As Goodwin and Ursprung (2014, 36) argued, we encounter a building in its setting, we move through it, we feel it, alone or with others (see 2.9).

This also stands for archaeological sites, which are places, and as such they have to be experienced first to be understood. As Holtorf (2001) rightly pointed out, it
is through experience that people know the world, and also the past. Recent work in museums (Pye 2007, Romanek and Lynch 2008, Peters and Romanek 2008) and heritage studies (Jones 2009 and 2010) has explored the benefits stemming from experiencing collections and objects. Evidence suggests that by evoking affective responses and engaging the senses of visitors, the interpretive experience becomes more powerful and a memorable one, it provokes thinking and ultimately contributes to learning (Black 2005, 203) (see 2.5).

It is nonetheless a fact, however, that physical access can be damaging to the materiality of sites, leading to loss of their fabric and values and ultimately to the very visitor experience itself (Aplin 2002, Timothy and Boyd 2003). Yunis (2006, 175) noted that, “uncontrolled tourism can severely and irreversibly damage fragile sites, deteriorating their physical fabric, destroying their values, and not effectively transmitting their importance to the visitor”. Famous sites, such as the Valley of the Kings in Egypt with about two million tourists a year are at risk from uncontrolled mass tourism (Weeks and Hetherington 2006, Agnew and Demas 2008). These risks not only include material damage but also impact on the sense of place. The case of Stonehenge in the UK in the 1980s and 1990s illustrates this well: “we have reached a position where so many people want to see Stonehenge, that very few see it properly” (Chippindale 1990, 31). Many archaeological sites have witnessed the negative, disastrous effects of uncontrolled visitation resulting in wear-and-tear and deliberate damage
(Timothy and Boyd 2003). However, Shackley (2003, 8) rightly points out that visitor pressure on sites exacerbates already existing conservation problems affecting the fabric. In most cases, visitors are not the root of the problem of decay, but an added layer of it. Sometimes the negative effects of access are also due to the lack of awareness of the negative impacts that visitors may be causing to sites, partly caused by the absence of any relevant information on site (Cunliffe 2006, 195).

As a response to uncontrolled visitation, various approaches have been developed for mitigating these impacts. In the framework of sustainability, and in the context of conservation as the management of change (see 2.7), recent approaches from environmental conservation have been adapted for controlling change stemming from use, and placing limits of change on visitor-induced degradations (see 2.7.1). More widely used are conventional approaches for managing visitors and their impacts at archaeological sites, such as placing barriers and ropes to control access (see 2.7.2). Although these approaches may have immediate results, the extent to which they respond to intragenerational equity and thus ethical responsibility of the field to current generations may be questioned. This is particularly the case with approaches allowing access to some but not all segments of the visiting population (see 2.8).
In the above context, is it possible to manage access in a sustainable way? Is it possible to create engaging experiences and respond to the needs of current generations, while not compromising the ability of future generations to meet their own needs? The conundrum of access versus conservation at archaeological sites is perhaps the most common conflict of values (de la Torre 2005a, 224), where usually the trade-offs favour conservation and leave the benefits of access unquestioned. Indeed, when guided by the “conservation ethic” and its concern for preserving the archaeological resource for the future, it is overall easier to favour conservation over access, although there are many cases where little or no conservation takes place, as a result of neglect. Many sites in the Mediterranean demonstrate this phenomenon (see 2.1.3), where no conservation follows excavation. This thesis argues that the field of site management also has to consider its responsibility to current generations if it wants to contribute to sustainable development, and be made relevant to the social sphere in the present. The key issue is whether it is possible to manage change stemming from access in the complex and multifaceted reality of site management, which involves the protection of values while considering the technical, social, economic and political problems and opportunities of the present.

This research offers an in-depth study of how values are in conflict in the access–conservation dilemma and how this conflict is shaped by the complex reality of
site management. As such, this study seeks to fill a gap in current research and contribute to the debate on sustainable use.

1.2 Research aims

The research is guided by the following key aims:

1. To develop an understanding of the role of physical access to the experience of archaeological sites.

2. To develop an understanding of the ways in which access impacts on the resource and the role that site management and conservation have in these impacts.

3. To discuss whether access is worth the impacts on the resource: exploring access as an interpretive approach and considering the limits of acceptable change.

4. To suggest a set of approaches for managing the impacts from access within a framework of sustainable development, in order to allow for its benefits to enhance the experience of sites.

1.3 Case study selection

The above concerns are explored at the archaeological site of Herculaneum in Campania, Italy. Herculaneum was chosen, as it is one of the few surviving sites in the world with an excellent state of preservation, but also with unimpeded
access that enables visitors to experience the ancient town by entering the buildings and experiencing their well-preserved interiors. It offers an ideal case for exploring the role of access to the visitor experience and for testing its sustainability.

When I first visited the archaeological site of Herculaneum in September 2008, I felt awe for a number of reasons. First, it was the scale of the site and its state of preservation. I have been to many other well-preserved Roman archaeological sites in the past, in North Africa, Italy and Cyprus but very few have succeeded in capturing me as Herculaneum did. It was difficult to verbalise the shivering feeling through my body at the time. The answer came a few months later, when I visited Pompeii. As I walked into the baths of the Forum (Figure 1.1), the first visit to Herculaneum came to my mind, and I realized what it was that struck me then. Walking through the central baths (of Pompeii) I admired the decorative art on the walls and the vaults of each room, the light coming through the roof, but I somehow felt detached from the place. I was one tourist among the hundreds who were queuing to get into the building. The interior route was already defined by the carpet that was put on the floor to prevent visitors walking directly on the mosaics, and by the barriers that were placed along the sides to prevent us from going closer to the archaeological fabric. The visit was similar to that of a museum On the contrary, the visit to Herculaneum was different: almost no barriers or floor covers were used (with the exception of two buildings); I walked into the buildings and I was free to move around; I was not reminded that I was a tourist. The past and the present had merged into those moments of being there. I grasped the sense of the ancient town, and this transformed my visit into something more than just a visit to an archaeological site; and that in itself was a very powerful and memorable experience. (Excerpt from fieldwork diary, May 2009)
The above excerpt from my fieldwork portrays the choice of Herculaneum as the main case study for the research. Although the site is described in detail in Chapter Four, a brief description is necessary to justify its selection as the main case for this research.

The site is extraordinary for the degree of preservation of its Roman townscape, a result of the excellent conditions created by the eruption of Vesuvius in 79 AD (Figure 1-2). Excavated in the nineteenth and twentieth centuries (see 4.2.4), the
Site consists of 45,000 square meters of remarkably intact, multi-storey buildings complete with precious architectural features, decorative surfaces and organic materials (Figures 1-2 to 1-7) (see 4.3). It offers an insight into a particular moment of the Roman past, of a resort town frozen in time in 79 AD.

Figure 1-2 View of Herculaneum towards Vesuvius, visible in the background, facing east.

Figure 1-3 Wall paintings inside the College of the Augustales.
Figure 1-4 Carbonised wooden bed frame in one of the rooms in the House with the Wooden Partition.

Figure 1-5 Wall decoration in the tepidarium of the Men’s section of the Central Baths.

Figure 1-6 Floor paved in opus signinum at the entrance of the House of the Wooden Partition.
This excellent state of preservation offers a unique visitor experience. It allows visitors to travel back in time to Roman Herculaneum and imagine themselves in the life of the town’s inhabitants as they walk inside the buildings and on the streets of the ancient town. This direct experience of the past is accentuated by the almost complete absence of visitor management measures, such as barriers and walkways over the original floor surfaces (Figure 1-1) or protective screens in front of the wall paintings. Visitors can explore the ancient town by walking directly on the original floor surfaces of the buildings, such as mosaics and other decorative pavements and feel the different spatial dimensions of their interiors (Chapter Two, Chapter Six).

The buildings of the ancient site are adorned with decorative surfaces, on walls and floors alike. In the areas open to access, floor surfaces are particularly
vulnerable to the effects of access, as direct contact with visitors becomes inevitable. At Herculaneum, four main types of floor surfaces can be found: floors in *cocciopesto*, in *opus signinum* (Figure 1-6), mosaics and floors in *opus sectile*. Floors in *cocciopesto* and in *opus signinum* are the most vulnerable due to the softness of their materials that come into direct contact with visitors’ feet. Mosaics are also vulnerable, although less so: their surface consists of materials of variable durability; they consist of different layers made of diverse materials, which may not be so well adhered to each other. They are, therefore, susceptible to somewhat different decay processes and visitor impacts than *cocciopesto* and *opus signinum* pavements (Martelli Castaldi 2005c).

The mosaic floors were chosen as the main focus of this research as this was the requirement of the internship with the HCP that chose to prioritise the protection of mosaics over *cocciopesto* and *opus signinum* pavements, despite the higher vulnerability of the latter two. Thus, the mosaics were selected as the main medium through which to explore the effects of access as direct experience on the fabric, but also the role of such access to the overall visitor experience. Although the site receives thousands of visitors annually, it is still not affected by over-visiting (Chapter Five, Figure 5-12), and this allows visitors to experience the site without the effects of mass tourism.

Finally, Herculaneum was chosen as the main case study due to its accessibility
for data collection. My research internship with the Herculaneum Conservation Project (HCP) since 2009 to investigate the impact of visitors on the mosaic floors at the site provided the basis for developing the research into this thesis. Through the internship, access to data was greatly facilitated, not only in obtaining data from the HCP but also from the Soprintendenza Archeologica di Napoli e Pompei (SANP) and its archives. These were invaluable in gaining a better understanding of the operational framework of the site in terms of management and also in understanding the history of conservation interventions to the mosaic floors.

1.4 Outcomes and original contribution

This study constitutes a major new piece of research in the field of site management. In terms of outcomes and original contributions to this field, this study provides:

1. An innovative perspective of the dilemma of access and conservation when managing archaeological sites, by bringing forth the role of direct access as an interpretive approach together with its intangible benefits, as a significant consideration in balancing this conflict.

2. The development of an approach for exploring and eliciting the experiential value stemming from access transferable to other sites.

3. The development of an interdisciplinary approach for assessing visitor use and impacts on archaeological sites, transferable to other sites, and specifically to sites with mosaic floors.

4. A toolkit of approaches suggested for managing access in the framework
of sustainable development that can be applied to other archaeological sites.

5. An interrogation of current approaches in the field of conservation and management in terms of theory and practice.

Alongside case study specific outcomes:

1. A set of visitor itineraries in GIS that can be used for managing visitor and planning conservation interventions in the context of the Herculaneum Conservation Project.


3. A complete history of interventions of the mosaics at Herculaneum included in the visitor impact assessment.

4. A collation of historical images for the mosaics included in the visitor impact assessment that can be used as a basis for creating a data base to monitor and understand mosaic change.

5. A set of recommendations for managing access at Herculaneum in the framework of sustainability.

1.5 Overview of the thesis

Chapter Two provides an overview of the main theoretical discourses that guided this research, by examining the developments in the field of site management and conservation that currently shape its practice, while it
examines ideas linked to the experience of archaeological sites stemming from
the field of human geography and museum studies.

Chapter Three presents the design developed for this research, including the
methods employed for the data collection, their analysis and interpretation.

Chapter Four introduces the historical and archaeological context of
Herculaneum, and ends with the presentation of the mosaic floors included in
the visitor impact assessment.

Chapter Five presents the management context of the site and expands on the
approach adopted for the conservation of the mosaics and for the management
of visitors.

Chapter Six presents the results from the exploration of the role of direct access
to the overall visitor experience at Herculaneum.

Chapter Seven presents the visitor impact assessment. This includes a discussion
of the archaeological context of mosaics and their deterioration processes. The
main part of the chapter considers the rationale and the methodology developed
for the assessment and how it has been applied at Herculaneum. This is followed
by the presentation and discussion of the results.
Chapter Eight presents an assessment of the way physical access is managed at Herculaneum, in terms of visitor movement and behaviour. This includes an identification of the factors that have the potential or actually contribute to impacts on the mosaics.

Chapter Nine considers the results of the previous chapters to assess the sustainability of access at Herculaneum. It provides a set of recommendations that can be used to make access sustainable, which have broader applicability to other archaeological sites.

Chapter Ten returns to the main aims of the research as presented in section 1.2 and provides a synthesis of the results of the research in response to the research aims.

Chapter 11 presents the conclusions of the research for the field of archaeological site management, evaluates the methods and data of the research and highlights areas with potential for future research.

The next chapter considers the theoretical framework that guided this research project.
2 Theoretical framework

This chapter maps out the key theoretical areas that link with the aims of the research. These are drawn primarily from archaeological site conservation and management, human geography and museum studies. The chapter first examines the history of conservation management theory as it relates to the care of archaeological sites. It then focuses on the current approach of values-based management and the idea of values, sustainability and interpretation. It also examines the ethics of access in archaeological sites management. Then the chapter considers the visitor experience at archaeological sites and draws on the idea of sense of place as used in human geography, affect and mindfulness as used in museum interpretation to discuss the ways that direct access can contribute to the experience of archaeological sites.

2.1.1 Changing perspectives in the conservation and management of archaeological sites

2.1.2 The development of conservation as a practice and a discipline

Although conservation evolved as a concept and a discipline in the nineteenth and twentieth centuries respectively, the practice of protecting and repairing archaeological remains or old buildings to bestow upon them a form of permanence and durability is known from ancient times (Lowenthal 1985, 385; Clavir 2002, 4; Corfield 1988; Pye 2001, 37). As Marijnissen (1996, 277) points out,
“the regular maintenance of historic buildings and works of art has been carried out since time immemorial”.

The rediscovery of antiquities and the revived interest in the past in the Renaissance, particularly the classical past, initiated more organized attempts for the protection of archaeological heritage (Jokilehto 1999, 29; Carman 2012, 16). However, as Lowenthal (1985, 390) comments, these attempts were limited and sought to preserve antiquities not for their own sake but as inspirations for future efforts in the realm of art and architecture. The conscious protection of archaeological heritage based on its historicity began a few centuries later, stemming from the realisation that history was an organic, multi-faceted process, where each period is unique and unrepeateable (Lowenthal 1985, 391). Archaeological relics became crucial to historic understanding as authentic evidence from past periods. They were valorized and conserved at the national level. By the end of the nineteenth century ancient monuments, including archaeological sites, of most of Europe were covered by protective legislation, while in the USA, the first Federal Antiquities law was enacted in 1906 (Cleere 1989, 1).

The modern concept of conservation evolved together with modernity in the Western world, as a reaction to the rapid changes evidenced in European society in the nineteenth century. The industrial revolution stirred a nostalgia for the
past and a fear for the unknown future, as the present was seen as “utterly unlike any past” (Lowenthal 1985, 395). Hence, a growing concern over the relics from the past gradually developed regarding what aspects of it should be kept for future generations (Jokilehto 1999).

The principles concerning the care and protection of archaeological heritage were guided by the need to protect the historic and artistic values embedded in the fabric and to respect their authenticity, thus making the protection of the fabric the primary concern of conservation. These became the first guiding principles of conservation practice as established in the early twentieth century and paved the way for the foundations of conservation as a discipline (Pye 2001; Matero 2006). The focus on age and historic values stemmed from the perception of historic buildings as a reflection of the labour of past generations, where age contributed to their beauty; marks of age were seen as essential elements in an object (Jokilehto 1999, 175) and conferred on them a sacred character (Choay 2001, 102).

Conscious efforts to protect archaeological sites following the principles established for the care of historic buildings was an increasing phenomenon at the end of the nineteenth century, particularly in the Mediterranean. The recommendations of the Madrid Conference of Architects in 1904 (RIBA 1904), was the first such co-ordinated attempt to include international principles for the
conservation of archaeological remains. Archaeological ruins were perceived as dead monuments, while historic buildings, still in use, were defined as living monuments. The former, had to be protected and preserved with minimum interventions:

Dead monuments should be preserved only by such strengthening as is indispensable in order to prevent their falling into ruin; for the importance of such a monument consists in its historical and technical value, which disappears with the monument itself (RIBA 1904, Article two).

The proceeding international charters with reference to archaeological sites, such as the Athens and Venice Charters created in 1931 and 1964 respectively (ICOMOS 1931, ICOMOS 1964), extended these recommendations into more explicit guidelines about technical interventions to archaeological sites. These included guidelines on documentation, anastylosis, reconstruction, restoration and maintenance. The charters are guided by the need to protect the historic and artistic values embedded in the fabric, while always emphasizing the need for minimum intervention, thus echoing Ruskin's (1996, 322) ideas that "we have no right whatever to touch [the buildings of past times]. They are not ours. They belong partly to those who built them, and partly to all the generations of mankind who are to follow us." The Venice Charter made explicit reference to the concept of authenticity as an additional principle guiding the conservation and restoration of archaeological sites and monuments (ICOMOS 1964).
All these attempts aimed at standardizing approaches and methodologies for the new discipline of conservation and were defined as the techniques for physical intervention or treatment directed at the preservation of the fabric (de la Torre and Avrami 2000, 3). This is clearly articulated by Berducou (1996, 250) as “the ensemble of means that in carrying out an intervention on an object or its environment seek to prolong its existence as long as possible.” These activities consisted of remedial and preventive approaches. Central to the latter has been the concept of maintenance, which as stated in the Venice Charter, is essential for the conservation of monuments (ICOMOS 1964, Art. 4).

2.1.3 Towards a broader definition of conservation

The late twentieth century marked a major transformation in the field of archaeological site conservation. The major social, urban and economic changes following WWII, namely urban development, reconstruction and mass tourism, placed archaeological sites in a new context. Exposure to the environment, partly caused by the fact that excavations were not followed by conservation and protection, was, until then, the main concern for their preservation. However, it had now become only one among numerous other threats: increased visitation, vandalism, urban and agricultural development, the use of incompatible materials in earlier interventions (such as reinforced concrete) (see 7.10.2), and lack of maintenance (see 7.10.2) (Palumbo 2002, Matero 2006). In particular, the
transformation of tourism, and especially cultural tourism, into a major international industry in the post-WWII period, changed the scale of impacts and issues associated with tourism (Barthel-Bouchier 2013, Timothy and Boyd 2003, Smith 2003, Liwieratos 2009). By the 1970s, the realization that archaeological sites are finite, non-renewable resources deteriorating at an increasing rate, led to a more conscious organised attempt to protect them as a whole, not limited to physical conservation.

Known as Archaeological Heritage Management (AHM) in Europe, Cultural Resource Management (King 2002) in the United States and Cultural Heritage Management in Australia (Smith 2006), this new movement consisted of a set of procedures and techniques guided by national legislation, and national and international charters, concerned with the preservation of archaeological heritage (Cleere 1989). These tools were shaped by the "conservation ethic", whose ultimate aim was the preservation of the fabric (Smith 2006). In terms of practice, the Venice Charter of 1964 became the instrumental document in heritage conservation management processes (Starn 2002, 2). The methods and theoretical underpinning of AHM were greatly influenced by processual archaeology, which dominated the theoretical debates in archaeology in the 1960s and 1970s. Processualism embraced logical positivism, and made this the epistemological framework of the discipline, aligned with the natural sciences (Smith 2004, 34).
In the 1980s, postmodernism challenged the definition of culture as a collection of things and supported the notion that culture is a set of processes (Avrami et al. 2000, 6). Post-processual archaeology was born as a reaction to processualism, offering alternative approaches to interpreting the past, through a more subjective and self-reflexive perspective (Smith 2004). This approach acknowledged other voices and perspectives in the practice of archaeology such as indigenous peoples (Hodder 1991). In this new context, heritage was inevitably given a new meaning: it was no longer perceived as a static set of objects with fixed meaning, but as a social process (Smith 2006, Mason and Avrami 2002), through which “any human artifact can be deliberately invested with memorial function” (Choay 2001, 12–13). Tangible manifestations of the past become heritage through conscious decisions and values of particular people and institutions, which are shaped by social contexts and processes (Avrami et al. 2000, 6).

The field of conservation was inevitably forced to respond to this new definition of heritage. The sole protection of the fabric did not suffice in responding to the ways archaeological heritage was defined in the present. Conservation had to respond to the critical questions of what and why to conserve, which were previously taken for granted. Thus conservation was transformed into a critical act in that the decisions regarding what is conserved, who decides and how, are a product of contemporary meanings (values) attached to archaeological heritage.
about the past’s relationship to the present (Avrami et al. 2000, 6; Matero 2003, vii).

Conservation as a discipline was thus broadly redefined as encompassing any action designed to maintain the significance of a heritage object or place and as a process that starts at the moment a place is recognized as having cultural values and singled out for protection (de la Torre 2013, 158). Archaeological site management has become part of this broader definition of conservation, which includes physical conservation, but also addresses practical issues, such as intangible values, social context, economics, site operations, and interpretation and visitor management (Sullivan and Mackay 2012). From this new perspective, site management becomes a complex and difficult undertaking. One way of dealing with this complexity has been the development of the values-based management approach to conservation.

Despite the theoretical advances in the field of conservation and protection of archaeological sites in the West, the actual practice of conservation and protection of archaeological remains in the Mediterranean rarely reflected these changes. The conservation of the fabric has not always been prioritized following the excavation of archaeological sites. Many sites have witnessed the decay of substantial amounts of excavated structures with associated decoration, as a result of the lack of comprehensive conservation and maintenance. Instead, the
practice of restoration, whose impetus is primarily the interpretation of the fabric rather than the preservation of materiality and its authenticity, has been widely practiced, particularly at sites with monumental architecture.

The site of Herculaneum and the approach of Maiuri in ensuring the conservation and protection of the site following its excavation was an exception to this reality (see 5.7.2). It is worth noting, however, that conservation did entail major restoration of the structures at the site, as one of the aims of Maiuri was to interpret the site and open it to the public (see 4.2.4).

### 2.1.4 Values-based management approach to conservation

The new values-based approach to conservation and management of archaeological sites is concerned with protecting the significance of a place, as determined by a holistic and integrated analysis of values that various stakeholder groups (‘any group with legitimate interest in the site’), attribute to a site (Mason 2002, 27; Mason and Avrami 2002, 15). Understanding all values attributed to cultural resources is fundamental to this approach, and only after this happens can one consider how these values are to be effectively protected (de la Torre 2005a, 5). This new management method relies on the elicitation of a broader spectrum of values, thus having a more “participatory” nature. As de la Torre (2005a, 5) points out, this participatory nature of the values-based approach is seen as a means of achieving sustainability.
Emblematic in the practice of this approach has been the Burra Charter, which was first drawn up in 1979 and modified twenty years later (Australia ICOMOS 1999). It introduced key ideas in the field, by replacing the Eurocentric idea of “monument” or historic and archaeological site with “place” (Article 1), in order to allow consideration of other types of heritage, such as indigenous heritage, to be protected. The Burra Charter made explicit the call for participation in the conservation and management of places of cultural significance through the identification and assessment of values (Articles 5 and 12). Cultural significance was defined as the aesthetic, historic, scientific and social values embedded in the place, fabric, associations, meanings, records, related places and objects (Article 1.2). The charter also provides a planning methodology for applying the values-based approach, consisting of the understanding of significance and the development of policies and strategies to protect and manage that significance.

The Burra Charter is currently considered the standard of good principles and practice in the field of conservation and management of cultural heritage. It has influenced heritage protection policies in most Western countries and conservation and management heritage practice advocated by international organisations, such as UNESCO and the World Heritage Centre, ICCROM and ICOMOS (UNESCO 2013d), the Getty Conservation Institute (Sullivan 1997; Demas 2002; Mason and Avrami 2000; de la Torre et al. 2005; Castellanos 2003;
2.2 Values

Defined as ‘the qualities and characteristics seen in things, in particular the positive characteristics (actual and potential)’ (Mason 2002, 5), values have always been at the core of conservation. Historic and artistic values and authenticity of cultural resources, perceived as intrinsic to the fabric have shaped early conservation theory (see 2.1.3). With the valued-based approach, the focus shifted from conserving materiality to conserving values, as values were no longer perceived to be intrinsic to the fabric. Instead, they are attributed by those with a vested interest in archaeological sites: “Value is learned about or discovered in heritage by humans, and thus depends on the particular cultural, intellectual, historical, and psychological frames of reference held by the particular individuals or groups involved” (Lipe 1974, 2). Values are multiple, subjective, dynamic and often conflicting in character (Hall and McArthur 1998, de la Torre 2013, Mason and Avrami 2002).

Most often, archaeological sites are already assigned with certain values, usually traditional ones, stemming from the process of designation or by legislation (de la Torre 2013, 160) (see 2.1.2). For example, sites with a national significance are attributed with historic values as these are important to the nation as a whole.
This means that other contemporary values held by legitimate interest groups tend to be overlooked in the process of management. This is where the values-based approach becomes critical as a management approach, as it strives for the consideration and protection of a broad spectrum of values, beyond the traditional ones. This ensures that contemporary values are not carelessly overlooked or impacted in the decision-making process. For example, the economic, social, religious or spiritual values associated with a site are acknowledged as significant and included in the spectrum of values that have to be protected. By doing so, decisions on access, interpretation and conservation are taken in an informed context that considers all values identified as significant.

The elicitation of values requires the identification of stakeholders. Usually, traditional stakeholders, such as professionals in archaeology, history and so forth, and government officials are the ones involved with a heritage site once its significance is acknowledged. These interest groups are associated with the traditional values in conservation. Although the values-based approach supports the involvement of additional interest groups, such as local communities, for the elicitation of all values, in practice this tends to be a very difficult undertaking and as de la Torre (2005a, 7) points out, the involvement of stakeholders in the planning process or the recognition of their values is not a guarantee they will be involved in the decision-making process. What is important is the consideration of the values of a wide spectrum of stakeholders by the group in charge of the
elicitation and assessment of values, and the consultation of those groups who would be mostly affected by a decision.

Value identification is usually carried out using a typology, which acts as a common language among stakeholders. Different value typologies have been developed over the past twenty years (English Heritage 2008, Lipe 1984, Demas 2002, Mason 2002). These have similarities but also significant differences. For example, economic value is not included in the Burra Charter (Australia ICOMOS 1999), but is acknowledged in the typologies by English Heritage and the Getty Conservation Institute.

2.3 Management planning process

The values-based approach is guided by a planning process, consisting of the following steps (Demas 2002, Mason 2002, Sullivan 1997):

1. The identification of values, the documentation of condition of the resource and the exploration of its management context;
2. The assessment and analysis of values and the identification of threats and opportunities;
3. The development of policies, objectives, strategies, and the development of a monitoring strategy.

These steps are seen as essential in the successful planning of the values-based
approach, as they assist in informed decision-making that responds well to the complex issues related to site management, with particular economic, social, political and physical environments (van der Linde and Williams 2006, 115). Although the process is based on following a sequence, it is simultaneously iterative in character, as it is not strictly linear in its progression. It allows and often requires looping back to previous steps to check or augment information and modify the assessment (Demas 2002, 29). Furthermore, although the linear format has the advantage of reducing risks of unforeseen impacts of uninformed decision-making, it limits the potential of immediate decision-making that may be beneficial for adapting to threats or opportunities and thus respond more effectively to the complex reality of site management (van der Linden and Williams 2006, 116). For example, potential opportunities for developing interpretation with short-term objectives along with the planning process may not be seized if the linear process is strictly followed.

2.4 Decision-making

The assessment of values, physical condition and management context will lead to the decision-making phase. This is the moment when values are prioritised as it is realistically not possible to protect all values. Some priorities are usually mandated by law, and usually favour those values that uphold heritage designation (de la Torre 2005a, 8) (see 2.2). Decision-making is also the moment
when value conflicts are resolved, and where values are impacted as a result of a decision, actions are taken to compensate loss (Demas 2002, 42).

Apart from the need to identify all values attributed to a heritage place, the process of decision-making also necessitates a prior understanding of the relationship of values to site features, as this will allow the protection of what makes a site significant. This requires the mapping of values on the features of the site, which do not have to be only parts of the archaeological fabric, but can also be intangible aspects, such as landscape views. This aspect of the values-based approach is perhaps what makes it different to the rationale behind traditional conservation, which is focused on the protection of the fabric per se, as this is where traditional values were perceived to reside (de la Torre 2005a, 8). This helps understand the amount of change that is possible without impacting values and thus protect what is significant. The process of matching values to various site elements further allows for the identification of threats or constraints and also identifies opportunities offered by the value-feature complex (Mason 2002, 25). However, the importance of opportunities is not always explicitly considered in the process of decision-making (van der Linden and Williams 2006, 114). Identifying opportunities and integrating them into the decision-making process is critical, especially when some values have to be compromised over others.
Prioritizing values and balancing options further requires thinking in terms of how certain actions or inactions may impact on values, but also how significant values are against other potential benefits stemming from certain actions or decisions. For example, in making decisions about the visitor experience, the impact on the historic and artistic values of the site features affected by access has to be considered, weighed against the potential benefits from the experience, such as a better understanding and appreciation of the resource (see Chapter Six). In this complex reality, finding a way to balance options is one of the major challenges in the decision-making process. The idea of sustainability, and especially the concept of limits of acceptable change, offers a framework for addressing this challenge (see 2.4 and 2.1.5).

In practice, the complexity of decision-making is further exacerbated by the context in which decisions are taken and by the decision makers themselves. Indeed, “any particular balance will be decided on... politically, not as a matter of optimal, objective solution” (Mason and Avrami 2002, 24). Recent critiques of the values-based approach and the extent to which it actually protects values and not solely the fabric (Poulios 2010, Smith 2006) tend to overlook the political, financial and practical issues that shape decision-making and the fact that most of the time conservation professionals are not the ones that ultimately decide (Mason 2002, 25). For example, the economic benefits from access are for many decision-makers a critical justification for their protection, and these are
prioritized over other values, which for preservation-led actors may be more important.

2.5 Interpretation

Interpretation has become an important facet of values-based management as the activity that communicates significance (Hall and McArthur 1998, 168). The ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites (Ename Charter) (ICOMOS 2008) defines interpretation as the “full range of potential activities intended to heighten public awareness and enhance understanding of cultural heritage sites. These can include professional and popular publications, lectures, and on-going research”. Presentation is considered part of interpretation, as it is a component of communicating significance. It involves the communication of interpretive information, conveyed through a series of technical means, such as informational panels, formalized walking tours, lectures and guided tours and multimedia applications (ICOMOS 2008).

Interpretation is the main activity through which access, both physical and cognitive, is explicitly considered. However, practice at various sites suggests that the communication of significance is usually achieved mainly through the provision of cognitive access onsite and/or offsite together with a high quality of
the visitors’ experience, as defined by good visitor facilities (de la Torre 2005b, 225). Although cognitive access is essential in communicating significance to a wide range of audiences, it is not sufficient in facilitating a sense of place that derives from direct experience. The full potential of physical access as an interpretive approach is not realized, and often the visitor is left feeling placeless (Lekakis 2009, 294). Instead, physical access is defined at many places based primarily on the need to conserve the archaeological resource. For example, at the site of Chaco Culture National Historical Park in the USA, physical access is controlled by the priority given to keeping the archaeological resources in “unimpaired” condition (de la Torre et al. 2005, 93). The limitation of access has resulted in reducing the areas and vistas that visitors can see and the ways they can experience the values of the park, even if this is perceived to have contributed to a quiet and reflective atmosphere (de la Torre et al. 2005, 88).

2.6 Sustainability and Sustainable Development

The concept of sustainability has gained wide acceptance in the field of heritage conservation and management in recent years as a framework of making decisions in the values-based approach and for developing policies (Throsby 2003, 7; Mason 2002, 27; Demas 2002, 42; English Heritage 2008). It is used as a basis for judging the extent to which a decision may lead to a sustainable result, thus testing the long-term outcomes of policies. As Throsby (2002, 101) points
out, “[…] a sustainable solution to a problem is one that is not a quick fix, but is likely to provide a more permanent or lasting remedy”.

Drawn from the field of environmental conservation, sustainability is about maintaining natural resources (Throsby 2002, 106; Dresner 2002, 3). Sustainability was linked to development in the Brundtland report of the United Nations in 1987 (World Commission on Environment and Development 1987). The central recommendation of this document, titled “Our Common Future”, was the need to find a balance between the competing demands for environmental protection and economic development through sustainable development (Dresner 2002). Sustainable development was defined as development that meets the needs of the present, without compromising the ability of future generations to meet their needs (World Commission on Environment and Development 1987, 43). In other words, sustainable development implies the need to maintain resources in order to achieve social and economic development (Throsby 2002, 106). Critical in achieving sustainable development are the concepts of participation and capacity building, whose significance came to the forefront with Agenda 21, resulting from the United Nations Conference on Environment and Development in Rio in 1992 (UNCED 1992).

Thus, although sustainability and sustainable development have been used interchangeably in the field of heritage conservation and management, they
denote different concepts, where sustainable development is a more encompassing concept that considers resource sustainability. Therefore, in this thesis the terms sustainability will be used to refer to sustainable development, which is what it acknowledges as the ideal framework for managing sites.

The notion of sustainability accords with the principles underlying values-based conservation planning in various ways. The long-term perspective of sustainability accords well with the idea of heritage as inheritance to be stewarded and passed on to the future (Mason 1999, 16). Furthermore, sustainability acknowledges from the outset that it is practically impossible to insist on the protection of all resources, similar to the values-based approach that asks for the consideration of all values but at the same time acknowledges the impossibility to equally protect all of them (see 2.2), including those values seen as intrinsic to the fabric. This facet of sustainability also finds parallels with the redefinition of conservation as the management of change (see 2.7), stemming from the realisation that conservation cannot stop deterioration but can only control it (Teutonico and Matero 2003, Muñoz Viñas 2005). Thus the use of sustainability as a framework for conservation helps prioritise what is important to be protected for the future but at the same time decide how to use these resources for the benefit of the present generation.
In this context, the principle of equity, both between generations and within generations, surfaces as the most important facet of sustainability. In the case of archaeological resources, this implies that the present generation holds these resources in trust for past and future generations, and at the same time is entitled to use and benefit from them. This principle requires moral vision and forces thinking in terms of the ethical management of archaeological resources (see 2.8). It requires a shift from the “conservation ethic” that has a primarily future-looking perspective, to a broader outlook to conservation that explicitly gives equal consideration to the needs of the present and the future. This is critical for the field of heritage conservation and its efforts to become relevant to contemporary society by responding to the broader economic and social spheres (see 2.1.4), attract support and allow participation in the planning process, while allow wise use of resources (Muñoz Viñas 2005; Throsby 2002, Avrami et al. 2000, Clark 2008).

This principle of sustainability is particularly relevant to the management of access. Making decisions about access has to consider not only the impacts of access to the resource, as capital to be passed on to the future, but also the benefits of using the resource for present generations. It requires the need to find a balance between present and future use.

In finding a balance in how resources should be used in the present and in the
future it is necessary to consider how to reconcile minimizing loss with the needs of the present and to ensure that the balance does not reduce our successors’ options for understanding and enjoying their inheritance. A question that arises from the above is the extent of change. How much change should be allowed to the resource, to accommodate the needs of both current and future generations?

### 2.7 Managing change

Accepting that it is not possible to protect all cultural resources if the needs of the present generations as well as those of the future are to be considered, the focus of conservation should be the management of change (Mason 2002, 27; English Heritage 2008, 318; UNESCO 2013d).

This outlook on conservation presupposes an informed understanding of how change occurs. As Matero (2003, viii) comments, “unless we understand how cultural heritage is being lost or affected and what factors are contributing to these processes, we will not be able to manage it, let alone pass it on”. Once change is understood, then limits can be used to control the rate of change.

In tourism and environmental conservation, various approaches have been developed based on the concept of “limits of acceptable change” that have to do with ways of establishing limits and controlling change stemming from visitor
use (Hall and Page 2006, 150). Their theoretical framework is linked to that of sustainability, as it is based on the assumption that change is an inevitable consequence of human use (Eling 2008; Stankey et al. 1984).

2.7.1 The Limits of Acceptable Change (LAC) framework

The LAC framework was developed in the 1970s initially as a response to the concept of carrying capacity, developed in the 1960s and 1970s, which is concerned with the maximum number of people that can be permitted into an area without the risk of degrading the site and their own experience (Stankey et al. 1984, 33). The concept of carrying capacity has been criticised as flawed, as it is based on the assumption that environmental degradation depends on the numbers of visitors, whereas in reality, it is their behaviour and the resilience and resistance of an ecosystem that are the main causes of damage (Pedersen 2002, 56).

The LAC approach emphasises positive planning and management prior to the occurrence of overuse thus avoiding the need for remedial or after-the-fact management solutions (Timothy and Boyd 2003, 163). It is based on the recognition that any recreational use leads to some change and that desired conditions should serve as the baseline for planning (Nilsen and Tayler 1997). Apart from setting limits to impacts, it addresses environmental and social
conditions, including human use causing stress for ecosystems, methods for determining appropriate types, levels, and conditions of use and methods for managing visitor opportunities (Hof and Lime 1997, 30). A critical component of the LAC is monitoring, the frequency of which can be adapted to the speed of change. It also calls for the formulation of future management direction and use indicators and standards (Hof and Lime 1997, 30). If conditions are not acceptable, a set of management strategies and actions are identified for action. The success of LAC is said to lie in the participation of the relevant stakeholders involved in setting indicators and standards and in monitoring. One of its strengths is that it provides a framework for managing conditions and minimizes any regulatory approaches (Hall and Page 2006, 151).

The above outcomes are achieved through a nine-stage process. These consist of the identification of area concerns and issues, the definition and description of opportunity classes, the selection of indicators for conditions and the inventory of resource and social conditions. These are followed by the specification of standards for indicators, the identification of alternative opportunity class allocations, the identification of management actions for each alternative and an evaluation and selection of the preferred option. Finally, the last stage is the implementation of actions and the monitoring of conditions (Hall and Page 2006, 150).
The core idea of the LAC approach has been used as the basis for developing various methods that aim to manage use and its impacts in tourism settings. These include the Recreation Opportunity Spectrum (ROS), the Visitor Impact Management (VIM), the Visitor Experience and Resource Protection (VERP), and the Management Process for Visitor Activities (known as VAMP) (see Hall and McArthur 1998, Timothy and Boyd 2003 for a more detailed description on these methods). The idea of managing use and its impacts at heritage sites has been advocated by international organisations in the cultural heritage conservation field, such as UNESCO for the management of World Heritage Cultural Landscapes (Mitchell et al. 2009). In particular, the LAC framework has been explicitly included in Charters related to tourism and cultural heritage conservation, such as the ICOMOS International Tourism Charter (ICOMOS 1999, Article 2.6).

Paradoxically, despite its advocated usefulness in managing visitor impacts at cultural heritage sites (Hall and McArthur 1998, 130), there have been very few published examples of its application and critique. An exception is the World Heritage Site of Hadrian’s Wall in the UK, where the LAC approach was applied by the Countryside Agency and English Heritage to the most highly visited and traveled stretch of the wall (Mason et al. 2003, 32; Young 1999, 45). This was achieved by setting indicators related to the identified values of the site together with set benchmarks as limits to each. However, its application has been criticized as being too expensive to be pragmatic and ultimately useful as a
widely adopted management method (Mason et al. 2003, 33). Hall and McArthur (1998) pointed out that the difficulty in its implementation may be one of the factors of its limited use, while Timothy and Boyd (2003, 163) argued that the increased responsibility put on managers, with no guarantees that managerial values and decisions will be in line with use preferences, may be a weakness of the process. Nevertheless, the application of the method at archaeological sites without the complexity of stakeholder involvement as this was manifested at Hadrian’s Wall, has the potential to contribute to the successful application of the method.

2.7.2 Specific tools for managing visitor impacts

Apart from the approaches available for controlling carrying capacity, a range of tools and techniques are available for managing visitor impacts on archaeological sites. These deal with regulating access directly or indirectly or both. Direct actions involve the use of hard measures that limit direct access (see 9.3.2), while indirect actions (see 9.3.5) aim at changing visitor behaviour through education, information and persuasion, or through physical alterations of visitor movement (such as redirecting trails). According to Pedersen (2002, 64), “…regulations succeed when they have strong public support, are carefully explained, and when visitors have some say in how they are implemented. Visitors must understand why a behaviour change is desirable.” Indirect measures are considered to be more sustainable as they have the potential to change behaviour
and thus reduce impacts in the long-term (see 9.3.5). In reality, direct measures tend to be more frequently employed at archaeological sites as they have immediate results, as opposed to indirect measures.

Various direct measures have been developed and applied for controlling visitors and their impacts on resources, ranging from rock art to prehistoric and classical archaeological sites (Shackley 2001, Leask and Yeoman 1999, Garrod 2003, Boniface 1995, Prentice 1993, Stanley–Price 2003, Feilden and Jokilehto 1993). These approaches range from hard to soft measures. They may be radical by restricting access altogether, such as the rock art caves of Altamira in Spain and Lascaux in France (Stanley-Price 2003), or of a more moderate nature where access is restricted through the use of barriers or platforms, such as at Ostia in Italy or Paphos in Cyprus, among others. Overshoes are another measure adopted at a number of sites with fragile floors surfaces in order to minimise the effects of shoes (Timothy and Boyd 2003, 168).

Soft measures for limiting and controlling visitors without intervening directly on the sites are increasingly being adopted, such as by controlling visitor flow through advanced booking and by controlling visitor numbers and impacts using established visitor management frameworks, such as the LAC (see 2.7.1). In terms of the former, an example is Stonehenge in the UK, where visits to the site require advanced booking and access to the inner circle is only allowed with
guided tours outside normal visiting hours. Similar measures have been adopted at other archaeological sites, such as the Valley of the Queens in Thebes, Egypt, where visits in each tomb last for 16 minutes only for a limited number of visitors, whose access is controlled by the presence of custodians positioned at the entrance to each tomb (Rivers 2003, Maekawa and Presseur 1993). The National Trust in the UK has carried out research in monitoring the number of people visiting a historic house at one time and the associated vibration in order to improve the control of visitor numbers, and set a sustainable capacity number (Lloyd and Mullany 1994, 133). Similarly, at the Mogao Grottoes in China, a more recent study by the Getty Conservation Institute on the impact of visitors on the caves aimed at determining the sustainable carrying capacity of the site for the peak period of visitation based on scientific measurements of the impact of visitors on the micro-environment of the caves (Demas et al. 2010).

Pricing is another measure that has been adopted at various sites with success in reducing visitor numbers, although there are sites that demonstrate that this is not always the case. It has been suggested that higher admission charges may be used as a tool for limiting numbers during busy periods, and lowering them during slow times can achieve a more balanced flow of visitors (Timothy and Boyd 2003, 168). However, the benefits stemming from visiting important sites

1 http://www.english-heritage.org.uk/daysout/properties/stonehenge/
are more valuable to visitors than a high entrance fee (Timothy and Boyd 2003, 170).

Indirect actions aimed at changing visitor behaviour can be achieved through the development of interpretation, education and communication strategies, as discussed in the following sections (see 2.7.3 and 2.7.4).

**2.7.3 Interpretation as a conservation tool**

Interpretation can be an effective tool for managing visitors and their impacts as an indirect action (see 1.1 and 2.7.2). It can have sustainable benefits as it has the potential to change behaviour, engage visitors and encourage support for the protection of heritage in the long-term (see 9.3.5 and 10.4.2). The function of interpretation as a conservation tool has been acknowledged in various cultural heritage charters, such as the Burra Charter (Australia ICOMOS 1999 and 2013) the Ename Charter (ICOMOS 2008) and the International Cultural Tourism Charter (ICOMOS 1999). The latter refers to interpretation as a necessary component of sustainable tourism development by communicating significance and by facilitating public awareness and support for the long-term survival of cultural and natural heritage (ICOMOS 1999, Articles 1.2-1.4).
Its function as a conservation tool can be achieved by integrating physical conservation needs in interpretative planning. For example, as the process that facilitates physical and intellectual access, interpretation can be developed in a way that relieves visitor pressure from areas that are particularly vulnerable, while it can promote less visited areas, and thus relieve pressure from those that are over-visited (Uzzell 1989, Moscardo 1996).

Technology and virtual reality can also be used as interpretive techniques in the control of visitor impacts, by re-creating the spaces that are vulnerable to access (Buhalis et al. 2008). As an extreme alternative, interpretation can provide another form of experience through the use of replicas. Such is the replica of the Lascaux caves in France, Lascaux II, which was created in the 1980s in response to increasing demands by the public for accessing the original cave that had been closed since the 1960s as a result of over-visitiation2. Since then, Lascaux II receives more than 280,000 visitors a year.

2.7.4 Interpretation, education and communication

As interpretation is an education-based activity, it has the potential to communicate conservation messages to visitors, including the vulnerability of archaeological resources and the importance of conservation. It can educate them

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about the need to behave respectfully and help them develop a sense of ownership and responsibility about the need to preserve the resource (see 9.3.5 and 10.4.2). This in the long-term may lead to broader public support for conservation and management. In this way, interpretation can become a tool for sustainable development by offering an enjoyable and stimulating visit in the present, while considering its long-term returns for the resource in the future through the change of behaviour and the creation of support for heritage. The role of interpretation towards sustainability has been advocated by ICOMOS, in the ENAME Charter for the Interpretation and Presentation of Cultural Heritage Places (ICOMOS 2008, principle 5).

Interpretation can further contribute to the control of visitor impacts by assisting site management goals through the explanation of management decisions to visitors. For example, giving the reasons for restricted access can be much more effective in changing visitors’ behaviour, rather than setting up a barrier without explaining anything. As Aplin (2002, 38) rightly argues, prohibitions without explanations are rarely received favourably (see 8.6.3).

If this function of interpretation in achieving sustainable benefits for conservation is acknowledged and integrated into the aims of site management, then it can be used to train and develop skills (capacity building) in a wide range of conservation and management practices (see 9.3.5). For example, guides can
be trained to integrate conservation issues into their guided tours at archaeological sites (van der Linde and Williams 2006, 119). Similarly, conservators working on site can be trained to present and communicate their work to the visiting public.

2.7.5 Maintenance as a tool for controlling change from use

Maintenance is significant in physical conservation for managing change. It is defined in the Burra Charter as the “continuous care of the fabric and setting of a place” (Australia ICOMOS 2013, Art. 1.5) and it is vital for retaining the cultural significance of material heritage (Australia ICOMOS 2013, Art. 16).

Maintenance is a continuous process where specific tasks should be defined and included in a scheduled routine based on regular inspections and monitoring. This should encompass long-term (5 years), medium-term (annual, seasonal) and short-term (monthly, weekly or even daily) tasks and also allow for emergency repairs, for example after heavy rain, high wind or natural disasters (Feilden and Jokilehto 1993, 42).

In the context of managing change stemming from visitor access, maintenance can contribute to keeping the fabric of archaeological sites in a stable condition and preventing or retarding any decay from happening. For example, in the case
of mosaic floors, maintenance can ensure that surface losses in the *tessellatum* are repaired and prevent further losses from occurring in the areas where foot traffic occurs (see 7.10.2 and 7.10.5).

### 2.8 Archaeological Heritage Management ethics and access

The responsibility of archaeological site management to society at large is primarily linked to questions such as *what* and *for whom* site management should be carried out, and to whom it is accountable. The ethic of archaeological conservation centers on the concept of stewardship. The concept of preservation of archaeological sites defined as non-renewable cultural resources to be preserved for future generations has been central to the developments of AHM, as one of its founding principles (see 2.1.3). The conservation ethic states that if at all possible, extant archaeological sites should be left intact and held in stewardship for potential future study (Fowler *et al.* 2008, 412). This ethic however does not respond to the use value ethic, which implies allowing and using resources in the present.

These ideas are central to the conflict of access *versus* preservation. In the values-based context of decision-making, this dilemma centers on the relative importance of use value versus the “continued existence value” of archaeological resources (Lipe 1996). Absolute adherence to the use value ethic would imply the
consumption of sites in the present, without considering the needs of future generations. Choosing the continued existence value instead, means that site management should focus on preserving archaeological resources intact for the sake of future generations, thus ignoring its social role in the present. Although this is a central concern to the field of site management, there is no simple answer, rather: “heritage managers…must keep the complex balance between the two values in the forefront of hundreds of management decisions about archaeological sites” (Fowler et al. 2008, 413).

Relevant to the intergenerational issue of ethics concerning access to archaeological resources is the question of intragenerational equity. Access should be provided for all segments of society and all types of visitors (Timothy and Boyd 2003, 179). However, certain visitor management measures, such as limiting access to some visitor types and not others, namely large tourist groups, can be challenged as to the extent to which they respond to this ethical concern.

2.9 Experiencing archaeological sites

2.9.1 Experience and sense of place

Archaeological sites are places, distinct locales in the landscape, created by past human actions (Matero 2006, Joyce 2006). As places, they are a composite of material remains, in which people used to dwell and act, and of past human
experiences (Tilley 1996). As such, they have to be experienced to be understood. Direct experience is essential for getting a sense of place, which serves, as Kevin Lynch (1960, 6) argues as the basis for the recognition of places as separate entities. Relph (2009, 27) defines sense of place as the synesthetic faculty that combines sight, hearing, smell, movement, touch, imagination, purpose and anticipation.

Beyond the definition of sense of place as the distinctiveness or unique character of places, there is another definition that refers to the emotive bonds or attachments people develop or experience in places (Foote and Azaryahu 2009, 96). It can be said that the latter is inextricably linked to the former: getting to the essence of places leads to an emotive bond with a place. In both cases, place experience becomes a central element.

Experience requires the use of the senses filtered through emotion and thought (Tuan 1977, Shamai 1991, 348). Lynch (1960, 8) in his seminal work Managing the Sense of a Region, described experience as: “what one can see, how it feels underfoot, the smell of the air, the sounds of bells and motorcycles, how patterns of these sensations make up the quality of places, and how that quality affects our immediate well-being, our actions, our feelings and our understandings”. Experience further requires insideness, the physical presence inside the place. According to Norberg-Schulz (1980, 25) “to be inside is the primary intention
behind the place concept”. The more inside you are the stronger is the identity with the place (Relph 1976, 49).

Integral to place identity is the spirit of place. Spirit of place consists of the inherent, intangible qualities of a place, whether built or natural, its distinctive identity (Relph 2007). The spirit of place has been acknowledged in the recent discourse of heritage conservation as significant, founded on the belief that heritage places transcend the realm of the ordinary (Turgeon 2009, xxxiv). Alois Riegl (1903 [1996, 47]) defined such admiration for the inherent value of the ancientness of historical monuments as a “modern cult”.

Experiencing archaeological sites involves the capture of their spirit as places and their identity that derives through the material remains of the past. Visitors understand their significance based on their own personal way they experience them. The level of interaction they have with the material remains of the past, determines the emotional potency of the experience, and the emotive attachments they create with them.

Various scholars have argued that grasping the identity of places can be achieved at different scales, depending on the ways people relate to them (Shamai 1991; Hummon 1992, cited in Najari and Shariff 2011; Relph 1976). Of particular interest to this research is Relph’s (1976) distinction between insideness and outsideness. These refer to the degree of attachment and concern a person or
group has for a particular place (Seamon and Sowers 2008). This dualism, according to Relph (1976), is fundamental in our experiences of space and one that provides the essence of place. He identifies seven levels of insideness based on various levels of experiential involvement and meaning. These levels are not always discrete and easily identifiable. For example, depending on our intentions, if our focus is our home, then everything beyond home is outside. As our intentions vary, so the boundary between inside and outside moves (Relph 1976, 50).

By drawing upon the work of social anthropologists in describing the levels of assimilation into the cultures they study, Relph (1976, 50) identifies the following levels of intensity for experiencing insideness and outsideness: behavioural, empathetic and existential. Behavioural insideness involves the physical presence in a place, while empathetic insideness involves the emotional participation in and involvement with a place. Existential insideness is the complete and unselfconscious commitment to a place. He further refers to other forms of experiencing insideness, such as vicarious insideness, which is the less direct experience through the media, or incidental insideness, where places are merely backgrounds for other activities (Relph 1976, 50).

Relevant to this thesis and the ways of experiencing archaeological sites are behavioural insideness and empathetic insideness. They both refer to the ways
an outsider attempts to experience a place from the inside. The former is about being in a place and seeing it as a set of objects, views and activities having certain qualities (Relph 1976, 53). The experience is defined by the structures and contents of the inside and other physically defined boundaries, which signify that we are in that particular place and not somewhere else. According to Relph (1976, 53), behavioural insideness is achieved primarily through the visual sense. On the other hand, empathetic insideness is achieved through some deliberate effort of perception. It requires openness to understand the "significances of a place, to feel it, to know and to respect its symbols- much as a person might experience a holy place as sacred without necessarily believing in that particular religion" (Relph 1976, 54). It requires the ability to identify the essential elements of its identity, which is achieved by people who are not constricted by rigid patterns of thought.

The concepts of behavioural and empathetic insideness can find parallels in the way archaeological sites are experienced as places, and in particular in how experience is managed. The processes of conservation and interpretation are those that shape the visitor experience at archaeological sites, both from a physical and cognitive perspective. They define where and how visitors should go, what to see, and what to be informed about. In other words, interpretation and conservation determine the level of insideness one can have at an archaeological site. In this context, it is often the visual sense that dominates the
experience, as other senses, such as touch (and direct contact), are limited by the conservation and management processes at the site. Thus, it can be argued that the type of insideness usually allowed at archaeological sites is behavioural insideness. Conversely, empathetic insideness depends on the visitors and how eager or willing they are to be inside an archaeological site, in a literal and metaphorical sense. However, site management processes, and especially interpretation, could assist visitors in gaining this level of insideness, by encouraging a more interactive, affective, and engaging experience. Direct experience through physical access, as a form of interpretation, is critical in this respect. It can facilitate active participation of visitors in the process of meaning-making and understanding of the character of places, which is one of the aims of interpretation, according to Tilden (1977) (see 2.5).

According to Relph, as empathetic and behavioural insideness can help an outsider to experience a place from the perspective of the inside, they also have the potential to lead to an authentic sense of place, which is “a direct and genuine experience of the entire complex of the identity of places—not mediated and distorted through a series of quite arbitrary social and intellectual fashions about how that experience should be, nor following stereotyped conventions” (Relph 1976, 64). In the case of experiencing archaeological sites, achieving an authentic sense of place requires physical insideness and the provision of cognitive access that facilitates an experience as close to that of their original inhabitants but
without limiting visitors’ own freedom to make their own conclusions about the significance of the place.

2.9.2 Experience and affect

If sense of place is about the affective relationship between people and places through experience, then experiencing archaeological sites implies an emotional response. As Shanks (1992, 106) points out, the experience of the archaeological past is primarily about “...encounter and images ... These are not primarily cognitive experiences where facts and knowledge about the past are acquired from the official learned guidebook. They are affective.” This affective effect of ruins on visitors can be traced back to the romantic notion of ruins of the eighteenth century (Lekakis 2009). Being on the same spot from the past and having some sort of overlap of experience, is enough to trigger an emotive response, although the more that can be experienced now as was actually experienced in the past, the stronger the impact is likely to be, and ultimately, the more memorable the experience (Bell 2007, 268).

Furthermore, as experience is shaped by the senses, emotion and thought, then as Tuan (1977, 10) points out, experiential knowledge does not stem solely from thought but also from feeling. This is clearly illustrated by Heidegger when he visits the Acropolis: "None of the archaeological description and historical exegesis could counter the silent emersion of this approach, coming from far
away. All our carried knowledge and thought sat in emptiness as subsequently added” (Heidegger 2005, 41). Thus, a sense of place necessitates primarily the physical encounter that engenders feelings and then the provision of cognitive information. Consequently, it can be argued that to achieve the above, visitors should be encouraged to consider themselves part of the setting, feel rather than see, and experience rather than observe (Lekakis 2009, 297).

Affect has also been acknowledged as significant in effective interpretation. Tilden referred to the importance of instigating emotions through interpretation as early as the late 1950s (Tilden 1977), while Uzzell (1998, 13) points out that emotion plays an important part in colouring our attitudes and actions and it should not be suppressed, but encouraged through interpretation.

Furthermore, direct experience of places or heritage settings has been acknowledged as critical in engendering affective responses, as part of an interpretive approach (Uzzell and Ballantyne 1998). However, the extent to which affect can be initiated from experiencing a place is not ubiquitous for all people, but depends on the personal engagement with the place as shaped by memories, beliefs, interests and values.

2.9.3 Experience and mindfulness

If experience can instigate mindfulness then visitors are more likely to enjoy their visit, have greater appreciation and understanding for a place. Mindfulness is a
concept put forth in the field of heritage interpretation by Moscardo (1996), based on the psychological work of Langer (1989). When people are mindful, they pay more attention to the world around them, are more receptive and thus more prone to learning (Langer 1989). In the context of heritage, mindful visitors are more sensitive to context, more satisfied with their visit and in turn learn more about the place. Interpretation can contribute to achieving mindfulness by providing novel experiences with an element of surprise, involve the use of the senses and encourage visitors to ask questions about the exhibits. Such form of interpretation facilitates the learning process that occurs in heritage settings and ultimately leads to a better understanding and support for protecting the heritage resource. As Moscardo (1996, 393) comments it can be an effective way for assisting visitors to change their behaviour in ways that minimise impacts on the site and lead to sustainable outcomes for the conservation of the site (see 2.7.4).

Physical access and direct experience can contribute to mindfulness, particularly if the level of access allowed facilitates a level of engagement and interaction between the visitors and the resource. The benefits stemming out of physical contact with heritage objects has been the subject of discussion in the field of museum collections (Saunders et al. 2008, Chatterjee 2008, Pye 2007). Museums and heritage institutions have been challenged to reconsider basic assumptions of access, where the experience of the objects becomes essential as a form of engagement with material culture (Peters and Romanek 2008, 1). Purposeful contact with objects nurtures and enhances learning, especially through the
instigation of feelings (Narkiss and Tomlin 2008, 166). Experience in museums where object handling has been used in learning environments demonstrates the benefits of touch as a learning aid. Such is the case of the Reading Museum in the UK that has been lending objects to local schools for almost a century, and in an evaluation of the effectiveness of this form of learning, it has been demonstrated that seeing and handling objects is an effective aid to learning and to retaining information associated with the objects (Pye 2008, 22).

2.9.4 Experience and authenticity
Relevant to the issue of experiencing sites and objects is the issue of authenticity. The authenticity debate has been central to the way people experience archaeological remains in terms of the extent to which objects and experiences are authentic or not. The concept of authenticity is associated with notions of the original and the genuine (Pye 2001, 58), in relation to the material and its faithfulness to original form and substance (Lowenthal 1994, 40).

An authentic site is one that is true to its origins in terms of its date, its material, its form, construction and its primary context and use (Jones 2009, 134). The concept of integrity is another critical term in the realm of conservation, and it is defined as an expression of authenticity, as it conveys the true nature of the site or object defined in relation to its origins, fabric and the intentions of its makers (Clavir 2002, xxi).
Structure, material fabric and composition have been central in the way the traditional, materialist notion of archaeological authenticity has been approached (Jokilehto 1995, Pye 2001), also reflected in the Venice Charter (ICOMOS 1964, Stovel 1995). This perspective was challenged with the acknowledgement of the multiplicity of values in conservation (see 2.1.3). The Nara document on Authenticity (ICOMOS 1994) is regarded as a turning point in the definition of authenticity, where it was defined according to the context and evolution of cultural heritage, by the form and design, materials and substance, use and function, traditions and techniques, location and setting and spirit and feeling (ICOMOS 1994, Art. 13). Despite this evolution in the definition and use of the term in the field of heritage conservation, archaeological authenticity tends to be seen as an objective and measurable attribute inherent in the material fabric, form and function of artefacts and monuments, as reflected by the positivist set of research methods and criteria that are used to test their genuineness (Jones 2010, 182).

This discourse on archaeological authenticity has been challenged in academia, especially in terms of its materialist aspect (Holtorf and Schadla-Hall 1999, Jones 2009, Smith 2006, Gustaffson and Karlsson 2008). This critique is based mainly on traditional conservation approaches that see authenticity as intrinsic in the fabric and as such prioritise the conservation of materiality. A more recent argument put forward by Holtorf (2013) is that materiality does not necessarily need to be equated with the age of the material to be authentic, but it can be
attributed with age-value, not age, and exhibit some sort of pastness. However, I would argue that age is important in determining authenticity, at least in the Western context, particularly when it comes to archaeological remains. The age of an object creates a link with the past in the present and a relationship between past and current generations. According to Ruskin (1849, 234), it is the Age of a building that gives its glory, “[...] which we feel in walls that have long been washed by the passing waves of humanity”. As Jones (2010) rightly discusses authenticity is not independent of, but firmly connected to the materiality of the object concerned, and this quality makes people’s relationships in the present with objects from the past powerful and meaningful. Bell (2007, 268) points out, sites and objects give the only physical nearness possible to people of a former age. As such, the materiality of sites is important in establishing a link between the past and the present. I would argue that materiality gives them a sense of continuity, as evidenced by the analysis of the findings from the visitor interviews on their experience at Herculaneum, presented in Chapter Six. Furthermore, the experience of materiality, of the authentic, contributes to engendering affective responses. Sian Jones (2009, 138) demonstrated through her research on the effects of touch on the Hilton of Cadboll cross-slab in Scotland that people “expressed a strong desire for physical contact as if this would achieve some magical communion with the past”.

Authenticity has also been examined from the perspective of the tourist experience, where two strands of thought have been put forward: objective and
constructivist authenticity. Objective authenticity stresses the originality of the toured object, where authentic experiences are equated to experiences with objects found to be genuine (Uriely 2005, Wang 1999). On the contrary, the constructivist approach sees authenticity as the outcome of the construction of objects as authentic by tourists or service providers in terms of points of view, perspectives, or powers (Cohen 1988). The experience is authentic as long as the people who experience it define it as such. In this sense, when visiting archaeological sites, the extent to which the site itself in terms of the fabric is authentic becomes of secondary importance, as long as visitors perceive their experience to be authentic. Duke (2007, 60) argues that perhaps there is no clear distinction between authentic and inauthentic experience when it comes to visiting an archaeological site. However, if experience, according to Tuan (1977, 8) is defined by the senses, for example, as what one sees, touches, tastes and smells, then all experience is real and genuine, irrespectively of whether the place, object or monument is authentic or not. As experience is lived it is always authentic.

Bringing these two perspectives of authenticity together, it can be argued that in experiencing archaeological sites, it is their authenticity residing in their materiality, as discussed above, and how people perceive and relate to it in a particular context that makes the experience more meaningful in the present, by creating a link with the past. As it will be shown in Chapter Six, visitors at
Herculaneum perceive their experience at the site to be authentic based on the realization that they walk on original, genuine Roman floors.

2.10 Conclusion

In this chapter I have traced the development of conservation and management theory and how it relates to the management of access at archaeological sites. This included the discussion of the notion of values and how they frame current theory in conservation and management of archaeological sites, and other concepts relevant to the field of site management such as sustainability and the notion of conservation as the management of change. Then it proceeded to the discussion of ideas linked to the way people experience places, and particularly ideas linked to the concept of sense of place, affect and mindfulness as aspects of effective interpretive experiences.

The next chapter presents the design of the research project, focused on the methodological approach and the methods used for the data collection and analysis.
3 Research methodology, methods of data collection and analysis

This chapter outlines and justifies the design chosen for the research and the methods used for the collection and analysis of data. These were selected as defined by the aims of the thesis (see 1.2), which were then translated into specific questions for the case study (see 3.3). The chapter provides an overview of the methods used, while more details in their application are given in the chapters where the relevant data are presented. For example, the rationale of the mosaic survey used in the visitor impact assessment is presented in this chapter (see 3.5.2), while details of the method and its application at Herculaneum are given in Chapter Seven (see 7.6).

3.1 Scope of the thesis

The subject of this thesis is the exploration of the role of direct access to the experience of archaeological sites, if it can be sustainable and if so, how this can be achieved. The research focuses at the site of Herculaneum for exploring these issues, and specifically on the mosaics as the main medium through which to explore the role of access in the instigation of impacts. It is necessary to acknowledge that the research is focused on the period of the data collection from 2009 to 2011. This is important with regards to the HCP and the SANP, as any
developments that may have taken place in the post-2011 period have not been explicitly considered and used as data in the research. The only exception is the mosaics conservation project of the HCP, which was completed in 2013 (see 5.7.4).

3.2 Research design

The design of the research was based on the case study approach. The case study design consists of an intensive study of a single unit for the purpose of understanding a larger class of similar units, by generating through a thick description of the phenomenon under investigation a holistic insight and understanding (Gerring 2004, 342; Berg 2007, 283). The case study design was also chosen as it responded to the exploratory and inductive nature of the research project (Yin 2003; Baxter and Jack 2008).

In order to respond to the research aims, a case was needed that could provide a deep understanding of the actual complexities involved in the management of access in the context of site management. At the same time, the case had to provide the appropriate context for exploring the role of access to the experience of visitors and its effects to the archaeological fabric.
Along with the reasons discussed in Chapter One (see 1.3) Herculaneum was selected as the main case as it responded to these requirements. Herculaneum is a unique case in terms of the experience it offers to the visitors, and in terms of the level of interactions they have with the physical fabric, as access to the mosaics is necessary for viewing the interiors of the buildings in the ancient town. As such, the site offers a unique case for exploring if and, if so, how experience through direct access can be integrated into a sustainable site management process that takes into consideration the impacts of access to the archaeological fabric.

Furthermore, cases should be selected on the basis of their potential for allowing access to data and thus maximize the opportunity to learn (Stake 2000, 446). This was another reason for choosing Herculaneum, as already explained in Chapter One, where the internship with the Herculaneum Conservation Project, facilitated and ensured access to data, that would have been perhaps more difficult to obtain otherwise, particularly as a non-Italian researcher, from the Italian local heritage authority.

### 3.3 Case study research questions

The research aims (see 1.2) were translated into specific questions for the case study, to facilitate the choice of methods for the collection of data. These are:
1. Does direct access contribute to the overall site experience of visitors at the site of Herculaneum? If so, in what ways?

2. How does direct access contribute to the instigation of visitor impacts on the mosaics and what factors contribute to these impacts?

3. How is access managed at the site?

4. Is the management of access to the mosaics at Herculaneum sustainable? If not, how can it become so?

3.4 Selection of research methods

Due to the nature of the research questions, it was necessary to combine qualitative and quantitative methods for the collection and analysis of data (see Appendix 1). Despite the epistemological differences between qualitative and quantitative research, research methods are autonomous and not necessarily grounded always in incompatible epistemological principles (Bryman 2004). It is possible to fuse methods usually associated with each strategy. Combining different methods increases the depth of understanding an investigation can yield. For example, both qualitative and quantitative methods were used for collecting and analyzing the data needed for research question regarding the role of direct experience to the mosaics in the visitors’ overall experience at Herculaneum (Chapter Six): a questionnaire was used to get a preliminary understanding of the issue under investigation, which was followed by interviews, to get an in-depth understanding and at the same time increase the validity of the data received through the survey.
The use of multiple lines of sight and data is a key characteristic of case study research (Gillham 2000, 2). The combination of multiple data collection methods and multiple analysis techniques is known as triangulation. It allows a better and more reliable overview of the case under investigation, as findings can be cross-checked, and improve the construct validity of the case (Yin 2009, 40; Baxter and Jack 2008, 554).

The choice of certain methods was ultimately determined by the population to be sampled. For example, although my initial aim was to carry out semi-structured interviews with site custodians, this proved impossible due to their unwillingness to engage in a formal conversation with me. Thus, ethnography and specifically informal conversations, was more appropriate for this population (see 3.5.6). Finally, the method selection for the data collection considered the realm of practicality of the project, in terms of time and resources available.

3.5 Methods of data collection

Due to the interdisciplinary nature of the research, various methods were used for the collection and analysis of data, drawn from the fields of archaeological site conservation, urban planning, museum studies and ethnography. The rationale of their selection is explained in this section with a description of the sampling strategy employed for each, where applicable.
3.5.1 Observations

Observations were used for recording visitor movement and behaviour throughout the site. Two types of observations were employed in the collection of data: structured and unstructured, as explained below.

Structured observations

Also known also as people-following technique or tracking, structured observations were used for recording visitor movement throughout the site. This is an unobtrusive observation technique, which provides an accurate representation of the actual movements of visitors as they experience the site. It is a method widely used in the field of the built environment, and particularly in urban planning, as part of the Space Syntax framework for analysing and describing spatial layouts (Hillier and Tzortzi 2006; Hillier and Hanson 1984; Vaughan and Stutz 2001, 32; Tzortzi 2007). This method has also been used in the field of museum research, particularly in evaluating the effectiveness of exhibitions (Bitgood et al. 1988; Diamond 1999; Korn 1994; Yalowitz and Bronnenkant 2009).

Recently, visitor tracking has been applied at archaeological sites as a method for investigating movement and behaviour to inform interpretive planning, using
Geographic Positioning System technologies and applications of Geographic Information Systems (GIS) (Chrysanthi et al. 2012; Russo et al. 2010). The method is concerned with understanding both volume and flow of individuals through urban and interior spaces by providing an objective account of their behaviour. However, the benefits of using advanced technologies are limited in the absence of financial resources. This was the case in this research, where the recording of visitor movement was carried out manually. GIS technology was only used for the processing and analysis of the recorded data, off site. The use of GIS formed the platform for correlating observations with the recorded mosaic damage (see 3.7.1).

The recording of visitor movement aimed at collecting information on the public use of the site and on visitor numbers into and within buildings with mosaics. A two-tiered approach was used: Macro-scale, where movement was recorded at the site level, and, micro–scale, where movement was recorded inside the buildings. The assessment of visitor numbers and frequency of access in selected buildings with mosaics was further supplemented by the data provided from the visitor counters installed in various buildings with mosaics as part of the HCP activities.

The recording of structured observations was based on the classification of visitors into three categories in terms of numbers and type: independent
(individuals, couples, small groups/families), school groups and guided adult groups. The recorded observations cover only weekdays and are representative of only the late spring and summer months. As most visitors come to Herculaneum in spring and summer, it was an essential priority to get a grasp of visiting patterns onsite primarily in that period. Practical limitations were another factor, as fieldwork could only be carried out in that period. During observations a sign was posted at the ticket office of the site informing visitors that observations were taking place for research purposes, so as to comply with the ethical guidelines in research (see 3.6).

The method of data collection for each type of structured observations adopted for this research is described in more detail in Chapter Seven (see 7.6.2).

- Macro-scale

Macro-scale observations were used to record visitor movement at the site level, for understanding the public use of the site, as well as visitor access frequency and numbers into the buildings with mosaics open to the public. The data were collected in three fieldwork seasons, from 2009 to 2011 (Figure 3-1).
The target sample size for this type of data was set to 120 routes, divided into 40 routes per each identified visitor type: independent visitors, organized groups and schools (Figure 3-2).

Following the completion of observations in 2009 and evaluating the time needed for the recording of each route, being on average about 90 minutes each (Figure 8-12), it was decided to accelerate the collection of data in 2010 with the support of eight local high school students specializing in tourist studies. They offered to volunteer on the research project through the International Study Centre for

![Figure 3-1 Recorded macro-scale observations for the years 2009 to 2011](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>Data collection period</th>
<th>Data collection hours</th>
<th>No. Routes collected</th>
<th>Data collected by</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>25 May-10 June</td>
<td>10-12,13-17</td>
<td>44</td>
<td>Researcher</td>
</tr>
<tr>
<td>2010</td>
<td>24 June-15 July</td>
<td>9.30-13</td>
<td>48</td>
<td>Tilgher students</td>
</tr>
<tr>
<td>2011</td>
<td>10 May-29 May</td>
<td>10-12,13-17</td>
<td>38</td>
<td>Researcher</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visitor Type</th>
<th>Number of routes recorded per year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2009</td>
</tr>
<tr>
<td>Independent Visitors</td>
<td>18</td>
</tr>
<tr>
<td>Guided groups</td>
<td>14</td>
</tr>
<tr>
<td>School groups</td>
<td>12</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>44</strong></td>
</tr>
</tbody>
</table>

![Figure 3-2 Sample of macro-scale observations for each visitor type for the years 2009 to 2011](image)
Herculaneum. This was an opportunity for them to gain experience in the field, which was acknowledged with a certificate at the end.

The students were first introduced to the project and to the site by the researcher, followed by an introduction to the method they had to employ for the data collection. As they could only assist in the morning hours, data collected in 2010 covers visitor movement in the period from 9.30 – 13.00 hours (Figure 3-1). Their participation in the collection of data in 2010 allowed the recording of more than one route simultaneously, and thus the documentation of more accurate observations of visiting patterns (Vaughan and Stutz 2001). However, as not all students participated on the agreed observation days this limited the number of routes expected to be recorded in that fieldwork season, which necessitated the collection of more routes in 2011 for the completion of the target sample. The details of the application of the method are explained in detail in Chapter Seven (see 7.6.2).

- **Micro-scale**

The tracking method described in section 3.5.1 was adjusted for recording visitor routes inside selected buildings with mosaic floors. This method substituted the unstructured observations used in 2009 (see 3.5.1), consisting mainly of note taking and photography.
Micro-scale observations were carried out to identify movement patterns per visitor type and how they correlate with the mosaics included in the research, and also to record any patterns of visitor behaviour that may impact on the floors.

The observations were carried out in those buildings with a spatial configuration that allows more than one circulation route, and thus do not always necessitate access to all the floors. These are: the House of the Alcove, the House of the Beautiful Courtyard, the House of the Black Saloon, the House of the Skeleton and the House of the Wooden Partition (Figure 3-3).

There was no target sample for this type of observations. The sample was determined by the time available for the collection of data during the fieldwork seasons in 2010 and 2011. Observations in the House of the Black Saloon were carried out only in 2010, as the data collected seemed sufficient for understanding visitor movement. In 2011 the House of the Wooden Partition was chosen as an alternative (Figure 3-3).
The details of the application of the method are explained in detail in Chapter Seven (see 7.6.1). A table listing the observation periods in each house and the number of groups recorded is presented in Appendix 2.3.

<table>
<thead>
<tr>
<th>Building</th>
<th>2010 Total hours</th>
<th>2011 Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>House of the Alcove</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>House of the Beautiful Courtyard</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>House of the Black Saloon</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>House of the Skeleton</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>House of the Wooden Partition</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 3-3 Recorded micro-scale observations in 2010 and 2011

**Systematic unstructured observations**

Obtaining information on visitor behaviour and movement inside the selected buildings with mosaics was initially carried out using systematic unstructured observations in 2009. However, as the project evolved, it became clear that it was necessary to spatially record visitor movement. Thus micro-scale systematic structured observations replaced systematic unstructured observations (see 3.5.1). Nevertheless, the data collected was still used as it provided further insights into visitor behaviour and movement.
This method involved the observation and recording of visitor behaviour inside the buildings using note-taking and photography. This was carried out for a fixed time slot of 20 minutes in each building in rotation. Four buildings were chosen, based on their popularity and their spatial configuration, as well as the number of mosaics open to access. These are the House of Alcove, the House of the Beautiful Courtyard, the House of the Black Saloon and the House Skeleton. The observations were carried out from the 28th May to the 4th of June in 2009, mainly in the early afternoon hours, when visitor numbers were still high on site.

Visitor counters

Additional data on visitor flow in the buildings with mosaic floors was obtained from the counters installed by the HCP at the entrances to five buildings with mosaic floors with only one access point. These were: the House of the Beautiful Courtyard (CBC), the House of the Stags (CER), the men’s (TCM) and women’s section (TCF) of the Central Baths and the House of the Skeleton (SCH). This covered the period from August 2010 to July 2011.

Due to the malfunctioning of the counters, the data obtained was limited and failed to provide an overview of an extended period of time and thus have a better perspective on actual visitor access frequency to the buildings with mosaics, but also to the broader site. However, monthly estimates were
calculated for the months for which data was available (Figure 3-4). The data collected and analysed for each building is presented in chart form in Appendix 2.4.

<table>
<thead>
<tr>
<th>Building name</th>
<th>Period for which data was available</th>
<th>Total numbers per period recorded</th>
<th>Average numbers per hour per period recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCH</td>
<td>1-30 November 2010</td>
<td>5,209</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>11-21 August 2010</td>
<td>23,199</td>
<td>63</td>
</tr>
<tr>
<td>CER</td>
<td>4-25 August 2010</td>
<td>27,638</td>
<td>189</td>
</tr>
<tr>
<td>CBC</td>
<td>9-19 July 2010</td>
<td>4,514</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>10-20 September 2010</td>
<td>5,643</td>
<td>43</td>
</tr>
<tr>
<td>TCM</td>
<td>19-25 October 2010</td>
<td>23,233</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>1-10 January 2011</td>
<td>6,498</td>
<td>22</td>
</tr>
<tr>
<td>TCF</td>
<td>1-10 November 2010</td>
<td>5,184</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>4-5 May 2011</td>
<td>28,695</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>10-19 June 2011</td>
<td>7,751</td>
<td>78</td>
</tr>
</tbody>
</table>

Figure 3-4 Recorded visitor numbers from the counters installed in the selected buildings for selected periods in 2010 and 2011

3.5.2 Mosaic survey

A major component of the visitor impact assessment to the mosaics was the mosaic survey. The method of recording was that of a broad-brush survey or preliminary documentation, using a systematic quantification of mosaic
phenomena with numeric rating scores (Zehnder 2000, 8). The use of this
recording method in conservation has been frequently adopted for museum
collections (Keene 1996, Fry et al. 2007) and in the field of risk assessments
(Ashley-Smith 1999, Darvil and Fulton 1998, Accardo et al. 2003). In contrast, very
few examples have been published using this approach for archaeological sites.
An example is the site of Chersonesos in Ukraine, where a general site-wide
survey has been adopted to assess the condition of the entire site according to a
set of given criteria and the use of rating scores (Cleere et al. 2006). The results of
the general survey provided the basis for selecting areas for more detailed
recording and conservation. The data of the survey were inserted in the GIS of
the site, to allow better overview and management of condition. A similar
approach was also used by the HCP, where a site-wide survey (also on mosaics)
was carried out at the beginning of the project in 2004–2005 (see 5.7.4). The survey
was carried out for identifying areas in need of emergency interventions and
areas suitable for detailed condition recording and further research into
conservation treatments and causes of deterioration (Pesaresi and Martelli
Castaldi 2007). It consisted of a broad assessment of condition using a three-scale
rating in terms of need of emergency interventions, danger to the public and by
the public (see 5.7.4).

In the field of mosaic conservation, the importance of broad surveys as a
preliminary understanding of the state of conservation and as a management tool
has been acknowledged since 1996 (Corfield 2003, 131). Nevertheless, few cases have so far been published that illustrate the method of documentation and its usefulness in the management of large numbers of mosaics at archaeological sites. An exception is the method adopted for the site of Volubilis in Morocco, where the results of a condition survey of the mosaics were inserted in the GIS of the site (Limane and Palumbo 2008). This allowed a site-level view of mosaic condition and thus provided a tool for a more effective management of conservation. Another example is the collaborative project of the Getty Conservation Institute (GCI) with the Israel Antiquities Authority (IAA) and English Heritage (EH), on the assessment of the protective function of shelters over mosaic floors (Neguer and Alef 2008; Stewart 2008; Stewart et al. 2006). This project included the recording of selected mosaic conditions linked to deterioration caused by the presence of shelters, using a numeric grading (from one to four) for assessing each condition in terms of extent and severity (Stewart et al. 2006).

In the case of this research, the recording of damage using a quantitative approach rather than carrying out a detailed recording was seen as appropriate for getting a basic grasp of distribution and extent of damage on the mosaics at a site of the scale of Herculaneum. This was decided on two factors: the aim of the survey, which was to establish an association between mosaic damage and visitor movement, rather than a basis for understanding deterioration (see 7.6.1), and
the time available for the data collection. The development of the methodology for the survey was also guided by the need to provide a set of data that would be of use to the HCP, seeing the scarcity of information related and the state of conservation of the mosaics. Obtaining data with the potential to be used as a baseline for monitoring mosaic change in the GIS platform of the HCP was a significant factor in the survey design.

The survey method was developed in phases, through pilot testing and modification (see 7.6.1). The rating of condition was initially based on the approach developed by the GCI-EH-IAA project. The spatial component, which was absent in the approach adopted by the GCI-EH-IAA project, proved to be significant in establishing an association between visitor movement and mosaic damage. Thus, spatial recording and transferring of the data in the GIS, together with the numeric quantification of mosaic phenomena for describing their extent and severity were the main significant components of the survey. The methods and phases of the survey are explained in detail in Chapter Seven (see 7.6.1).

3.5.3 Visual and documentary research

A vital component of the site survey was research in the archives of the SANP and HCP, libraries and documentation organisations (Appendix 1) to obtain textual and visual documentation on the mosaics to better understand their
history of conservation and condition change. This is further explained in Chapter Seven (see 7.6.1).

Further online search of the Italian newspapers *La Repubblica, Corriere della Sera* and *La Stampa* was conducted for getting further insights on issues linked to the official guides and the custodians and for obtaining information on the history of the site in terms of its management (Appendix 1).

### 3.5.4 Visitor questionnaire

A self-completion visitor questionnaire was developed for gaining a preliminary understanding of the role of direct physical access to the mosaics on their overall site experience. The use of questionnaires as a preliminary method of inquiry is frequently used in the social sciences, especially when combining qualitative and quantitative research (Bryman 2004). The questionnaire was first developed and distributed in 2009. Following the collection and analysis of data, it was subsequently modified, expanded and redistributed in 2010.

The distribution of the questionnaires was done by myself in 2009, whereas in 2010 they were distributed by the student volunteers from the high school at Ercolano, ‘Tilgher’. Prior to distributing the questionnaires, they were familiarized with the scope of the questionnaires and were instructed on how to carry out the survey at the same locations used in 2009 (Figure 3-5). Four persons
were positioned in each location, although these numbers were not always fixed, as some students did not partake on a daily basis.

The target population of visitors was comprised of adults, over sixteen years old visiting the site on their own. This age was decided in order to be confident of informed consent. Initially I intended to include organized groups in the questionnaire, but this proved impossible, due to the limited time they have at the site. In such an attempt, I had asked in 2009 an escort of a group to distribute the questionnaires to the visitors while on the bus, and return them to the site on her next visit. However, this was never realized.

The sample taken from the population was nonprobability sample. This sampling method relies on judgment and the needs of the survey (Fink 1995, 29). Due to the limited time available for the collection of data, the aim was to collect as many questionnaires as possible. This was based on the premise that large groups of data show a higher degree of stability than small ones, and for a variable population such as visitors, a larger sample is needed to represent it (Hannagan 1986, 46-47). A total of 100 and 150 questionnaires were collected in 2009 and 2010 respectively. Prepared initially in English, the questionnaire was then translated in Italian and French, with the assistance of Italian and French-speaking staff from the HCP. It was then distributed in all three languages to visitors on their way out of the site. This was done at two locations, each chosen
for the availability of seating space and shade: the first was at the ticket control counter, and the second close to the entrance and exit locations to the archaeological area (Figure 3-5). All questionnaires were anonymous.

![Figure 3-5 Location of the distribution of the visitor questionnaires and interviews in relation to the entrance/exit of the archaeological area and ticket control. Not to scale.](image)

The questionnaire consisted mainly of closed-ended (multiple choice or tick box), although some open-ended (write-in responses) questions were included (Appendix 10). Fink (1995, 15) notes that open-ended questions are useful when the respondent should “describe the world as the respondent actually sees it”. Most of the closed–ended questions required the selection of one response. Some
questions allowed multiple responses, such as question S1 in the 2010 questionnaire, “Which other sites apart from Herculaneum in the region of Campania have you visited?“.

The questionnaires were designed to gather data on themes determined by the research questions. The themes used in 2009 were the following: 1. *Motivations* (question M1); 2. *Physical access* (questions A1 and A2); 3. *Interpretation* (questions I1 and I2); 4. *Experience* (questions E1 – E3); 5. *Conservation* (question C1). A section on demographics was also included (questions D1 - 5). These are presented in Appendix 10.1.

In 2010, additional questions were inserted in the questionnaire, following the collection and analysis of data and reflecting upon the aims of the research. Additional questions were added in the “Experience” theme, aiming to contribute to a clearer understanding of visitors’ perceptions on the role of direct access on the mosaics to the site experience. Other questions were added reflecting new themes: “Prior knowledge on Herculaneum” (questions K1 and K2) and “Other sites visited” (questions S1 and S2) (Appendix 10.2). These were added, as it seemed they would be useful to get a sense of prior knowledge of visitors about Herculaneum and the degree of visitation of Herculaneum in comparison with other sites in the region of Vesuvius. Furthermore, question E2 was modified, using a Likert scale to measure the extent to which access to the mosaics contributed to the site experience, rather than using a Yes or No
response. This type of question seemed more fitting in exploring the extent of positive effect of direct access on the mosaics and allowed a better perspective of visitors’ opinions. This was followed by an exploratory open-ended question. Three additional questions were added (E3 – E4). Question E3 aimed to measure the extent in which the absence of direct access to the mosaics would negatively affect the experience, again using a Likert scale, followed by an exploratory “why?” question. Question E4 examined visitors’ perceptions on the ways that impacts could be controlled to the mosaics. Finally question I2 from the “Interpretation” theme was removed from the questionnaire, as upon reflection on its relevance to the aims of the questionnaire, it seemed to be less essential.

The results of the analysis of the questionnaires are presented in Chapters Six and Eight. In the presentation of quantitative data stemming from the survey only valid percentages are used, i.e. percentages derived from counts that do not take into account missing data.

3.5.5 Interviews

Different types of interviews were conducted with visitors and other stakeholders, such as the official guides, local heritage authority staff, and HCP staff. The method and sample used for the interviews was ultimately determined by the data and unforeseen circumstances encountered in the field during data collection as already discussed at the beginning of this section.
Most interviews were semi-structured. Semi-structured interviewing involves the implementation of a number of predetermined questions and special topics, but the interviewers are allowed to digress and probe beyond the answers to the prepared standardized questions (Berg 2007, 95).

Only visitors’ interviews were recorded, as the rest of interviewees did not wish to be recorded. Their responses were recorded in hand notes. The responses of interviewees, excluding those by the visitors, are included in the text as personal communications. Anonymity was retained for all persons interviewed.

Visitor interviews

Visitor interviewing was the other method used in exploring the role of access to the overall site experience. A dilemma faced in the choice of the method use for collecting data on the visitor experience, was whether to adopt a phenomenological approach. Reflecting on the overall management perspective of the research, semi-structured interviews seemed more appropriate as a method of enquiry.

Interviews focused on the visitor experience and more specifically on the role of access into the buildings and on the mosaics, as defined by the analysis of the data collected from the questionnaires in 2009 (Appendix 11). Although most questions were similar to the open-ended questions of the survey (Appendix 10), additional questions were asked aiming at getting a deeper understanding of
visitors’ perceptions on the role of direct access. For example, visitors were asked if walking on a wooden platform rather than directly on a mosaic floor would make a difference to their experience of the site. This approach brought to the surface nuances that would otherwise not have been expressed by visitors, and thus added to the validity of the data collected.

In conducting the interviews I was supported by the assistant to the project manager of HCP, who carried out 23 interviews in French and Italian. Although I had explained in advance the scope and method of interviewing, her adopted method was that of structured interviewing. Questions were asked, but no further discussion was initiated from her part. Following the collection of data, she transcribed the responses in Italian and deleted the original recordings immediately thereafter. This limited the control I had over the data, as my interpretation was based on the transcribed text, which may have omitted parts of the recorded interviews. Despite these shortcomings, I decided to include the collected responses in the data sample, as they represent the thoughts of visitors on the posed questions, and could thus contribute to a better understanding of visitors’ experience at the site.

Visitors were asked to participate in the interviews at the same locations where the survey questionnaire was distributed (Figure 3.6), as they could rest while responding to the questions. Each interview lasted from five to twenty minutes. A total of 72 visitors were interviewed, of which 43 were female and 29 male
(Figure 6-3). The results of the visitor interviews are presented in Chapter Six while the questions used in the interviews are presented in Appendix 11.

**Guides**

Random and purposive sample was used for the selection of guides to be interviewed. The initial aim was to ask guides at the entrance of the site if they wish to participate in the interview. However, as most came to the site and left with their group, they had no time to engage in a conversation. Having succeeded in conducting already five interviews, I decided that the only way to increase the sample size was to participate in their tours, and try to engage with them in a conversation at the end, when visitors are given free time on their own. This method was very fruitful as it further allowed an insight of how guides actually carry out their tour, thus verifying their opinions against their actions and enhanced the validity of the data collected. A total of four interviews were carried out using this method, as each tour lasted from 60 to 90 minutes. A list of the guides interviewed is provided in Appendix 12.

Three guides working at Pompeii and Herculaneum were further interviewed as they were recommended by the HCP staff to be particularly aware of the problems involved regarding visitors and their management at the two sites. Two of them were interviewed in Naples and the other one at the offices of the HCP.
Using purposive sampling, past and current personnel working for SANP and Pierreci, the private organization in charge for the interpretation and educational activities at the site, were interviewed, to comprehend better the operational context of the organization at the site and the issues involved in the management of access and conservation. In addition, three of the staff working at the ticket sales office at the site were also interviewed.

It is worth noting that this sample does not include the site director. Although the director was asked via the HCP repeatedly if she could attend a face-to-face interview, she refused. Instead she asked to be given the questions in writing, sent to her via electronic mail. Her responses to the questions were limited to one sentence, and some questions had no response. As a result, I decided not to consider this type of data in the analysis. This was based on the fact that the responses were not sufficient to yield meaningful conclusions. This would have been avoided through a face-to-face discussion, where I could ask more questions or explain any points that perhaps were not clearly understood from the written questionnaire.

In response to the director’s refusal to be interviewed, another archaeologist, who worked for the SANP for many years, was interviewed in 2013. This was done with the aim to get a better insight of the issues involved in the management of
sites in Campania, including Herculaneum, from the perspective of the local heritage authority.

From in-house SANP professional staff, I carried out interviews with an architect and a human resource manager, using a semi-structured interview format. They provided useful insights on the issues involved with the management of custodians and site workers, broader issues of site maintenance and conservation practices.

Finally, with the assistance of the Study Centre, I contacted one of the former site directors, who had worked with Amedeo Maiuri (the archaeologist who initiated the excavations of the site in the 1920s) at the time of the latter’s involvement in the excavation and conservation of the site in the 1950s and 1960s. I visited him at his house and tried to instill information regarding the history and practice of mosaic conservation, as well as to infer information on the historical development of access to Herculaneum (see 5.7.2. and 5.8.1).

The educational officer of Pierreci located at the site was also interviewed to get another perspective on the problems linked to access at Herculaneum. This was an opportunity to also get additional information on the educational activities on offer at the site (see 5.8.5 and 8.4.3).
Finally, three of the staff working at the site ticket sales office, responsible for managing access into the site, were interviewed. The aim was to collect information about visitor flow, types and numbers and to get their perspective on access issues at the site.

**HCP team members**

During my fieldwork at the site, I have had various semi-structured interviews with a number of HCP team members, including the conservators (past and present) responsible for the mosaics; the project manager and the communications officer in order to get more input on various aspects of the HCP activities.

**3.5.6 Ethnography**

Ethnography, both as a method of research and the written product of it, has long been recognized in anthropology as a potent tool to interpret and describe empathetically socio-cultural phenomena relating to the people studied (Bryman 2004, 292-293). Werner and Schoepfle (1987, quoted in Berg 2007, 179) argued that ethnography becomes a process of gathering systematic observations, partly through participation, and partly through various types of conversational interviews.

In the case of this research, ethnography proved an essential method in understanding the dynamics of the various groups visiting and working on-site.
The time spent at the site during the three years of fieldwork, helped in making the analysis of the qualitative data collected more context-based.

My ethnography drew on field notes, in which I registered any event that seemed relevant to the research. After each fieldwork season, I analysed and edited the notes into detailed accounts of each event. From these I drew what seemed relevant to use as interpretive and descriptive accounts in different chapters of the thesis, such as when discussing visitor behaviour and stakeholders' interaction (see 8.5 and 8.6).

Ethnographic fieldwork consisted of participant observation and informal conversations with people working for the SANP, the HCP and the visitors.

**Participant observation**

Participant observation was vital in gaining a nuanced sense of the on-site dynamics between various groups, but also for gaining an understanding of visitor interaction with the site. The latter was carried out through unstructured observations as explained below.

As I was part of the team of the HCP as a research intern, I was able to observe the dynamics among the various groups working at the site, such as the SANP, the guides and the custodians. This insight aided in a more meaningful
interpretation of the data collected from the interviews I conducted with various groups.

**Unstructured observations**

Unstructured observations were carried out in order to better understand visitor behaviour and interaction with the site. Field notes and photography were taken while being on site to document any particular phenomena in order to clarify the ways access may impact on mosaics.

**Informal conversations with site custodians**

Site custodians are key in the management of access at Herculaneum. Informal conversations with them were carried out during the 2010 and 2011 season. The aim was to gain a better understanding of the issues of the site related to access, but also to get information about past conservation interventions to the mosaics, particularly from those who have been working at the site for more than 30 years. A list of the custodians I spoke with is provided in Appendix 12, including their age and years they have worked at Herculaneum.

Although initially my intention was to conduct recorded semi-structured interviews, this was not possible, for various reasons. While initially I intended to interview as many of them as possible, it soon became evident that not all of them were willing to engage in a conversation. It also became evident that my role as a research intern of the HCP was one of the reasons why they were
reluctant to talk to me, as they positioned me in an oppositional “camp”. My presence at the site was initially seen as a threat, especially as I soon realized that they were illegally involved in guiding visitors on site in return for a reward (see 8.6.1). It took two fieldwork seasons for them to open up and start engaging in conversations. They even felt comfortable enough to let me take notes of their responses. Nevertheless, not all custodians were equally collaborative; some were to more eager than others. In particular, some old custodians with many years of experience at the site were very talkative and provided useful insights of how the site was managed and accessed in the past, but also what the current problems are related to these issues.

3.6 Ethical Considerations

Some scholars argue that any method decision is an ethics decision (Denzin and Lincoln 2000). In this research, ethical considerations were raised in the selection of methods for the collection of data and their presentation concerning the observation and interviewing of human subjects. These concerns were addressed by complying with the Institute of Archaeology and UCL research ethical guidelines. Visitors were informed that observations were taking place onsite, when macro- and micro-scale observations were being recorded by placing a notification sign at the entrance of the site. In the case of interviews, the

3 [http://www.ucl.ac.uk/archaeology/research/ethics/ethical_guidelines](http://www.ucl.ac.uk/archaeology/research/ethics/ethical_guidelines)
anonymity of interviewees was retained, as it was not relevant or necessary to the aims of the research to disclose their personal details.

3.7 Methods of data analysis

3.7.1 Geographic Information Systems (GIS)

The recorded conditions of the mosaics and the recorded structured observations of visitors were digitized and analysed using GIS, which is a computer-based technology for producing, organizing and analysing spatial information (Box 1999). Since the 1980s GIS has become a very efficient means of managing large data sets and an invaluable tool in the decision-making process of many organizations (Demers 2000).

GIS is a computer system based on databases of information that include a spatial reference for each record. There are several software programs available to process and display data stored in GIS. This thesis relies on Esri ArcMap 10.2. A GIS combines graphic computer mapping abilities with a database management system. It allows the calculation, sorting and querying of the data which has a spatial location recorded as a pair of geographic coordinates. An attribute table records information about the components that make up an object or feature, as well as where the object is located.
These capabilities are fundamental for archaeological heritage management, as data presented in digital layers can be analysed and interpreted for conservation planning, interpretation and visitor management. In conservation, GIS can provide an excellent means of storing, integrating and administering spatial and non-spatial information generated by a condition survey. It is a useful tool for integrating large amounts of diverse types of information, and for visualizing the spatial distribution of specific types of deterioration and thereby gaining an understanding of the significant underlying processes of deterioration acting on a given site. It has also been used as a tool for documenting visitor movement at heritage sites for improving visitor management and informing interpretation planning (Chrysanthi et al. 2012). The results are easily accessible via a graphic interface and can be easily updated in the future. Having this information in a dynamic and easily accessible format is an invaluable resource for site management, including monitoring of access and condition.

For this research, the data collected from structured observations and the site survey were added on the GIS platform of Herculaneum. Each type of data was inserted in separate layers, and attributes were added to describe each recorded feature. Queries, such as “select by attributes”, or “select by location”, were used for carrying out the analysis needed for analyzing visitor access patterns to the site (see Chapter Eight) and for assessing visitor impacts on the mosaics (see Chapter Seven).
3.7.2 Analysis of quantitative data: Visitor survey

The data collected from the questionnaire survey was analysed through the use of SPSS (Statistical Package for the Social Sciences), through descriptive and inferential statistics, and Atlas.ti, a program that enables the codification and thematic analysis of textual and visual data.

The analysis of quantitative data from the survey (responses to the closed-ended questions) in SPSS was carried out mainly through descriptive statistics, although inferential statistics were occasionally employed. In the case of the latter, the relationship between variables was explored through contingency tables and chi-square tests, with a significance level set at lower than 0.05 (Bryman 2004, 238).

The data collected from the open-ended questions were analysed in Atlas.ti, in a similar way as the data obtained from visitor interviews, as explained in the following section.

3.7.3 Analysis of qualitative data: Interviews

Qualitative data from the interviews and the visitor survey were analysed in Atlas.ti, which enables the codification and thematic analysis of textual data.
Using an active and reflexive process, thematic analysis of the text will allow codes to emerge from data that respond to the research aims (Berg 2007, 332). Through this process of coding, theory gradually emerges, known as grounded theory (Bernard 2006, 492-493).

The recorded interviews were transcribed and then inserted in Atlas.ti, wherein it was possible to identify themes and assign codes. The codes I used often derived from the respondents’ own words. Once codes were assigned, it was then possible to also count their frequency and thus transforming qualitative data into a quantitative result. This was useful for comparing responses to similar questions in the questionnaire and the interviews, such as the one exploring the reasons for visiting Herculaneum (question M1 in the visitor survey, see Appendices 10 and 11).

3.8 Presentation of Data

All research for this project was conducted in English and Italian. In the case of interviews conducted (or transcribed) in Italian and quoted in the text in English, I am responsible for the translation. Finally, I have taken all photographs used in this research, unless otherwise stated.
3.9 Conclusion

The interdisciplinary nature of the research necessitated a mixed method approach for the data collection and analysis, based on a case study research design. Qualitative and quantitative research methods drawn from the fields of conservation, urban planning and museum studies were combined, supplemented by ethnography. In addition, different sampling techniques were used for each data. The analysis of data was conducted using different software and followed well-established procedures within the social sciences.

Having explained the methodology adopted for the research, the next chapter introduces the case of the research, the archaeological site of Herculaneum, in terms of its history and archaeology.
4 Herculaneum: Landscape, History and Archaeology

This chapter introduces the archaeological site of Herculaneum, focusing on the landscape and climate (see 4.1), history (see 4.2) and archaeology (see 4.3). It also describes the mosaic floors currently open to public access (see 4.4) that form the focus of the visitor impact assessment (Chapter Seven). These aspects contribute to the experience of Herculaneum as a place with a rich archaeology and history.

4.1 Landscape and Climate

"Next after Neapolis comes the Heraclean fortress, with a promontory which runs out into the sea and so admirably catches the breeze of the southwest wind that it makes the settlement a healthful place to live in."
Strabo geographica 5.4.8.

The site of Herculaneum is located in Campania in South Italy, about 8 km southeast of Naples and 7 km northwest of Vesuvius. It sits on a natural terrace in a strategic position overlooking the sea. This terrace was formed from accumulated tuff layers from the Ottaviano/Mercato eruption of Vesuvius in 6000 BC and the ash layer from the Avellino eruption in 1750 BC (Camardo and Court 2013). Due to the good quality of the tuff as a construction material, quarrying lowered the area by the sea by more than ten meters. According to literary classical writers, such as Sisenna (first century BC) and Strabo (first century AD), Herculaneum was a fortified coastal town on a promontory, situated between two rivers at the foot of Vesuvius.
Today’s landscape of the ancient town is significantly altered, primarily as a result of the eruption of Vesuvius in AD 79, which buried Herculaneum under many layers of volcanic material and pushed the coastline about 400 m outwards (see 4.2.2). What is seen today of the site, about 4.5 hectares, is only one portion of Roman Herculaneum (see 4.3): the rest (about 20 hectares) is still buried under the modern town of Ercolano (until 1969 it was called Resina), which took its name from the ancient site in 1969.
In Herculaneum, as in the whole of Campania, the climate is typically Mediterranean, with high temperatures and sunny days in the summer and colder, damper weather in the winter. The wettest season is from October to April, while the hottest and driest is from May to September (Figure 4-2).

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean Temperature °C</th>
<th>Mean Total Precipitation (mm)</th>
<th>Mean Number of Precipitation Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>3.8</td>
<td>104.4</td>
<td>9.9</td>
</tr>
<tr>
<td>Feb</td>
<td>4.3</td>
<td>97.9</td>
<td>9.8</td>
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<tr>
<td>Mar</td>
<td>5.8</td>
<td>85.7</td>
<td>9.5</td>
</tr>
<tr>
<td>Apr</td>
<td>8.3</td>
<td>75.5</td>
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<tr>
<td>May</td>
<td>12.1</td>
<td>49.6</td>
<td>5.7</td>
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<tr>
<td>Jun</td>
<td>15.6</td>
<td>34.1</td>
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<tr>
<td>Jul</td>
<td>18.0</td>
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<tr>
<td>Aug</td>
<td>17.9</td>
<td>41.6</td>
<td>3.8</td>
</tr>
<tr>
<td>Sep</td>
<td>15.3</td>
<td>80.3</td>
<td>5.8</td>
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<tr>
<td>Oct</td>
<td>11.6</td>
<td>129.7</td>
<td>8.1</td>
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<tr>
<td>Nov</td>
<td>7.7</td>
<td>162.1</td>
<td>10.8</td>
</tr>
<tr>
<td>Dec</td>
<td>5.1</td>
<td>121.4</td>
<td>10.7</td>
</tr>
</tbody>
</table>

Figure 4-2 Climatological information for the area of Naples based on monthly averages for the 30-year period 1961-1990 (Source: World Weather Information Service, World Meteorological Organisation: http://www.worldweather.org/176/c00604.html.)

4.2 History of Herculaneum

4.2.1 Pre-Roman Herculaneum

There is very little material evidence for the foundation of Herculaneum, as archaeological excavations have focused primarily on the Roman period (see 4.3). Evidence of Pre-Roman Herculaneum derives mainly from literary sources. Dionysius of Halicarnassus (first century BC) attributes the foundation of the town to Heracles on his return from Iberia (Maiuri 1958, 5), with whom its name
is associated. Strabo in his *Geographica* (book V) suggests that the settlement, like Pompeii, was taken over by a series of tribes, such as the Oscans, the Etruscans, the Pelasgians and the Samnites (Guidobaldi 2006, 15). It is likely that Herculaneum was subjected to a similar sequence of events to other areas in Campania, where the native Oscans were driven out by the Greeks, who were then defeated by the Etruscans. They, in turn, lost their supremacy in the area to the Samnites in the late fifth century BC.

Archaeological evidence (Pagano 1997b, 7) suggests that the town was founded towards the end of the 4th century BC, the time of the Samnite domination in Campania. It fell under Roman supremacy in 308 BC and by 293 BC all towns in Campania were allied to Rome. Despite Roman domination they retained their political systems and continued to use Oscan as the official language (Pagano 1996, 7). Herculaneum became a Roman Municipium in 89 BC, following its defeat in the Social War (the war of the italic allies against Rome from 91 BC to 89 BC).

### 4.2.2 Roman Herculaneum

*The period up to the eruption AD 79*

The Roman period lasted about a century and was the last phase of the ancient town of Herculaneum. Thanks to the eruption of Vesuvius in AD 79, it is very
well documented. It witnessed significant changes in the development of the town, as evidenced by archaeological and literary evidence. It is characterised by an increasing growth and prosperity that reached its peak in the early Empire as a result of the political stability during the Roman hegemony in Italy. This economic prosperity led to many social and consequent political changes, not only confined to Campania, which were further instigated by the attempts of the elite to assert its status in a rapidly changing political scene (Wallace-Hadrill 1998, 173).

These reforms can be read in the urban fabric and in the inscriptions found at the site. By the early Imperial period, new public and private buildings were constructed (see 4.3.1, 4.3.3) while existing ones were repaired or modified. This urban explosion was intensified by the late mid-first century AD, in response to the damage caused by a severe earthquake in AD 62. The wealth and prosperity of the town are evidenced by its size and population prior to the eruption: by the first century AD, it covered 20 hectares with a population of 4,000 inhabitants.

*The eruption of AD 79*

Historical evidence and the stratification of the volcanic layers revealed by excavations contribute to the understanding and clarification of how the eruption led to the destruction of the town by Vesuvius. Amedeo Maiuri (1958) suggested
that Pompeii was destroyed mainly by ash and lapilli, whereas Herculaneum was engulfed by thick layers of mud, an amalgam of ash, pumice stone and water. However, research by volcanologists looking at the stratigraphic deposits of the eruption in these locations, in combination with the historical evidence provided by the writings of Pliny the Younger (book VI, xvi 7-12), suggest that the disaster took place in different phases, affecting each location in a different way and with different consequent effects.

Sigurdsson et al. (1982, 42) have suggested that the severe earthquake of AD 62 is linked to the eruption: it was a warning sign of the coming activity of the volcano, caused by the initial movement of magma towards the surface and fracturing of the edifice of Vesuvius. The eruption took place in two phases. Herculaneum was not severely hit by first phase, as the thickness of the pumice deposits recorded over the town was less than 20 cm (Mastrolorenzo and Petrone 2000, 53). It was the second phase that was most destructive, consisting of the eruption of ground surge deposits that formed the deeper part of the magma reservoir of the volcano. These are made with ash and hot gases and travel at speeds often exceeding 100 km/h. They are the most destructive product of volcanic activity as they are succeeded by layers of pyroclastic flows, hot dense mixtures of fine ash, pumice and gases (Sigurdsson et al. 1982, 43). Due to its proximity to the volcano, Herculaneum was buried by a series of thick pyroclastic flow deposits at an average temperature of 400 °C. The first surge deposited a layer of a thickness of
3 m of hot ash over the town. Four more similar layers followed that reached a total height of 20 m (Figure 4-3) (Rocco 2003, 49). The last one was so powerful that it swept across the Bay of Naples to the island of Capri in the south and to Misenum in the west (both 30 km from the volcano) (Figure 4-4) (Berry 2007, 26).

Those who were unable to escape during the first phase of the eruption found instant death (Rocco 2003, 49), such as the 300 bodies found in the arcades at the waterfront (see 4.3). Nevertheless, the heat and density of the pyroclastic flows have succeeded in preserving the ancient town fabric, including organic materials, such as wood, elements of vegetation and fabric, and the upper storeys of buildings.
Figure 4-3 The ancient coastline showing the height of 20 m of the deposits from the eruption in 79 AD. Photo: HCP

Figure 4-4 The main places affected by the eruption of Vesuvius in AD 79 around the bay of Naples.
4.2.3 The aftermath of the eruption

The aftermath of the eruption is recorded by a limited number of historical sources. Life was gradually brought back to the area. It was repopulated and a new town called Resina was built over ancient Herculaneum. The latter was generally forgotten, except by the local people who made chance discoveries of ancient artifacts when digging wells in the area. It is in the Renaissance that allusions to the buried town are found in the literature and in reports of local people discovering inscriptions, coins, wall paintings, mosaics and columns on their property (Berry 2007, 37). The eighteenth and nineteenth centuries signaled the discovery of Herculaneum that was brought to light in the twentieth century (see 4.2.4).

4.2.4 The rediscovery of Antiquity and the transformation of
Herculaneum into an archaeological site

“One hates writing descriptions that are to be found in every book of travels; but we have seen something today that I am sure you never read of and perhaps you never heard of. Have you ever heard of a subterranean town? A whole Roman town with all its edifices remaining underground?”

Walpole 1740.⁴

⁴ Correspondence with Richard West in Walpole 1837 (see Walpole 1837)
The discovery of Herculaneum, Pompeii and Stabiae in the eighteenth century acquired international fame in the circle of scholars and connoisseurs of classical art and archaeology. The Vesuvian area had become one of the main destinations of the grand tours of that period; many famous scholars, artists and writers witnessed the buried cities of the Roman world coming to light (see 5.8.1). Their discovery contributed to the knowledge of Roman art and archaeology and paved the way for the development of scientific methods for archaeology and the preservation of the past (Jokilehto 1999, 299).

Herculaneum became the focus of intensive investigations by the various rulers of the kingdom of Naples in the eighteenth century. These continued until the twentieth century, when it was officially excavated by the Italian State and led to unearthing of what is visible today at the site (Figure 4-5).
The Eighteenth century

Prince D’ Elboeuf, an Austrian cavalry commander serving the Viennese viceroy in Naples, initiated the first investigations in the area of buried Herculaneum in 1709. At the time, Naples and Sicily were under the domination of the Austrian Hapsbourgs, following the Spanish conquest in the beginning of the sixteenth century.
D’ Elboeuf was looking for marble for the interior of his new seaside villa at Portici, when he was informed that a recently dug well close by had surfaced pieces of marble. He bought the land and with the assistance of seven workers he started excavating the area by digging wells and narrow underground tunnels, from which marble and bronze statues were unearthed from the ancient theatre of Herculaneum (Parslow 1995, 23).

Following the conquest in 1734 by the Spanish branch of the Bourbon dynasty, Naples and Sicily had become an independent kingdom. Official explorations did not begin until 1738, under the auspices of the Royal Court and the new King, Prince Charles VII. He was informed of the existence of antiquities in the area, which he could use for decorating his new palace at Portici, southeast of the villa of D’ Elboeuf (Gordon 2007, 37).

The King appointed the Spanish military engineer Rocque Joaquin de Alcubierre as director of the excavations who was trained in mining techniques and tunneling and directed the excavations for more than 40 years. As the King only saw the exploration of the area as “a dig mine from which royal treasure could be extracted” (Gordon 2007, 39), Alcubierre’s focus was limited to the quantity of antiquities unearthed on a daily basis. Miners, soldiers and prisoners were used for the construction of a network of underground galleries, cutting through building walls, and removing what was seen as valuable, leaving behind what they did not want and backfilling the tunnels as they continued (}
Figure 4-8) (Berry 2007, 38). The extensive investigations reached the northeast boundaries of the town and the coast, which included the House of the Atrium and the House of the Stags (Appendix 6.5) in 1748-1749 (Pace 2000, 27). The successful operation of unearthing large quantities of antiquities led to the expansion of investigations in other areas further east of Herculaneum in 1748: the buried city of Pompeii began to be brought to light (Longobardi 2002, 39).

Alcubierre was replaced by a number of military engineers and architects during the Bourbon period until 1860. Karl Jakob Weber, who became director of the excavations in 1750-1764, was perhaps the most professional in his approach to excavations. As an engineer and architect, he used a very methodic way for the excavations by following the lines of the streets and entering buildings through their openings, and thus protecting the context of the site. His methods anticipated the scientific methodologies of modern archaeology, including the documentation of his investigations (Parslow 1995, 3). Most of Weber’s work focused on the exploration and documentation of the Villa of the Papyri. Thanks to the detailed accuracy of his work, his successor Francesco La Vega succeeded in drawing the first complete map of the ancient town, published in 1797 (Figure 4-7).
Figure 4-6 Visit to the Excavations by Giacinto Gigante (1806-76) (above left). Photo: Wallace-Hadrill 2011

Figure 4-7 Plan of Herculaneum by Francesco La Vega, 1796 (above right). Photo: Wallace Hadrill 2011

Figure 4-8 The tunnels used by the Bourbons in the eighteenth century for exploring Herculaneum, as seen today from the Palestra.
The discoveries at the site soon attracted international attention. Scholars from Europe were eager to visit the place from which the abundant antiquities were unearthed. Very few, however, had the luck to descend into the tunnels and have a close look at the ancient town (Figure 4-6). The Royal Court exercised a form of military control over its guests. After 1765, obtaining permission to visit the archaeological sites of Pompeii and Herculaneum had become more feasible, and visitors were allowed to spend more time onsite (Longobardi 2002, 39).

**The Nineteenth century**

Herculaneum became the focus of investigations again in 1828. Following the successful open-air excavations at Pompeii, the new investigations were carried out in the open-air. Headed by Bonucci, excavations brought to light the northwestern part of the town, the House of Argus, House of Aristide, and House of the Genius in 1830 (Maiuri 1958). The House of the Skeleton began to be excavated in 1852 (Pace 2000, 113) (Appendix 6.2). However, these activities came to halt in 1855; Pompeii had already been given primacy for the excavations as it was much easier to excavate, and thus more could be unearthed in a shorter time.

Following the unification of Italy in 1860, the new King, Vittorio Emmanuele II, provided funding for the continuation of open-air excavations directed by the
new Soprintendente Giuseppe Fiorelli in 1869. A substantial area was brought to light: insulae II and VII and small parts of insulae III and VI (Guidobaldi 2006, 10). Due to the existence of the modern town at the borders of the site, excavations could not continue and came to a halt in 1875.

By the end of the nineteenth century, Herculaneum began to be included in the itineraries of tourists and scholars from Europe and America as a great source of learning about the Roman past of the first century AD. However, due to its limited size, it failed to gain the popularity of Pompeii.

The Twentieth century

- Amedeo Maiuri and the excavation of Herculaneum

The site was again excavated after the WWI by the Italian state in the context of the Fascist Regime (Pagano 1997, 14). Amedeo Maiuri became the new Soprintentente agli Scavi ed alle Antichità della Campania in 1924 (Figure 4-9) and was responsible for the excavations at the site (Figure 4-10). His first task was to arrange for the expansion of the excavations by gradually expropriating the land bordering the already excavated area on the north and southeast sides, demolishing the modern buildings that impeded the progress of the excavations, and imposing a series of constraints to the adjacent area not yet developed.
Figure 4-9 Amedeo Maiuri, the archaeologist who brought most of Herculaneum to light through excavations in the twentieth century. Photo: Wallace-Hadrill 2011, 73

Figure 4-10 Excavation of *Insula III* in 1928. Photo: SANP C2371
He achieved this with the support of extraordinary funds obtained from the *Cassa del Mezzogiorno* (the South Italian finance scheme) and the *Risanamento* (the Improvement authorities for the town of Resina) (Maiuri 1958, 10). Official excavations started on the 16th of May 1927 and lasted until 1961 (Camardo 2005, 28). Maiuri’s rigorous and systematic approach succeeded in unearthing most of what is visible today at the site by 1942 (Figure 4-10). His work gradually transformed the site into an open-air museum.

In the 1930s investigations focused in the northern areas towards *Decumanus Maximus* and extended to the *Palestra*. By 1942, the southern quarters as far as the ancient coastline began to be excavated, including the sacred area and the suburban baths. The excavations came to a halt during the WWII but were resumed in 1952.

Maiuri’s approach was remarkable as he integrated excavation with conservation and restoration activities (see 5.7.2). By using a team of 90 to 100 workers from Resina (Maiuri 1991), he succeeded in conserving, restoring and reconstructing the excavated buildings and having them open to the public within two years from the time of their excavation. By attracting publicity for the results of his work he ensured the continued funding of the excavation. In the context of the Fascist regime and Mussolini’s ambition to revive the grandeur of Imperial
Rome, his project was regarded with a very positive outlook (Camardo 2007, 206).

The past approaches to the excavations of both Herculaneum and Pompeii since the eighteenth century led to irreparable damages and loss of the archaeological remains. Maiuri’s approach was different, as he ensured that original material was left in situ and that structures were restored to their original condition, in the original style. Although integrations and additions were sympathetic to the original structures but at the same time distinguishable from them, what is visible today at the site is “not the ancient town preserved by an eruption, but fragments painstakingly pieced together, reinforced and restored by Maiuri” (Wallace-Hadrill 2011, 74). In some buildings, like the House of the Telephus Relief, reconstruction equals about 50% of the structure (Camardo 2007). However, in some cases, due to the nature of the inferior tuff stone used by Maiuri, it has degraded to the extent that the twentieth century restorations are no longer distinguishable as modern interventions on the exterior of the buildings.

Despite the extensive restoration and his focus on the visitor experience in recreating the spaces of the buildings of the ancient town (Figure 4-11-Figure 4-15) his approach to conservation in the context of his time was successful in keeping the site in a stable condition. This was achieved through an ongoing
maintenance regime, by using personnel from the local heritage authority until the early 1960s (see 5.7.2).

Figure 4-11 The façade of the House of Neptune and Amphitrite with the respective shop and the upper floors of the House as reconstructed by Maiuri in 1933. He tried to reconstruct the interior spaces, using original objects, to facilitate public understanding of the use of the buildings. Photo: SANP C2600
Figure 4-12 The shop of the House of Neptune and Amphitrite, as displayed in 1933. A display case is visible with original Roman artifacts, together with a series of ceramic pots. This was Maiuri’s attempt to demonstrate his own perception of how these spaces functioned before the eruption. Photo: SANP C2596

Figure 4-13 Objects put on display in the House of the Carbonised Furniture in 1933: The surviving wooden bed displayed in the together with a three legged table in the display case. Photo: SANP C2605
The post-Maiuri period (1960-2000)

The period following Maiuri’s death in the 1960s was characterized by limited archaeological activities and a focus on the restoration of the already excavated buildings and the exploration of the Bourbonic tunnels (Pace 2000, 128). Maiuri’s approach to routine care was gradually abandoned and came to a halt fully by the 1990s, when the site began to fall into a state of disrepair and neglect. Processes of decay accelerated, becoming evident on the roofs and walls of the buildings. Inevitably buildings started to close, as they became a danger for the safety of visitors (see 5.7.2).
Despite the grave conservation problems at the site, excavations continued and brought to light significant finds. In the early 1980s, the ancient coastline and the suburban area were excavated by Giuseppe Maggi, the site director at the time. A series of 12 arcades were unearthed along the seafront, which were used partly for the storage of boats and partly as an outlet for the drains for the suburban baths (Rocco 2003, 60). The excavations lasted until 1988 and led to an important discovery: over 300 skeletal remains of adults and children together with objects, victims of the eruption of AD 79 (Figure 4-16). These were found in nine arcades and on the ground of the ancient seafront. These discoveries contribute to a better understanding of life at Herculaneum at the time of the eruption and its people: coins and necklaces, either worn or kept in little containers, as well as objects, such as lamps, spoons and coins (Rocco 2003, 61). The skeletons were all recorded in situ, and casts were made of all of them and they placed in the location where the skeletons were found in 2012 (Anon 2012; Capasso 2001, 15).
Figure 4-16 Over 300 skeletons were found along the ancient coastline (top) (Photo: Brian Donovan / HCP), inside the arcades (bottom), shedding light to the population of Roman Herculaneum.

The second significant discovery was the Villa of the Papyri and *Insula nord-occidentale*, the former located outside the walls of Herculaneum (De Simone 2010, 1). Only the western part of the atrium of the Villa of the Papyri has been excavated, together with parts of the lower ground and second lower ground floors. *Insula nord-occidentale* has been fully excavated and consists of a residential
and a thermal bathing complex. Both discoveries are currently closed to the public.

*The Twenty-first century*

The poor condition of the site by the end of the twentieth century forced the Soprintendenza to prioritise conservation over further archaeological research. As a result, the Herculaneum Conservation Project was born in 2001 (see 5.7.3). Nevertheless, investigations did not stop completely. In parallel with the ongoing excavation project of the Villa of the Papyri and *Insula nord-occidentale*, which began in 2003 (Guidobaldi and Esposito 2010, 22) additional areas have been brought to light in the context of conservation work (see 5.7.3). For example, investigations in *Insula Orientalis II* succeeded in locating and re-using the ancient sewage system for controlling the effects of water on the archaeological fabric (Camardo 2008, 415).

4.3 Archaeology

Most of what survives and is visible today at Herculaneum dates to the Roman period, which is well documented due to its excellent preservation as a result of the eruption of AD 79. It is possible to trace the development of the town from the early Imperial period onwards but it is very difficult to link this with previous phases of the settlement, as pre-Roman archaeological evidence is scarce.
The first topographical plan of Herculaneum by Francesco La Vega (Figure 4-6) illustrates the extent of the Roman town below modern Ercolano. The plan is fairly accurate and indicates that the town consisted of eight rectangular *insulae* with a narrow strip of buildings on the west side and a structure on the east side (the *Palestra*), and two *decumani* running from northwest to southeast, intersected by a series of five *cardini*, vertical to the coastline. The excavations have brought to light eight *insulae*, including *Insulae Orientalis* I and II. It is believed that the town must have had at least three *decumani*, of which *Inferiore* and *Maximus* have been excavated. It is believed that the other *decumanus* are located north of *Decumanus Maximus* (de Kind 1998, 58; Pagano 1996, 229-238). One of them is likely to be *Decumanus Superiore*, which must have formed part of the road from Neapolis to Pompeii within the city walls (Pagano 2000, 19). From the *cardini*, only the third, fourth and fifth have been unearthed.

The excavated streetscape is paved with large paving volcanic stones, except sections of *Decumanus Inferiore* and *Cardo V* outside the *Palestra*, which are paved with white calcareous blocks. *Decumanus Maximus* as a pedestrianised street with a beaten floor (‘*battuto*’), similar to the raised pavements (30-40 cm high) running along all streets (Figure 4-17). *Cardo IV Superiore* is lined with a series of columns, used for the support of the porticoes and balconies of the upper levels of the buildings (Guidobaldi 2006b, 298).
4.3.1 Public and Religious buildings

Most of the excavated public and religious buildings except the central and suburban baths (Figure 4-21) and the respective terrace (Figure 4-19) (built in the first century BC and the late Augustan or Tiberian period respectively) were built in the Augustan age. Although so far only the theatre, the basilica, the *Palestra* (Figure 4-20), the Sacred area (Figure 4-18) and the College of the Augustales have been excavated, it is believed that the town must also have had a forum, like all Roman towns, also reinforced by the plan by La Vega (Pagano 1996, 235).
Figure 4-18 The Sacred area seen from the bridge to Cardo III.

Figure 4-19 The terrace of Marcus Nonius Balbus outside the suburban baths.
Figure 4-20 The colonnade of the *Palestra* at Herculaneum, facing east.

Figure 4-21 The interior of the Suburban Baths, currently closed to the public.
4.3.2 Commercial buildings

Commercial activity in the town is testified by the presence of shops and bars, such as wine shops, a clothes press shop, taverns (Figure 4-22) and thermopolia. These are located along the two decumani and cardini IV and V.

![Fig 4-22](image)

Figure 4-22 The Grande taberna on Cardo V inferiore (left) and the Termopolium on Cardo III Inferiore (right).

4.3.3 Domestic buildings

Most of the excavated buildings at Herculaneum are houses. They exhibit a unique architectural diversity showing an evolution of the Roman house from the second century BC to the first century AD. Some are small, rectangular in shape and simple in layout, reflecting elements from the Oscan period (Pagano 1997, 15). The majority of houses retain the typical Roman plan with an impluviate atrium, a compluvium and fauces, such as Samnite House, House of the Black Saloon, the House of the Bicentenary, the House of the Wooden Partition, the House of Apollo Citaredo (Guidobaldi 2006a, 181). Others exhibit variations to
this plan, where an *atrium* is absent but replaced by a courtyard, such as the House of the Beautiful Courtyard (see 4.5.6) or by a room, such as the House of the Alcove (see 4.5.3). Other houses indicate different ways in which the traditional core with the *atrium* was expanded with reception and sleeping areas, or the addition of upper floors to take advantage of prominent positions overlooking the sea, employing architectural solutions appropriate to this type of residence, such as terraces and verandas. Notable examples include the House of the Stags (see 4.5.4) (Figure 4-23) and the House of the Hotel. According to Guidobaldi (2006, 23) these structures reveal the presence of a noble class from the provinces, from the end of the first century BC to the first half of the first century AD.

Figure 4-23 View of the terrace of the House of the Stags towards the sea, facing northeast.
It is likely that in the Claudian period additional housing apartments in the upper floor levels of existing houses were built, similar to the Ostian housing type of the second century AD. According to Maiuri (1958a, 16), this was the result of the increase of inhabitants in relation to the limited space available in the core of the town. The House of Wattlework (*a Graticcio*) and the houses of *Insula Orientalis* II are examples of this type.

The houses at Herculaneum are considered to be of a higher quality in their decoration and architectural design in comparison to the respective ones at Pompeii (Guidobaldi 2006b, 180). Irrespectively of size and wealth, they exhibit unique features, sometimes unparalleled to anything else in the entire Vesuvian area. Notable examples are the *nymphaea* in the House of the Skeleton (see 4.5.1).
and the House of Neptune and Amphitrite (see 4.5.5). Thanks to the excellent preservation of the site by the eruption of Vesuvius, the houses further attest to the level of craftsmanship of the first century AD, as shown by the different types of furniture preserved, such as beds (Figure 4-24), tables, doors (Figure 4-31) and other decorative and architectural details.

4.4 The mosaic floors at Herculaneum

This section describes the mosaic floors open to public access and included in the visitor impact assessment (Chapter Seven). They form the focus of the visitor access and preservation debate that guides the argument of this research, as explained in Chapter One (see 1.1).

4.4.1 Typology

The mosaic floors included in this research consist of two types: opus tessellatum and opus scutulatum. Opus tessellatum is the most common type of ancient pavement. It usually consists of small sized pieces of usually stone, ceramic or glass (see 7.1). At Herculaneum, the pavements open to access in opus tessellatum are made with limestone and volcanic stone. Opus scutulatum is composed of usually a monochrome tessellated background into which stone fragments of different colours and irregular shapes are inserted (Roby et al. 2011, 2).
Opus tessellatum mosaics

The pavements in *opus tessellatum* are bi-chrome (27 out of 34), made with black and white *tesserae*. These are subdivided into black-on-white and white-on-black, as follows:

- **Black-on-white**
  
  This is the predominant type found onsite. The field of the majority of this category is plain white, although some are geometric or figurative, surrounded by one or two black frames.

- **White-on-black**
  
  These mosaics have white frames and a geometric field, made with individual white *tesserae* arranged against a black background. This type is only found on the peristyle floors of the House of the Black Saloon.

Opus scutulatum mosaics

Mosaics made in the *opus scutulatum* technique are bi-chrome or polychrome.

- **Bi-chrome (white-on-black)**
  
  This type consists of triangular marble insets in a variety of shapes against a black tessellated background. Only one mosaic of this type is included in the survey: the one paving the *fauces* of the House of the Skeleton (see Figure 4-27).
• Polychrome

Similar to the previous type, these mosaics have polychrome marble and stone insets arranged against a white or black background with or without a frame.

4.5 Buildings with mosaic floors

This section presents all buildings with mosaics open to public access and included in this research, with the exception of the House of the Hotel. This was decided as the mosaic is partially accessible and the accessible part is not tessellated.
4.5.1 House of the Skeleton

This house has its entrance on *Cardo III Inferiore* (Figure 4-25). It was partly excavated in the nineteenth century and completely unearthed by Maiuri in 1927-
1928 (Appendix 6.2). Its name derives from the skeleton found on the upper floor, now collapsed, in 1831.

The house is the outcome of the integration of three smaller housing units. It had an upper floor, which covered the entire area of the house. The fauces (n.1) leads to the atrium (n. 23), initially an atrium tuscanicum but after the addition of the upper floor it became a closed atrium (Maiuri 1958, 266). Every area of the house could be reached from the atrium. The tablinum (n. 7) is found opposite the fauces and the triclinium (n. 6) on the north side of the atrium, leads to a nymphaeum (n. 29). The rear wall of the nymphaeum was decorated with a mosaic with a frieze with figured panels above it (Figure 4-26). Parts of it were removed by the Bourbons and are now found in the National Archaeological Museum in Naples.

An oecus (n. 10), the most luxurious room, looked out into a courtyard (n. 27). A corridor (n. 26) leads to an access corridor (n. 8) and to a bedroom (n 9). The other rooms looking onto the atrium (n. 4, 5 and 25) were living rooms, bedrooms or storage rooms. Corridor 11 led to the southern area of the house. This included an access corridor (n. 21) leading to an ante-room (n. 17), and to bedrooms 18 and 19.
Figure 4-26 The nymphaeum in the House of the Skeleton, with the mosaic frieze.

Mosaics

Various types of floor decoration are found in this house, ranging from *opus signinum* (rooms 3-5, 21 and 27) to *opus sectile* (rooms 7, 8, 10, 26). A pavement with a black background in *opus scutulatum* decorates the fauces (n.1) and is accessible (Figure 4-27). Plain bi-chrome black-on-white mosaics with a double frame decorate the floors of rooms 6, 9, 17, 19, 18, 21. Only 17 (Figure 4-28) and 21 (Figure 4-29) are currently open to access.
Figure 4-27 (left) Mosaic 1 in the House of the Skeleton, facing south.

Figure 4-28 (centre) Mosaic 17 in the House of the Skeleton, facing east.

Figure 4-29 (bottom) Mosaic 21, in the House of the Skeleton, facing north.
4.5.2 House of the Wooden Partition

Figure 4-30 Location of the House of the Wooden Partition in Insula III (top) and the plan of the house (bottom).

The House of the Wooden Partition occupies the north side of insula III, extending from Cardo IV to Cardo III (Figure 4-30). The western area up to and including the West wing of the peristyle and the shops on the north side as far as
room 2 were excavated in 1869-1875 (de Kind 1998, 105), while the rest in 1928 and 1929 by Maiuri.

The house takes its name from the wooden partition that separated the *atrium* from the *tablinum* and was found in an excellent state of preservation. It had three double heaved doors, of which the central one is missing (Figure 4-31). The house also stands out for the excellent preservation of its façade, considered the best preserved from all the surviving houses in the Vesuvian area (Guidobaldi 2006b, 200), and for its compluviate *atrium* and *impluvium* with *opus signinum* and marble (Maiuri 1958).

Like other houses, this was the outcome of the integration of two smaller units in the late Republican period, with initial entrances on the East and West respectively. The main entrance is on *Cardo IV Inferiore*. The *fauces* (n. 15) has a room on either side (n.1 and 2), and leads to the *atrium* (n. 16). The atrium has two *cubicula* (3 and 4) and an *ala* (n. 5) on the west side. The *triclinium* (n. 6) and the *tablinum* (n. 7) are on the north side, with a corridor (n.18) that leads to the back of the house. The latter consists of a colonnaded garden (n. 19). Various rooms (n. 8, 20 and 18), likely to be living rooms, open onto the colonnaded sides of the garden.
The rooms east of the *atrium* facing *Decumanus Inferiore* and those facing *Cardo III* were transformed into shops, probably in the early Imperial period. Additional shops are found on the *Cardo IV* side. Two independent entrances to the upper floor are found on Cardo III (n. 3) and *Decumanus Inferiore* (n. 1) respectively. Various elements of architectural decoration survive, such as wall paintings and different types of pavements, including *opus signinum* and mosaics. Wall decoration is present throughout the house, although poorly preserved.

![Figure 4-31](image)

**Mosaics**

Plain black-on-white tessellated floors are found in rooms 7 and 9, decorated with a double border, while room 2 is decorated with a black-on-white geometric...
mosaic with coffer patterns. Only mosaic 7 is currently accessible to the public (Figure 4-32).

Figure 4-32 Mosaic in the *tablinum* (room 7) in the House of the Wooden Partition, facing north.
4.5.3 House of the Alcove

Figure 4-33 Location of House of the Alcove (top) in Insula IV and its plan (bottom)
The House of the Alcove was first partly explored in the eighteenth century (Guidobaldi 2006a, 75). It was fully excavated by Maiuri in 1928–1929 (Appendix 6. 4).

The house is named after the alcove, an apsidal bedroom at the back of the house (n. 24) (Figure 4-33). It stands out for its unusual layout, which is the outcome of a number of interventions in the Imperial period (Guidobaldi 2006c, 334). For example, it has two entrances on Cardo IV: one leading to the main ground floor level and the other one to the upper floor. Nevertheless, it retained elements of traditional Roman architecture, such as the fauces (n. 25) and the vestibulum (n. 3). The part of the house on the axis of the fauces is long and narrow, distinguished by the courtyard (without a roof) (n. 26), which leads to a smaller atrium with a roof (n. 7). This leads to an oecus (room 8), and another exposed courtyard (n. 9).

A corridor (n.11) leads to the bedroom area and to a triclinium (n. 12).

The rest of the house at a lower level to the southwest is connected with the other half with an opening at the vestibulum, which leads to a covered atrium (n. 17), with a large triclinium on the east (n. 20), and a biclinium (n. 19) and a service room (n. 18) on the west. A narrow corridor (n. 21/28) next to the triclinium leads to the alcove (n. 24) and to an anteroom (n. 23).
Different types of floor decoration are used throughout the house, ranging from beaten earth (rooms 2, 4, 5, 9, 11), *opus signinum* (rooms 1, 3, 6, 7, 10, 12, 14-16, 22, 25-27), *opus tessellatum* (rooms 17, 21, 28) and *opus sectile* (room 20). Similarly, wall paintings of different styles decorate various rooms, such as rooms 23, 24, 19, 3, 4 and 8. Besides the rich architectural decoration, the house exhibits a number of well-preserved wooden artifacts, such as the two wooden beds found in room 19, still *in situ* (Figure 4-24).

**Mosaics**

The *atrium* (n. 17) at the lower section of the house is paved with a polychrome *opus scutulatum* mosaic (Figure 4-34), while the long corridor (n. 21) is a black-on-white geometric mosaic, with a single frame and a wide black border (Figure 4-35). The central frame is decorated with cruciform patterns. The same geometric pattern is found on corridor 28, but with a double frame around the central panel (Figure 4-36).
Figure 4-34 Mosaic 17 in the House of the Alcove, facing west (left) and northwest (right) with rooms 18 and 19 also visible.

Figure 4-35 Mosaic 21 in the House of the Alcove, facing southeast.
Figure 4-36 Mosaic 28 in the House of the Alcove, facing west.
The House of the Stags is considered one of the largest and most luxurious houses in Herculaneum. It covers an area of 1,100 m² at the southwest quarter of insula IV (Figure 4-37). The house was first explored by tunneling in the Bourbon period, under Alcubierre (Tram Tan Tinh 1988, 3) (Appendix 6.5) and excavated by Maiuri in 1929-1932. The cavamonti had removed many wall painting
fragments, mainly emblemata (Figure 4-38) and opus sectile pavements from other parts of the house, now found in the National Archaeological museum of Naples and the Louvre (Guidobaldi 2006a, 78; Tram Tan Tinh 1988, 11).

The house had undergone many modifications during the late Samnite Republican and early Imperial periods (de Kind 1998, 180). It was severely damaged in the earthquake of AD 62 and underwent many repairs.

The entrance to the house is on Cardo V Inferiore and leads to the fauces (n. 1) and to the atrium (n. 24). Several living rooms are found north of the atrium (n. 2-4). Continuing through corridor 26, one finds a group of service rooms (n. 11-14) on the right and a cubiculum (n. 10) with an anteroom (n. 9). Corridor 27 leads to an oecus (n. 7), a storage area (n. 8), the large triclinium (n. 5) and the cryptoporticus (n. 29-32). The cryptoporticus is considered the most important architectural element of the house, decorated with floor mosaics and frescoes. Another
significant architectural element is the opening to the garden from the Northern corridor of the cryptoporticus (Figure 4-39).

The house exhibits diverse architectural decoration, such as mosaic floors (rooms 1, 9, 22, 29-32), opus signinum (rooms 3, 25, 26), opus sectile (rooms 5-8, 10, 15-18 and 23), frescoes and various types of furniture. Notable examples are the stags, of which copies are found in the garden of the house (Figure 4-39).

Figure 4-39 The garden of the House of the Stags from room 31, facing east. The opening of room 29 to the garden is visible in the background while copies of the Stags discovered in the house are displayed in the foreground.
Mosaics

A total of seven rooms are paved with mosaics. The fauces is paved with a polychrome *opus scutulatum* mosaic against a white background (Figure 4-40). The floors in rooms 9 and 22 are paved with plain bi-chrome black-on-white mosaics, with a single band of black *tesserae*. The former is currently accessible, although most of the mosaic is lost, with the exception of its west side (Figure 4-41).

All sides of the cryptoporticus (n. 29-32) are paved with polychrome floors in *opus scutulatum*. They are all accessible, albeit only mosaics 30 and 31 are directly accessible, due to the presence of wooden pathways along the surface of the mosaics in rooms 29, parts of 30 (Figure 4-42) and 31 (Figure 4-43 and Figure 4-44) and 32. These were placed over the mosaics in the 1990s (SANP personnel 2 2010, personal communication). The mosaics have polychrome insets against a white background with a double black frame, running along and across the main panels.
Figure 4-40 Mosaic in room 1 in the House of the Stags, facing north.

Figure 4-41 Mosaic in room 9 in the House of the Stags, facing west.

Figure 4-42 Part of mosaic 30 in the House of the Stags, facing east.
Figure 4-43 The south part of mosaic 31 in the House of the Stags, facing south.

Figure 4-44 The north part of mosaic 31 in the House of the Stags, facing north.
4.5.5 House of Neptune and Amphitrite

Figure 4-45 Location of the House of Neptune and Amphitrite in Insula V (top) and its plan (bottom).
The House of Neptune and Amphitrite was fully excavated by Maiuri from 1931 to 1934 (Appendix 6.6). The building was probably constructed in the second half of the first century BC. It is of the *atrium* type. It had an upper floor, as indicated by its reconstruction by Maiuri. Its entrance is on *Cardo IV Superiore*, with a *fauces* (n. 8), which leads to the *impluviate atrium* (n. 11) and to the *tablinum* (n. 7).

The highlight of the house is the *triclinium* (n. 10), which is laid out with couches spread around a rectangular basin for water and an elaborately decorated stage front masking the water tank (Clarke 1991, 255). The east wall is decorated with a polychrome wall mosaic, depicting Neptune and Amphitrite, from which the house takes its name (Figure 4-46). The mosaic is surrounded by an illusionistic garden painting. A *nymphaeum* behind the *triclinium* is decorated with a polychrome mosaic depicting vegetable motifs with peacocks, deer and dogs against a blue background (Figure 4-47).
Figure 4-46 The wall mosaic in the *triclinium* of the House of Neptune and Amphitrite, facing south.

Figure 4-47 The *nymphaeum* in the triclinium of the House of Neptune and Amphitrite, facing southeast.
Various types of floor decoration can be found in the house: *opus signinum*, plain or with marble insets (n. 11), *opus tessellatum* (see mosaics below) and *opus sectile* (n.5).

*Mosaics*

Only the mosaic in the *tablinum* is currently accessible to the public (Figure 4-48). The mosaic is fragmented, and its central part of the mosaic is made in *opus signinum*. The surviving part of the mosaic is black-on-white with a single black border.

![Figure 4-48 Mosaic 3 in the House of Neptune and Amphitrite, facing south](image-url)
4.5.6 House of the Beautiful Courtyard

Located next to the House of Neptune and Amphitrite, this building stands out for the unusual architectural plan (Figure 4-49). The traditional atrium is replaced by an interior small courtyard (n. 3), from which the house takes its name. The house was excavated by Maiuri from 1931 to 1934 (Appendix 6.7). The entrance to the house lacks the typical fauces, but has a large rectangular vestibulum instead (n. 12). A narrow corridor (n. 18) on the right of the vestibulum leads to a series of
service rooms (14-16), while an elevated passageway (n. 20) leads to the courtyard (n. 3) and the large triclinium (n.4). A staircase next to the courtyard leads to the upper floor, currently not accessible, although still visible. The oecus (n. 2), at the lower level, has an opening to the courtyard.

The House of the Beautiful Courtyard stands out for its rich decoration. All floors are paved with mosaics, except the service area, which has beaten earth. All walls are decorated with paintings.

**Mosaics**

Most mosaics are currently accessible, with the exception of the one in room 2. There is uniformity in colour and style. Almost all are of the black-on-white geometric type with single black frames (Figures 4-50 – 4-55). Mosaics 4 (Figure 4-51) and 12 (Figure 4-53) are exceptions as they have a plain white background.
Figure 4-50 Mosaic 3 in the House of the Beautiful Courtyard, facing east.

Figure 4-51 Mosaic in the *tablinum* (room 4) in the House of the Beautiful Courtyard, facing west.
Figure 4-52 Mosaic 5 in the House of the Beautiful Courtyard, facing south.

Figure 4-53 Mosaic 12 in the House of the Beautiful Courtyard, facing west.
Figure 4-54 Mosaic 13 in the House of the Beautiful Courtyard, facing northwest.

Figure 4-55 Mosaic 19 in the House of the Beautiful Courtyard, facing southeast.
4.5.7 House of the Black Saloon

Figure 4-56 Location of the House of the Black Saloon, in Insula VI (top) and its plan (bottom).

This is a large house, about 600 m², occupying the east section of Insula VI (Figure 4-56). It is named after the large saloon (n. 7) whose walls paintings have a black background. It was excavated by Maiuri in 1939-1940 but there is evidence for earlier investigations in the Bourbon period by the hole on the wall facing the peristyle of the andron (n. 10) (Appendix 6.8).
It has a traditional layout, with an *atrium*, a *tablinum* and a peristyle (Guidobaldi 2006a, 104). The main entrance is on *Decumanus Maximus*; a secondary entrance, on *Cardo IV Superiore*, led to the service quarters (n.1-3) and to the upper floor. The shops attached to its facade on *Decumanus Maximus* were originally connected with the house. It is likely that they were rented out as indicated by recent evidence (Guidobaldi 2006a, 104). The fauces (n.26) leads to the *atrium* (n. 14), surrounded by the bedrooms (n. 24, 25, 21, 23) and the kitchen (n. 22). The *tablinum* (n. 11) leads to a colonnaded peristyle, surrounded by bedrooms (n.4, 5 and 9) and the reception room (n.7).

The house exhibits a diverse and rich architectural decoration; wall paintings adorn the walls of all rooms, while the ceilings of room 4 and 5 have wall paintings on their ceilings as well. The floors are either paved with mosaics or *opus signinum* with inlaid marble pieces (in the *tablinum* and the *atrium* area).

**Mosaics**

All peristyle corridors (n. 8, 16-19) are decorated with white-on-black geometric mosaics, with a double white border (Figure 4-59, Figure 4-61 to Figure 4-64). The surrounding rooms (n. 4, 5, 9) have plain black-on-white mosaic floors with a double black border (Figure 4-57, Figure 4-58, Figure 4-60).
Figure 4-57 Mosaic 4 in the House of the Black Saloon, facing west.

Figure 4-58 Mosaic 5 in the House of the Black Saloon, facing west.
Figure 4-59 Mosaic 8 in the House of the Black Saloon, facing north.

Figure 4-60 Mosaic 9 in the House of the Black Saloon, facing north.
Figure 4-61 Mosaic 16 in the House of the Black Saloon, facing north.

Figure 4-62 Mosaic 17 in the House of the Black Saloon, facing west.
Figure 4-63 Mosaic 18 in the House of the Black Saloon, facing west.

Figure 4-64 Mosaic 19 in the House of the Black Saloon, facing north.
4.5.8 Central Baths

Figure 4-65 The location of the Central Baths complex in Insula VI, with the Women’s section highlighted in light blue and the Men’s section highlighted in dark pink.

The bathing complex in the centre of the town in Insula VI consists of two sections, one for men and another one for women (Figure 4-65). They were excavated by Maiuri in 1931-1932.
The entrance of the masculine section is facing the central *Palestra* (n.7), accessed from *Cardo III* and *Cardo IV Superiore* (Figure 4-66). This section is larger than the female section, but not as well preserved. The first room of the baths is the *apodyterium* (n.1). The three walls of the *apodyterium* are divided into stalls, used by the bathers for storing clothes and towels, while sitting on the benches below. A fountain is located at the centre of the far wall. The round *frigidarium* (n.2) has a domed roof, and walls painted with water scenes (Figure 4-67). The *tepidarium*
(n.3) is located right of the *apodyterium*, also with an apsidal roof, benches and stalls running along all the walls (Figure 4-67). This room leads to the *caldarium* (n.5). The roof of this room collapsed, and it is thus in the poorest condition of all rooms in the entire bathing complex.

Figure 4-67 The *Frigidarium* (left) and the *tepidarium* (right) in the Men’s section of the Central Baths.
Mosaics decorate the *caldarium* and *tepidarium*. The *tepidarium* mosaic has a central figurative panel, depicting Triton in a sea scene in a single black frame (Figure 4-68). The mosaic in the *caldarium* is a plain black-on-white mosaic, of which most of it is lost. A figurative panel in a single black border is found at the threshold between the two rooms (Figure 4-69).

![Image](image1.png)

![Image](image2.png)

Figure 4-68 The *tepidarium* in the Men’s section of the Central Baths, facing west (top) and a close-up of the figurative emblema (bottom).
Figure 4-69 View of the mosaic in the *caldarium* (room 5) in the Men’s section of the Central Baths, facing east.
The entrance to the baths is on Cardo IV Superiore, leading to the waiting room (n.5) (Figure 4-70), with a capacity of 50 persons (Guidobaldi 2006a, 102). The apodyterium, much smaller than the male one, has an apsidal roof, and a series of stalls running around the walls for the bathers to store their towels and clothes, above a series of benches. The tepidarium is of a similar layout, with stalls on the
walls and benches. The bath basin is very well preserved in the caldarium, while the base of the labrum for cold water is still in place.

- Mosaics

All floors are decorated with bi-chrome black-on-white mosaics with different patterns, exhibiting the most diverse group of mosaic decoration in Herculaneum. The entrance mosaic (room 5) has a geometric panel with a checkered design (Figure 4-74), while in the tepidarium a series of meanders run across the surface with different patterns in their centre (Figure 4-72). The figurative scene in the apodyterium depicts a Triton in a marine scene framed by a black double border (Figure 4-71). The scene is similar to the one of the tepidarium in the male section (Figure 4-68). Finally, the caldarium is paved with a plain white mosaic framed by a black single border (Figure 4-73).
Figure 4-71 Mosaic in room 2 in the Women’s section of the Central Baths, facing east.

Figure 4-72 Mosaic in the tepidarium (room 3) in the Women’s section of the Central Baths, facing east.
Figure 4-73 Mosaic in the *caldarium* (room 4) in the Women’s section of the Central Baths, facing south.

Figure 4-74 Mosaic 5 in the Women’s section of the Central Baths, facing south.
4.6 Conclusion

This chapter introduced the site of Herculaneum, which forms the main case study of the research project. The chapter presented an overview of the site, focusing on the historical background and the archaeological remains of the ancient town, including the buildings with mosaic floors currently open to the public.

The next chapter will present the management context of Herculaneum, focusing on the administrative, conservation and visitor management context of the site.
5 Herculaneum: Site management context

Having introduced the historical and archaeological context of Herculaneum in Chapter Four, this chapter provides an overview of the management context at the site, with a particular focus on conservation and visitor management practices. This aspect is essential for understanding and assessing the sustainability of access as it is managed at the site, which is the overall aim of the case study investigation (see 1.2).

The chapter presents the legal (see 5.1), institutional (see 5.2) and administrative (see 5.5) frameworks in which Herculaneum operates under the regional heritage authority (see 5.3). It also provides the background of conservation practice at the site (see 5.7), including approaches to mosaic conservation. It then provides an introduction to the visitor aspect and how this is managed in the operational framework of the SANP (see 5.7.4), while it introduces the interpretation (see 5.8.5) and visitor management approaches (see 5.8.6) currently in use.
5.1 Legal framework

The protection of cultural heritage and landscape in Italy is the responsibility of the Italian Republic, as defined in article 9 of the Italian Constitution\(^5\). The main instrument in force towards this is the legislative Code for Cultural Heritage and Landscape (see Legislative decree no. 42 of January 2004). It consists of 184 articles, which cover all aspects related to the protection, conservation, enhancement, and public enjoyment of Italian cultural heritage and landscape (as defined by the principles of the code in article 1). According to article 2.1 of the Code, cultural heritage consists of movable and immovable cultural property and landscape assets. Article 1.3 of the code states that the state, the regions, the provinces and municipalities of Italy are responsible for the conservation of cultural heritage and for its promotion for public enjoyment and use (“[..] la pubblica fruizione e valorizzazione”).

5.2 Institutional framework

The central authority responsible for the protection, promotion and enhancement of cultural heritage is the Ministry of Culture and Cultural Activities and Tourism, which was formed in 1975 but has undergone significant changes since

\(^5\) https://www.senato.it/documenti/repository/istituzione/costituzione_ingles e.pdf
then, only to acquire its present form in 2013 (see Law n. 296, 27 December 2006 and Law n. 71, 24 June 2013). Nine central bodies within the Ministry are responsible for the management of various types and activities of cultural heritage, including the Direzione Generale per le Antichità, responsible for all administrative activities regarding the safeguarding and management of archaeological heritage. These include all activities concerning the protection and conservation of cultural heritage for the purposes of public enjoyment (see Legislative Decree n. 42, 22 January 2002, article 3.1).

The bodies responsible for these activities at the regional level are the Soprintendenze, the main operative element of the Italian heritage system (Zan et al. 2007, 58). Their role goes back as far as 1894. In 1904 they were entrusted the protection of different types of heritage: monuments, archaeological assets and galleries (Gianighian 2001, 198).

The Soprintendenze are responsible for the administration and preservation of cultural heritage in their territory, whether public or private (Zan et al. 2007, 58). They are divided according to geographical districts in the twenty regions of the country. Currently, a total of 100 Soprintendenze operate across the country, each responsible for one type of heritage in each region: modern and contemporary activities.

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art, archaeological heritage, architectural and landscape, historical, artistic and ethno-anthropological heritage and archives\(^7\). Only 17 of these are directly accountable to the Ministry, and three regions have gained full autonomy, by exercising direct legislative and administrative responsibility for their own heritage assets (Bodo and Bodo 2011, 12). These are Valle d’Aosta, Sicily and Trentino Alto Adige.

5.3 The Soprintendenza Speciale per I Beni Archeologici di Napoli e Pompei (SANP)

Until June 2013, the site of Herculaneum was under the responsibility of the Soprintendenza Speciale per I Beni Archeologici di Napoli e Pompei (SANP), which is the local heritage authority responsible for the management of protection, conservation and enhancement of the archaeological heritage of the Naples and the Vesuvian area, as defined in the Code (see Legislative Decree n. 42, 22 January 2002) (see 5.1).

With the legislative decree Valore cultura in 2013 (see Legislative decree n. 91, 8 August 2013) the SANP was split in two separate Soprintendenze: the Soprintendenza di Pompei, Ercolano e Stabia, and the Soprintendenza Speciale per il Patrimonio storico, artistico ed etnoanthropologico e per il polo museale della città di

\(^7\) Ministry of Cultural Heritage and Activities website
This was done to ensure the effective management of the interventions at the site of Pompeii as part of the Grande Progetto Pompei, a large-scale conservation program for the site funded by the European Union. As this development took place in August 2013, the thesis will refer to the SANP as this was the main body the site of Herculaneum was under during the course of this research.

The SANP was created in 2008, when the Soprintendenza of Naples and Caserta and that of Pompeii (that included Herculaneum, Pompeii, Boscoreale, Stabia and Oplontis and other smaller sites) were merged. It retained the financial, organisational, administrative and scientific autonomy that was granted to the Soprintendenza of Pompeii in 1997 with the law 8/352/1997 (Wallace-Hadrill 2011, 322).

The Soprintendente is the head of the local heritage body, supported by the Board of Governors and the Board of Auditors (SANP website). Upon the Soprintendente lies the responsibility for all scientific and administrative activities. The boards act as the decision-making organs and advisory bodies for all SANP activities (such as financial aspects, annual programming). This excludes the management of in-house human resources that is under the direct management of the Ministry (SANP website). With the 2013 legislative decree (Legislative Decree n.91, 8 August 2013), the new Soprintendenza has a Director-General responsible for the
Grande Progetto Pompeii, who is also responsible for ensuring that the 105 million Euros received by the European Union (European funds for Regional Development) are used effectively and spent by 2015 (Legislative decree n. 91, 8 August 2013).

The Soprintendenza is responsible for all activities regarding the protection, conservation, promotion and research of archaeological heritage under its control. These are carried out by the staff of each of the sites and museums under its control, in collaboration with its central offices. Each archaeological site has secretarial, surveillance and protection services, a group of workers responsible for ordinary site maintenance activities, and a director, who reports to the Soprintendente (Zan and Paciello 2003, 62).

Overall, the Soprintendenza has around 900 staff for all spheres of activities, of whom over half deal with Pompeii. The Technical Office at Pompeii is responsible for the management of conservation projects, including those executed through tendering (Zan and Paciello 2003, 65). This Office has six personnel and is responsible for all Vesuvian sites (UNESCO 2011, 9).

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8 The aims of the project include the control of the hydrogeological risks, ensuring the safety of the site, the consolidation and restoration of frescoes and decorative surfaces, the conservation and opening of areas currently closed to the public, and the installation of a video surveillance system (http://www.beniculturali.it/mibac/export/MIBAC/sito-MIBAC/MenuPrincipale/GrandiRestauri/Grande-Progetto-Pompeii/index.html)
5.4 The autonomy of the SANP (previously SAP)

Until 1997, the Soprintendenza of Pompeii (SAP) was fully dependent on the Ministry for financial support to carry out all activities related to the conservation and excavation of the sites under its responsibility. With the Law 352/97, the SAP was granted financial, administrative and organisational autonomy (see Law n. 352. 8 October 1997). This autonomy was an attempt by the Ministry to experiment with the effects of decentralization and to facilitate and encourage activities concerning the protection, conservation and public access of the heritage sites under its control (Guzzo 2003, 13). As Zan (2002) argued, this was an experiment prior to making further reforms to the whole structure of the Ministry.

The financial autonomy has allowed the local heritage authority to have control of the revenues generated by ticket sales and the ability to raise money from other visitor services, such as bookshop sales, school services and site interpretation. The income from these sources, instead of going back to the Ministry, can be used for research, maintenance, conservation, and promotion of the archaeological sites within its territory.

The money received by SANP from each site is pooled in and then redistributed according to the needs of each site and the proposed works in the triennial budget (the three year planning cycle is common to all public authorities in Italy).
However, the merger of the two Soprintendenze in 2008 has provided a new drain on Pompeii, which was and still is the “cash machine” of the heritage authority, as the funds stemming from the site have been used to help cover low revenue sites, formerly part of the Soprintendenza of Naples (see 5.3). Hence, even though the revenue of Pompeii is high, the merging of the two regional bodies has made it impossible to make ends meet. It also has to be noted that the significance of Pompeii and its poor state of conservation have been the main factors for its absorption of most of the budget for 2011, where 23 out of 40 proposed projects were for the conservation and enhancement of the site (UNESCO 2011, 10).

Apart from ticket sales revenues, the SANP periodically gets additional funding from the Ministry and other public institutions (Guzzo 2004, 78). It also gets funds from the European Union, from local or regional entities and from private sponsors to support its activities, such as the Packard Humanities Institute that has supported conservation work at Herculaneum since 2001 (UNESCO 1996; UNESCO 2011).

5.4.1 Limitations of the autonomy

Despite the benefits gained by the reform in 1997 in allowing the SANP to have control of its financial resources, the reform did not grant to the local body full control of its human resources. The autonomy was thus partial, as it did not allow
the SANP to directly manage its own staff, who are still paid, administered and
directly managed by the Ministry. This limitation is one of the impediments
today in the operational effectiveness of the SANP, with repercussions on the
conservation and management effectiveness of its sites: it cannot increase
specialised staff to cover its needs, nor can it dismiss or redefine the roles of its
employees (Zan 2002, 108; Guzzo 2004, 78) (see 8.6.1 and 9.3.5).

Furthermore, although the law 352/1997 has given the Soprintendenza financial
autonomy, this was only on the surface, as the Ministry still has the power to
impose financial withdrawals from the regional body when needed. This leaves
the Soprintendenza unable to have full control and make full use of the income it
receives, and poses a barrier in the planning and successful implementation of
conservation projects. For example, in 2006, 30% of Pompeii’s tickets earnings
were paid back to the Ministry to support other cultural entities (Zan and Ferri
2010, 8). In the same year, 30 million euros were withdrawn from the SANP for
conservation and enhancement activities of other sites managed by other
regional bodies. Consequently, many activities outsourced by SANP and
included in the triennial programming cycle including feasibility studies, the
preparation of conservation proposals and important works campaigns, could
not be completed as funding was no longer available to activate the contracts
(Zan and Ferri 2010, 9).
Another limitation impeding the successful completion of works through outsourcing, is the requirement of SANP to abide to the rules concerning the assignment of public works contracts. These rules oblige the SANP to always select the lower bidding company, rather than the one with the potential of delivering a higher standard of work (see 5.7.4).

5.5 Administrative structure at Herculaneum

Each site in the Vesuvian area under the responsibility of SANP has a site director and its own administrative and specialised personnel that comprise the Office for Excavations (*Ufficio Scavi*). The site director at Herculaneum is responsible for all activities concerning site protection, archaeological research and excavations and for overseeing all projects related to conservation (Zan and Paciello 2003, 63). The Office for Excavations consists of the following departments: restoration office; human resources and administration; technical and scientific assistance; custodianship and surveillance (SANP Staff 1 2011, personal communication).

Site personnel are characterized by a disproportionate number of technical and professional staff, as evidenced by data available for the years 1997 and 2011 (Figure 5-1). Workers, custodians and administrative staff have been disproportionally higher than specialist staff (namely qualified heritage
professionals) in both years. The lack of personnel, including technical staff and custodians, has exacerbated as retired people are not being substituted.

<table>
<thead>
<tr>
<th>Department</th>
<th>Post</th>
<th>1997</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office for Excavations (Ufficio scavi)</td>
<td>Site director/Archaeologist</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Conservation office (Ufficio restauro)</td>
<td>Architect</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Technical staff-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>conservation assistants</td>
<td></td>
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<tr>
<td>Human resources</td>
<td>Administration</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Technical assistance</td>
<td>Technical staff (workers)</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Custodianship and surveillance</td>
<td>Site custodians</td>
<td>61</td>
<td>46</td>
</tr>
</tbody>
</table>

Figure 5-1 SANP staff breakdown at Herculaneum for the years 1997 and 2011. Source: Zan and Paciello (2003, 68) and the Office for Excavations at Herculaneum.

The imbalance between professional and technical staff is not limited to Herculaneum but affects the entire SANP, as the number of custodians has been much higher than any other personnel (Zan and Paciello 2003, 69). Nevertheless, there has been a substantial increase in professional staff in SANP since 1998, although this has not been reflected on Herculaneum. For example, in 1998, when the autonomy legislation was approved, the SANP had 711 personnel of whom only 16 were professional staff (architects, archaeologists, art historians), 2 were assistant conservators and about 438 were guarding staff (Zan and Paciello 2003, 68). In 2009, the personnel of the SANP totaled to 1038, of which 567 were
custodians, 191 workers and 60 professional staff, including 9 conservators. One explanation for the lack of increase of professional staff at Herculaneum could be the significance, scale and needs of Pompeii that continues to absorb most human and financial resources of the SANP.

Nevertheless, the overall shortage of professional staff is a major problem for the protection and effective management of the SANP sites, and has been identified as one of the limitations in the sustainable management of access at Herculaneum (see 9.2).

5.6 World Heritage status

Herculaneum has been part of the World Heritage List of UNESCO since 1997, together with Pompeii and Oplontis, based on criteria iii, iv and v of the World Heritage Committee (WHC). The inscription was justified as “the impressive remains of the towns of Pompeii and Herculaneum and their associated villas, buried by the eruption of Vesuvius in AD 79, provide a complete and vivid picture of society and daily life at a specific moment in the past that is without parallel anywhere in the world” (UNESCO 1997).

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9 Criteria: iii) to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared; iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history; v) to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change (http://whc.unesco.org/en/criteria/).
The three sites as a World Heritage Property are subjected to the law 77 / 2006 (see Law n. 77, 20 February, 2006), concerning special measures for the protection and public enjoyment of Italian cultural, landscape and natural sites inscribed on the World Heritage List.

The World Heritage Property of Pompeii, Herculaneum and Oplontis did submit a management plan to the World Heritage Committee that required an update and began to be reviewed with the assistance of ICOMOS, ICCROM and other experts in 2012 (UNESCO 2012).

5.7 Conservation approaches at Herculaneum

This section presents a historical overview of conservation approaches at Herculaneum with a particular focus on mosaics. The approach adopted at the site, particularly with regard to maintenance, in the early twentieth century, offers useful insights and lessons to be learned for the effective care of the site today (see 9.3).

5.7.1 Definition of maintenance in the Italian context

Before proceeding, it is necessary to explain how maintenance is defined in the Italian context, as this is an important aspect of conservation practice at
Herculaneum. Ordinary maintenance is preventive maintenance and refers to the actions carried out prior to damage, such as cleaning and removal of weeds. Extraordinary maintenance is corrective maintenance and refers to the remedies needed after some damage has occurred and usually implies minor repairs (Watt 2009, 1-2). For example, in the case of mosaics, this includes infilling of lacunae, consolidation and repair of edges, among others.

5.7.2 From routine site maintenance to sporadic, one-off conservation projects

One of the legacies of Maiuri was the routine site maintenance programme he established in the early twentieth century. A permanent workforce of craftsmen within the heritage authority undertook the conservation, restoration and maintenance of the excavated buildings (see 4.2.4). Ordinary maintenance, supplemented by extraordinary maintenance activities was what kept the site in a good state of preservation until the 1980s.

For mosaics, periodic control of their condition included cleaning and the infilling of lacunae with tesselae, which were collected from other parts of the site during excavation; in the absence of tesselae, workers would use cement and later cement-based mortar (see Appendix 6). Preventive measures, such as periodic
covering of floors with clear river sand were also adopted during the wet season for protecting decorated floors not under a roof (see Appendix 6.1).

In-house maintenance staff until the 1980s consisted of technical specialists in different fields, such as wall paintings and mosaics. Their numbers began to be reduced following Maiuri’s retirement in the 1960s and continued in a downward line until the late 1980s, when the in-house maintenance programme came to an end (Wallace-Hadrill 2011, 318). This was the result of the introduction of more rigorous European health and safety standards in the workplace that required the upgrade of facilities for maintenance activities (Figure 5-2). In the absence of funding, in-house facilities had to be closed. Maintenance staff was thus unable to operate effectively and address the maintenance needs of the archaeological fabric. Their responsibilities were reduced to day-to-day minor activities, such as painting barriers for preventing access (Thompson 2007, 192). As a response to the new health and safety standards and the lack of financial resources, the SANP began to use external contractors to meet any conservation emergencies that arose (UNESCO 2011, 11).

This reality was exacerbated by the changes in the funding of maintenance in 1976, with the First Special Law for Pompeii (Law n. 216, 12 April 1976). With this law, maintenance had to be funded from special funds (art.1, 4/1976, n. 216) as opposed to regular expenditure (Cherchi 2014; UNESCO 2012, 1). Thus, the
planning of conservation had to specifically consider maintenance as a one-off conservation project from external funds and not from the regular expenditure SANP funds.

As a consequence of this reality, outsourcing for maintenance and restoration became the only way for conservation work to take place at the site. However, in the absence of daily care, conservation problems and needs became much more serious, requiring larger contracts and more funds to be dealt with. In addition, the Soprintendenza’s approach to conservation favoured interventions that yielded immediate visible results, over site-wide initiatives addressing the broader needs of the site. As such, interventions were planned and outsourced as one-off projects on single buildings or one-off major visitor initiatives, such as the site interpretation programme (see 5.8.5). The Soprintendenza struggled to manage and successfully complete such projects, not only due to financial constraints and the shortage of in-house professional staff but also due to the absence of effective bureaucratic procedures, which were designed for the regulation of public works and not for conservation projects (Wallace-Hadrill 2009, 203).
As a result, escalating decay soon became a reality at the site (Figure 5-3) and led to the closure of buildings that were unsafe for the visiting public. By the end of the twentieth century only a third of the site was open to the public (Figure 5-4), as opposed to the whole site in the 1960s (Guidobaldi 2006, 136). The very closure of buildings became another factor that exacerbated deterioration processes. The buildings closed to the public were left unchecked for decay, while the pressure on the buildings that remained open was intensified (Thompson 2007).
Figure 5-3 (Top) Decumanus Maximus in 1984. The overgrowth of vegetation and lack of maintenance of the site was the result of the changes in the management and conservation in the 1980s, Photo: HCP/ SANP.

Figure 5-4 (Bottom) Buildings open to the public in the 1990s at Herculaneum, when decay was taking over the archaeological remains, thus making buildings a risk for visitor access. Photo: HCP
5.7.3 The Herculaneum Conservation Project

As a response to the derelict state of conservation of the site by the late 1990s, under the direction of the Soprintentente of Pompeii at the time, a plan of conservation interventions was prepared for the site in 2000 (Guidobaldi 2005, 9). This was the first time that issues of deterioration and decay at the site were addressed in a systematic way by the heritage authority. The plan included interventions on a house-by-house basis, starting from the buildings with high historic and archaeological values, such as the House of Bicentenary, the House of the Atrium Mosaic and the House of the Wooden Furniture, among others (Guidobaldi 2005, 9).

About the same time, the Packard Humanities Institute (PHI) through its President, Dr. David W. Packard, expressed an interest in assisting the SAP. In 2001, a three-year memorandum of understanding was signed between the SAP and the PHI, where the latter would provide financial and methodological support to the former in addressing the critical state of the site. This new initiative, the Herculaneum Conservation Project, brought together a team of specialists under the supervision of a scientific committee to analyse the problems of decay and to experiment with solutions and address emergencies (Wallace-Hadrill 2004, 203). Financial support included reimbursement for
works to the *Soprintendenza*, which were approved by the scientific committee and monitored as pilot projects (Guidobaldi 2006, 137).

A major component of the project was the use of *Insula orientalis I*, as a case study for investigating the conservation problems affecting the site and for developing and testing conservation and restoration solutions, applicable to other parts of the site (Thompson 2007, 195). Through this initiative it became clear that a site-wide methodological approach was needed for addressing the conservation problems, different from the existing block-by-block or house-by-house approach of the *Soprintendenza* (see 5.7.2).

Furthermore, it became evident that the *Soprintendenza* was in need of additional operational input in the execution and management of conservation works, as the specialist staff of the *Soprintendenza* were too few (see 5.5). Input was needed for adopting a different methodological approach for conservation and a faster route for implementing the proposed conservation works. Through a special sponsorship agreement in 2004, the British School at Rome (BSR) entered the project as a third partner (see Sponsorship agreement n. 535, 21 June 2004). This new framework allowed operational support to be provided for the delivery of the site-wide campaign with the private partner appointing professionals and commissioning works directly on site. This private commissioning route of
specialist contractors bypassed some of the steps required in the slow public route, but was carried out with close supervision by the public heritage authority.

As a first step, a site-wide campaign was carried out for identifying and resolving areas at risk, placing particular emphasis on slowing down decay and eliminating its causes across the site (Thompson 2007, 195). From 2004 until 2010 the focus of the project was to control deterioration stemming primarily from the presence of water and from lack of maintenance. Various campaigns of emergency interventions on the structures and decorative surfaces, as well as works on reinstating the infrastructure of the ancient town, through water collection and disposal and roof repairs, have succeeded in stabilising the condition of the site and in returning about 1400 m\(^2\) of it to the public by 2007; since then almost two-thirds of the site have been returned to the public. The project aimed that by 2014 the houses that have been closed for more than twenty years, such as the House of the Telephus Relief, and the ancient shoreline, would be opened to public access (Herculaneum Conservation Project 2011).
As the site has been brought under control, efforts have turned to the development of strategies for programmed maintenance (ordinary and extraordinary) by taking into consideration the limitations of the existing management system (Guidobaldi 2010). For this purpose, the partnership between PHI, the Soprintendenza and BSR has evolved with a modification in the 2009 renewal of the SANP-BSR sponsorship agreement. This foresees that the private partner not only carries out conservation works and other activities directly, but also draws up conservation proposals for the SANP to implement, and contracts them out under the public works law. This is the first phase of the gradual exit strategy of the partnership, when the HCP downsizes radically as the SANP takes on programmed maintenance in a comprehensive way (it began in 2014). As a step in this direction, the 2009 change marks a financial shift in the partnership, where the SANP shares the costs of the conservation works at the
site: maintenance activities and work on infrastructure are being funded directly by the SANP’s annual budget (a minimum of 1 million Euros on an annual basis from ticket sales) (HCP 2010). These funds are ring-fenced for Herculaneum from the budget of the SANP. Periodically, additional initiatives for safety, conservation and enhancement initiatives are also being funded by the SANP.

The overall aim of this substantial contribution of the project is to translate into documentation, tools and guidelines the experience and knowledge accumulated until now by the HCP regarding the conservation and management of the site. Following the takeover of programmed maintenance by SANP, it is hoped a team of specialists will continue to provide support and supervision of the conservation works at the site for a period of time to be determined but will constitute the last phase of the exit strategy (HCP 2010).

Apart from its main focus on conservation activities, the project has made significant contributions to the archaeological knowledge of the site (see 4.2.4). A vital outcome of the HCP is the approach developed for the management of information of conservation activities through a GIS database. This includes the documentation and mapping of all interventions, including post interventions documentation (*post-operam*). The GIS database will be used as a management tool for site conservation activities, including maintenance, especially valuable
for the *Soprintendenza* as HCP withdraws. It is hoped that the collected data for this research will be ultimately integrated in the GIS database of HCP (see 3.7.1).

As the project’s vision of conservation expanded from an *Insula* perspective to site-wide initiatives, it became clear that the sustainability of the project is inextricably dependent on the interactions of the ancient town with the modern urban landscape. Various initiatives have been created in re-establishing a link with the community of Ercolano, managed by the International Centre for the study of Herculaneum, now known as the Herculaneum Centre, which has strong links with the HCP. The Centre was founded based on an agreement between the *Soprintendenza*, the local city Council of Ercolano and the BSR (Wallace - Hadrill 2007, 189).

Part of the future plans of HCP’s activities include the construction of a new museum complex at the site of Herculaneum, as proposed by David W. Packard, the main sponsor of the HCP activities (HCP 2010, 30). This would include the construction of a new museum complex in the place of the existing one, currently closed, or the renovation of the existing building to a complex suitable for hosting objects excavated from the site. At the moment of writing the thesis nothing more concrete was established on this front of the HCP activities.
The role of the sponsor on prioritizing and planning of conservation activities

The uniqueness of the HCP also stems from the special interest and active role of the sponsor, in influencing the overall process of decision-making for planning and prioritising conservation activities (HCP staff 1 2010, personal communication). According to staff of the HCP, one of the reasons that conservation has been given a priority in the planning of interventions on site and over other aspects of site management such as interpretation, has been partly due to the preference of the sponsor in spending the funding on physical conservation first, and ensuring that the site is returned to a stable state of conservation, before other aspects are addressed. Thus, it has only been possible at this last phase for HCP to address interpretation and visitor management concerns at the site, including the opening of the museum.

5.7.4 Mosaic conservation in the context of HCP

The HCP approach to conservation is also reflected in the adopted approach to the conservation of mosaics. According to Pesaresi and Martelli Castaldi (2007, 231), the main shift has been the introduction of “emergency measures and maintenance before and during the planning and implementation stages of longer-term measures.” This has been achieved by planning and carrying out interventions in different spheres of work, as follows.
Preliminary investigations and planning for emergency interventions or extraordinary maintenance for decorative surfaces (2004-2007)

Preliminary investigations and planning began in 2004 until 2005. This first phase aimed at understanding the extent and severity of decay through the mapping of the state of conservation of the mosaics and other decorative surfaces. The objective was to identify and assess areas at risk representing a danger to and from people (visitors and conservation personnel), and to provide brief indications of the causes of deterioration (Pesaresi and Martelli Castaldi 2007, 220). The areas were mapped and used as a monitoring tool and as a basis for prioritizing interventions and maintenance planning through the GIS database.

Following the initial mapping in 2004, periodic updating every 2 to 3 months took place based on site surveys, supplemented by input from the custodians and other team members (Martelli Castaldi 2009).

A team of 10 conservator-restorers based at the site since late 2004 was responsible for carrying out emergency interventions, which were prioritized based on the following criteria: archaeological value, severity of decay and risk to visitors and from visitors (Martelli Castaldi 2005c). The aim of the interventions was to stabilize the mosaics and to prevent further losses until further conservation interventions could be planned (Martelli Castaldi 2005b). They were thus implemented only in areas judged to be in serious risk of loss. They included the following actions (Martelli Castaldi 2005c):
1. Documentation of the area to be treated before and after the intervention, and mapping of the phenomenon of decay;

2. Cleaning and removal of dirt, roots and plant from the areas with deteriorated preparatory layers and detachments, followed by the injection of hydraulic mortar to consolidate the layers;

3. Grouting to the areas affected with detachment or bulging using hydraulic mortar;

4. Filling of lacunae with soft mortar (non dura) that is easy to remove or reinforcing the borders with hydraulic mortar (see 7.10.2).

Conservation planning on a house-by-house basis (2004-2007)

A more systematic and detailed approach to conservation of decorative surfaces was developed on a house-by-house basis for selected buildings with the ultimate aim of achieving sufficient stability (but not an exhaustive conservation intervention) to allow public access to be reinstated. Twenty-one buildings were chosen based on their significance or the severity and extent of decay of their decorative features or structure (Pesaresi and Martelli Castaldi 2007, 224). For these, more detailed documentation was carried out with specifications on costs and labour needs for the execution of the recommended interventions.
These interventions were carried out in coordination with structural building interventions, in collaboration with the project manager of architectural interventions. A total of seven buildings were completed by 2009, while partial interventions have been carried out on the rest as resources allowed, since priority was given to the completion of structural works concerning the roofs (Martelli Castaldi 2009, 228).

*Prioritizing interventions (2004-2007)*

As the emergency campaign evolved, a simple system was developed for assessing and quantifying the urgency of each recommended intervention stemming from the data collected from the first phase. A form was completed for each recommended intervention, and its priority was assessed as “urgent, medium, or low urgency”. This was achieved by assigning numeric values from 1 to 20 to a number of criteria on the form, such as the rating of the mosaics’ artistic/historic values, the costs for interventions and the severity of condition. Other secondary criteria were also considered and rated, such as the level of risk from and to visitors, the presence of roofing, coordination with other structural works planned on different materials, climate factors and areas open and closed to the public (Martelli Castaldi 2009, 227). Each of these forms required budgetary approval for the specific campaign in order for interventions to be carried out.
Ordinary maintenance interventions (2006-2007)

The experience gained from the emergency interventions works since 2004, was used as a basis for creating the first plans for ordinary maintenance. This was achieved through periodic visual controls of condition every 2 to 3 months by the conservator-restorers team to the areas where interventions were carried out, especially before, during and after the peak-visiting season. This included consolidation, biocide, and other ordinary maintenance treatments. It was first carried out in the seven buildings where detailed interventions were completed and opened to the public in 2006 and 2007 (Martelli Castaldi 2009, 229).

Systematic campaigns of ‘extraordinary’ maintenance (2008-2011)

The emergency interventions drew to a close in 2007 having addressed the areas of the site that could benefit from the HCP campaign. Some were excluded pending SANP projects to be implemented, or because the complexity of the conservation problems required more substantial capital projects (HCP staff 1 2011, personal communication). The focus shifted to experimenting and delivering structured campaigns of ‘extraordinary’ maintenance in specific areas of the site, which united works on structures and decorative surfaces effectively and were followed by ordinary maintenance. The campaign on Decumanus Maximus resulting in the reopening of the street to the public is perhaps the most successful example (HCP 2011).
In parallel, the first works contracts were planned for SANP implementation. Works campaigns under the SANP budget in 2010 addressed outstanding priorities for repairing and substituting shelters and associated work on decorative features. However, works campaigns planned under the same budget in 2011 began to take on a structure that mirrored the works on the *Decumanus Maximus*, uniting ordinary with ‘extraordinary’ maintenance (HCP staff 1 2011, personal communication). Similarly, a campaign was developed for mosaics in accessible areas, again uniting ‘extraordinary’ with ordinary maintenance.

The benefits of the GIS for planning, implementing and monitoring these types of work, became more and more evident and led to the decision in 2010 to make an important capital investment in creating a rigorous body of documentation systematically documenting all decorative features, mosaics included, for the first time (Puglisi *et al.* 2011). These data are being united in the GIS and will form the backbone of ongoing planning for the triennial programmed maintenance cycles for the site, which SANP will launch in 2014.

The nature of works on mosaics in the years 2008 to 2011 were sporadic as they were not based on the system used in the earlier years. The site-wide condition checks of the previous years continued, although not as frequently as before. This was due to the fact that a new conservation project of the mosaics was in the
process of being developed in 2010 (Puglisi 2010b), and finally implemented in 2012, which was planned to form the backbone for determining routine and extraordinary maintenance needs for the mosaics.

**HCP planning and SANP implementation: the conservation and maintenance of the mosaics in areas of the site open to the public**

The site-wide mosaic campaign merits further attention. It was planned in 2010 by the HCP team in collaboration with the SANP and implemented by the latter with works starting on site in early 2012 (within the “HCP Joint Programming” (HCP 2010, 13). The project proposals were based on interventions stemming out of a “rapid” condition survey campaign of the mosaics carried out in 2010 by the HCP team and its consultants (Puglisi et al. 2010). The contract value of the project, about 650,000 euros, was approved by the SANP and following a tendering process, the project was contracted to a regional company who made the best technical and financial offer, the most common basis for the tendering process in Italy through the public works route. The same company is responsible for the maintenance plan for the mosaics for the next two years. The conservation project includes, apart from cleaning and stabilization of the mosaics, the removal of cement-based mortar repairs and their replacement with lime mortar (Figure 5-6). The project also foresees the closure of certain areas currently open to the public and the opening of additional areas currently not accessible.
Following this campaign, selected mosaics currently open to the public will be closed off, while others currently inaccessible will open to access. The programmed maintenance will be put in force following the completion of the conservation campaign. This forms part of the recommended proposals for maintenance that SANP has committed to carry out in the following years.

The maintenance programme is based on a set of recommendations for ordinary and extraordinary maintenance for all mosaics of the site open to access. In an attempt to facilitate the company in their work, HCP developed a set of guidelines of standardized interventions by grouping mosaics into four categories, based on two criteria: the type of exposure and visitor access (Puglisi 2010a, 1). On the basis of this, four sets of recommendations have been proposed: a) for exposed mosaics open to access; b) for exposed mosaics restricted to access;
c) for covered mosaics open to access and, d) for covered mosaics restricted to access. Of particular interest to this research are categories a) and c).

The guidelines recommend periodic control of condition every six months for all categories. Recommendations for ordinary maintenance for categories a) and c) include surface cleaning of deposits from the mosaics, removal of microbiological growth and vegetation from the interstices and along the borders. It is suggested that these activities are carried out preferably in spring and autumn, although the final time frame of interventions is to be decided following the conclusion of the conservation project. According to the conservator of the HCP in charge of the project (Puglisi 2011, personal communication), the company is supposed to propose a detailed report for each pavement, including its proposed maintenance.

Recommendations for extraordinary maintenance for categories a) and c) involve surface cleaning and removal of deposits, including salt efflorescence (which is not included in ordinary maintenance, as salts must be periodically extracted through poultices) and microbiological growth; stabilisation of loose tesserae and infilling of the interstices of the tessellatum; infilling of small lacunae and consolidation of surfaces with lime-based mortar (Puglisi 2010a). All these operations must be carried out only by conservator-restorers. The plan recommends that extraordinary maintenance for categories a) and c) is carried
out every two years. Again, this is a broad recommendation; the actual suggested
time frame would have to stem from the conservation assessment of the mosaics
and the periodic condition assessment as part of the first ordinary maintenance
cycle (HCP Staff 3 2011, personal communication).

The conservation project was completed in 2013, and its outcomes were not
satisfactory (HCP staff 1 2013, personal communication). This has been partly
attributed to the quality of work of the selected company. The HCP plans to use
the experience from this first project on mosaic maintenance as a basis for
ensuring that the companies selected for programmed maintenance are of a high
standard (HCP staff 4 2013, personal communication).

**Conservation of floors in cocciopesto and in opus signinum**

As already mentioned (see 1.3), apart from mosaics, floors in *cocciopesto* and in
*opus signinum* constitute major surface areas of floors at Herculaneum. However,
their importance at the site, perhaps due to the simplicity of their materials and
decoration, has been undervalued by the HCP in the early stages of the project.
Hence, they were not considered early on in the conservation interventions of the
site or as part of a wider conservation project, similar to the one that was
developed for mosaics. Only in the later phases has the need to address their
conservation become explicit (HCP 2013, 2). These floors will be first conserved
and then included in the programmed maintenance of the HCP-SANP (HCP 2013, 2).

The approach of HCP in not considering all floors in its attempt to address visitor impacts, has had negative consequences for the floors in *coccopesto* and in *opus signinum*, as they have suffered significantly from foot traffic, due to their material composition (Figure 5-7). As it will be discussed in chapter Seven (see 7.10), their deterioration as a result of visitor access is an indirect cause of damage to the mosaics themselves, which could have been mitigated, had the approach to their conservation been more holistic.

![Figure 5-7 The deteriorated floor in *opus signinum* at the entrance to room 7 of the House of the Wooden Partition in 2010](image)
5.8 Managing visitor access at Herculaneum

This section introduces aspects of site management related to visitors at the site. It then provides an introduction of visitors’ profile (nationality and numbers), pricing, and an overall description of interpretation and visitor management practices. This sets the context for understanding the visitor access assessment in Chapter Eight and other issues related to the management of access discussed throughout the thesis.

In Italy, the responsibility for the visitor experience at cultural heritage sites, in particular the interpretation and educational activities, belongs to the Direzione Generale per la Valorizzazione del Patrimonio Culturale of the Ministry, which is a different sector to the one of the SANP. According to article 6 (1) of the Code for Cultural Heritage (Legislative decree n.63, March 26, 2008), enhancement (valorizzazione) is defined as the regulation of the activities aimed at promoting public awareness of cultural heritage and ensuring the best conditions for public use and its enjoyment. This includes communication and promotion, such as educational activities and territorial promotion.

The educational activities for schools, as well as the creation of interpretive material for sites are carried out by private bodies that collaborate with the
respective Soprintendenze. Furthermore, the funding for such initiatives is usually external and has to be approved by Regional Council of Campania. For example, the interpretive programme at Herculaneum and Pompeii developed in 2000 was funded by European funds received by the Regional Council of Campania and then passed on to the SANP (Archaeologist 1 2013, personal communication).

5.8.1 Past visitor access
The vision of Maiuri was to turn Herculaneum into an open-air museum with many finds displayed in situ. This he succeeded, by allowing visitors to enter inside the buildings and view their interiors and the objects on display (Figure 5-8). Thus the free access enabled throughout the site has determined the interpretation approach since then.

It is not clear whether the level of access granted to the site, especially in relation to the mosaic floors was deliberately determined as such by Maiuri, or it was never explicitly thought about due to the limited number of visitors at the time to the site. According to his assistant at the time (SANP archaeologist 1 2010, personal communication), Maiuri had thought about the potential damage caused to the mosaics through access, but it could not be addressed in practice due to lack of sufficient funding, as most of the funding was given for the excavation and reconstruction of the site.
Despite the initial drive for this approach to access, Maiuri had succeeded in establishing an approach to visiting a site that was innovative in the context of his time. The open-air museum approach to presentation lasted until the WWII. After that, the gradual increase of visitors, together with the increased risk of theft, led to the removal of most objects on display to storage (Camardo 2007).

Notwithstanding the opening of the site as early as the 1920s, Herculaneum did not attract many visitors, as opposed to Pompeii, which became the most popular destination in the region. It was only with the excavation of the ancient coastline in the 1980s that visitors to the site increased significantly (Archaeologist 2 2010, personal communication).

Although there is no precise date available of the opening of the site to the public, evidence suggests that it was open for visits in the mid-1920s onwards, despite ongoing excavations (The Blue Guide 1925; Touring Club Italiano 1927). Opening hours were initially limited to 10 to 12 in the morning and 14 to 16 in the afternoon, while entrance was free on Sundays.

The buildings with mosaics included in the research (see 4.5) have always been opened to public access since their excavation, with the exception of the House of the Black Saloon, which was periodically closed in the 1990s (Custodian 1 2010,
personal communication) (Appendix 6.9). In contrast, other buildings have been closed for more than twenty years, such as the House of the Bicentenary and the House of the two Atria (Custodian 1 2010, personal communication).

As the collapsing site has been made more stable (and accessible), visitor management has come to the fore as another main pressing issue to be addressed by the HCP. More specifically, as HCP activities onsite are currently moving towards the development of guidelines for maintenance cycles (see 5.7.4), thus reducing full-scale conservation activities, there is increased interest to update the interpretation of the site and make it more relevant to conservation objectives. This is also in line with the plans to develop and re-open the site museum (Court

Figure 5-8 Display case in the *triclinium* in the House of the Beautiful Courtyard in 1939. Photo: SAP, C2790
2010) (see 5.7.3). The need to address site interpretation and the overall visitor experience has also been acknowledged by SANP, particularly for Pompeii, as it gets about 2 million visitors per year, and the lack of visitor management measures leads to significant impacts on the condition of the fabric (UNESCO 2011).

5.8.2 Current visitor access

Herculaneum is open to the public every day from 8:30 to 19:30 from April to October, and from 8:30 to 17:00 from November to March. Entry tickets cost 11 Euros each. Students from the European Union (EU) under 18 are free, as well as EU senior citizens over 65. Special discounts also apply for EU citizens between 18 and 25 years old, for which the ticket is 5.50 Euros. An additional ticket at 20 Euros is available for visiting the site in combination with Pompeii, Oplontis, Stabiae, and Boscoreale and is valid for three days (SANP website). Tickets can also now be bought online through the Pierreci/Coopculture website. Booking is obligatory for schools, through Pierreci, and a fee of 10 Euros is charged. Each school booking must not exceed the limit of 50 students (Pierreci website).

5.8.3 Current visitors

So far very little has been researched on visitors at Herculaneum, with regards to their profile, expectations and satisfaction from their visit to the site. The need to
address this gap has been acknowledged by Guzzo (2004, 78), a previous Soprintendente of SANP, who saw the need to gain a better insight of visitors to the Vesuvian sites, as a basis for developing more effective visitor strategies and providing a better visitor experience.

The only available information on visitors comes from past visitor surveys at Herculaneum and Pompeii. An example is the survey carried out at Pompeii and Herculaneum in 1997 on visitors’ profile and itineraries in the Vesuvian area (Manente and Minghetti 1998). The survey consisted of a total of 5,700 questionnaires, of which 800 were collected at Herculaneum. The demographics of the sample do not distinguish between the two sites, and they indicate that more than 60% were foreign visitors coming from the USA (20%), the UK (14%), Germany (12%), France (9%) and Japan (5%).

The visitor survey carried out by the local Istituto Superiore “Adriano Tilger” during the two weeks at the end of February until the beginning of March in 2007, provides supplementary information on the nationality of visitors, although sample size is not available (Court 2010). According to the sampled population, about 50% were Italian, 23% French, 15% from the UK and USA. The difference between the two surveys in terms of nationality could be attributed to the different sample, and to the season in which the survey was carried out, including the days of the week, as weekend days receive more Italians.
These surveys, together with the demographics obtained from my survey and interviews (see 6.4.1), suggest that the majority of visitors to the site are from Europe, such as the UK, France, Germany and the Netherlands. Non-European visitors come from the USA and less from other continents, such as Asia (namely Japan). Italian visitors are proportionately fewer. Although no official statistical data are available, based on information obtained from members of staff at the site ticket office, about 40% of the visitors are Italian. They tend to come on the weekends and during the holiday periods, especially Easter, and on free access days to the site, such as in May, the Month of Monuments, when entrance to monuments are free (site ticket office staff 2 2010, personal communication).

Three types of visitors come to Herculaneum: school groups, independent visitors and guided groups.

School groups

School groups constitute a significant population of visitors. Most school groups coming to the site are Italian schools, mainly primary schools. They visit during the months of April to May. Foreign schools visit throughout the year, with peaks in early autumn, Easter and summer holidays.
Schools constitute the highest group of non-paying visitors to the Campanian sites, which is a significant part of the total visitor inflow. Data available for the years 1996 and 1997 demonstrate that non-paying visitors are higher in numbers than paying visitors for almost all sites except Pompeii and in some cases the difference is remarkable (Figure 5-9 and Figure 5-10). For example, Oplontis and Stabiae had only non-paying visitors in 1996. For Herculaneum, non-paying visitors are higher for both years.

Figure 5-9 Visitor numbers to the archaeological sites in Campania in 1996. Source: Zan 2002, 100
Independent visitors

Independent visitors come to the site in groups, either with friends and/or family.

Guided groups

Guided groups represent groups of more than ten persons who come to the site as part of a package tour or a cruise group. The former are usually based in the Sorrento peninsula and take daily excursions to cultural sites in the area (Guide 4 2010, personal communication). Their numbers increase in late spring and summer months.

Cruise groups constitute not only an important population of guided groups, but also a significant portion of cultural tourism in Campania. Their sightseeing tours
include the main archaeological sites and museums of Campania and other regions depending on the time they have at their disposal. Even though numbers of cruise visitors to Herculaneum are not available, the chart below (Figure 5-11) with the total numbers of visitors arriving at the port of Naples for 2011 (in transit or for a holiday in Italy)\textsuperscript{10} provides an idea of the visiting trends of cruise groups to the region and to the site. July is the busiest month of the year, followed by the autumn and spring months.

\begin{figure}
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\includegraphics[width=\textwidth]{chart.png}
\end{figure}

\textsuperscript{10} http://www.porto.napoli.it/en/statistiche/stat3.php
5.8.4 Visitor numbers

Herculaneum is the second most visited archaeological site in the Vesuvian area (Figure 5-12). It receives only about a tenth of the visitor numbers as Pompeii, but six times more than Oplontis. A closer look at the site annual visitor numbers indicates that they have been on the increase since 1985 (Figure 5-13).

![Visitor numbers graph](image-url)

Figure 5-12 Visitor numbers for the three sites of the World Heritage Property, Pompeii, Herculaneum and Oplontis, for the years 2000-2013. Source: SANP.
Figure 5-13 Annual visitor numbers at Herculaneum for the years 1985-2013. Source: SANP.

Annual visitor flow

Visitor statistics provide an insight to the annual visitor flow to the site, showing more or less a stable pattern for the period 2000 to 2011 (Figure 5-14). The average monthly visitor numbers help to identify site visitation levels (Figure 5-15). According to the data available the peak season is April to May. The medium season includes March and June to October. The low visiting season includes January to February and November to December. Another study on seasonality patterns to the main Vesuvian sites (Polese 2011, 16) had similar findings, with the main difference being that August was classified as a peak month.

The high increase in March to May is attributed mainly to the influx of schools, mainly Italian. This is reflected in the bookings of schools to the site for the
months of November 2008 to July 2009, which demonstrate a similar peak in this period (Figure 5-16).

Figure 5-14 Monthly visitor numbers at Herculaneum for the years 2000 to 2011. Source: SANP.
Figure 5-15 Average monthly visitor numbers to Herculaneum for the years 2000 to 2011. Source: SANP.

Figure 5-16 School groups to the site for the months of 10 November 2008 to 8 July 2009. Source: Pierreci.
Using the data on visitor numbers (Figure 5-14) with additional information on seasonality per visitor type collected from the site ticket office personnel, it was possible to extrapolate an annual visitor seasonality pattern per type (Figure 5-17). This indicates schematically the monthly visitation levels for visitors at the site. It is clear that April and May are the months that receive most visitors, as it is then that large groups coincide (schools and guided groups).

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Figure 5-17 Schematic presentation of annual visitor flow to the site per visitor type based on monthly visitor numbers and visiting trends obtained from the personnel at the site ticket office.

**Daily visitor flow**

Although there is no official data available on daily flow, information deriving from the visitor counters installed by the HCP at various buildings with mosaic floors in 2010 to 2011, provides an overview of daily flow (see Appendix 2.4). Overall, numbers in the summer season start increasing around 10:00 hours and gradually peak from 12:00 to 14:00 and then increase again at 16:00 to 17:00 and...
then start decreasing until closing time (Appendix 2.4, Figures A2.1 – A2.10). In the peak season, groups and schools coincide in the late morning hours, thus leading to overcrowding at certain areas within the site (see 8.3), which gets exacerbated on Wednesdays and Fridays, when cruise groups visit.

Further information is available for school groups flow to the site. According to ticket sales office staff (2010, personal communication), only one group can enter the site in a twenty-minute slot. Hence for the peak-visiting season, this would mean that about 3 groups enter the site per hour, and an average of a total of 25 groups per day, considering that the last visit is usually around 17.30 hours. If the average number of students in each group is 25, as documented in macro-level observations (see Appendix 2.1), this translates to about 75 students on-site per hour during the peak season, which is a manageable number. However, according to ticket office staff (2010, personal communication), timed bookings and group numbers are no strictly enforced, and this results in having more than three groups onsite each hour. This was also reinforced from onsite observations, where many schools groups entered the site simultaneously (Figure 5-18). Unfortunately, no information exists on the daily flow of guided groups, or even independent visitors to understand in a more comprehensive way visitor flow into the site.
5.8.5 Site Interpretation

The interpretive approach of the SANP at Herculaneum, also reflected in its other sites (mainly Pompeii and Oplontis), is focused on the provision of information through interpretive tools that are not intrusive to the archaeological remains. The current approach follows that of Maiuri that aims to present the site as an open-air museum. As a result, there is very little signage, including interpretive panels, on site. These are only found in the House of the Stags and the House of the Beautiful Courtyard. Additional panels describing conservation activities are found at the exterior of some buildings with ongoing conservation work, such as the House of the Tuscan Colonnade. Hence, physical access and direct experience
of the archaeological remains can be considered as one of the main aspects of the interpretive approach adopted at the site.

Cognitive access is provided through the official SANP interpretive tools (audio guide, map and booklet), or personal interpretation (official guides and educational guides for schools), which also influence physical access. The current interpretation tools on offer by the SANP at Herculaneum were developed in 2000, as part of a wider project towards an institutional identity for the local heritage authority when it gained autonomy in 1998 (Court 2010). Additional options have been developed in recent years for schools and independent visitors, including the visually impaired (see 5.8.5).

The map and the information booklet

These are given to all visitors on their arrival at the site as their costs are covered by the ticket price (see 5.8.2). The map shows the archaeological site with the most important buildings worth visiting in three dimensions and the rest in two dimensions (Figure 5-19). Not all of the former, however, are accessible. Since the commencement of the HCP, many areas highlighted as open on the map have been closed, while others currently open to access are not highlighted on the map. For example, the House of the Hotel is currently open to access, but it is shown as closed to access.
Furthermore, each building is numbered, and each number corresponds to numbered locations at the site. The map offers an itinerary for the visit with suggested stopping points, which are numbered based on the corresponding locations onsite. These numbers are also found in the audio guide and the booklet (Figure 5-20). This allows the map to be used with the audio guide as well. The map is printed in Italian and English.

The booklet provides information on the suggested numbered buildings shown on the map with a short text and a photograph (Figure 5-20). A short glossary at the back helps visitors understand technical terminology. The booklet is available in Italian, English, French, German and Spanish. It is worth noting that in the spring and summer season, maps and / or guidebooks may run out of print, which leaves visitors without any form of intellectual or physical guidance to the site, unless they have their own guidebooks.
Figure 5-19 The map of Herculaneum developed by the SANP. The buildings in 3D are supposed to be open to the public, while those that are not are in 2D. This does not respond to the current access afforded onsite. Source: SANP

Figure 5-20 An inside spread of the booklet to Herculaneum. Each numbered building presented in the booklet corresponds to the same number found onsite. Source: Court 2010/SANP
The audio guide

The audio guide is outsourced to the company that was commissioned to create the content based on texts provided by the SANP (Court 2010). Visitors can hire a device from a booth inside the archaeological site, before descending to the archaeological area.

Apart from information on the suggested stopping points of the visit, the audio guide has the option of additional commentaries on various aspects of the Roman world, such as wall painting styles, architecture and decorative features. It also includes information on topics related specifically to Herculaneum, such as the history of excavations and the eruption of Vesuvius. Various sounds are also added to reconstruct the experience of living in the ancient town. The itinerary offered is the same as the one offered by the map and booklet, and functions using the numbering system used for the map and booklet. The audio guide is offered to visitors at an additional price of 6.50 Euros, with the children’s audio guide at 4 Euros. Discounts are available if more than one device is hired (two for 10 Euros for adults and 6 Euros for children). Both versions are available in Italian, French, English, Spanish and German.
Guides

Visitors have the option to hire an official guide licensed by the Regional Council of Campania. Guides have to undergo training and pass the professional qualification exam. Since 2008 the Regional Council enables archaeology, art history, foreign languages graduates and others with relevant degrees to work as guides (Executive Decree n. 285, 11 June 2008). This means that they can be qualified without the necessary training, as long as they can provide evidence of the level of knowledge for foreign languages directly with the guides themselves. Both types of guides are external to the local heritage authority and thus do not officially collaborate in defining their visits to the site or in the content of their tours (Guide 1 2010, personal communication).

In contrast to Pompeii, where a new system has been introduced for guided visits in 2010 and where guides are available at the site\textsuperscript{11}, at Herculaneum most guided visits have to be booked through travel agencies or directly with the guides themselves, as very few guides are available at the site. In 2009, official prices for guided tours started at 175 Euros for a two-hour tour for a group of 1 to 7 persons,

\textsuperscript{11}SANP website (last accessed 2/10/2010):
and increase by 2 Euros for each extra person (Executive decree n. 466, 16 July 2009). For schools the prices started at 103 Euros for a group of 8 to 25 students.

Tourist guidebooks
Apart from the official site presentation at the site, visitors use their own tourist guidebooks (such as Lonely Planet, the Blue Guide and others). Guidebooks are important, as the map and booklet are not always available throughout the year and visitors have to rely on these for their visit (see 5.7.4).

Multi-sensory itineraries for blind visitors
The Herculaneum Centre in collaboration with the HCP, the SANP and the Italian Union for Blind People in 2010 developed a special itinerary specifically designed for blind people, but also for people who want to use their senses while visiting the site. The guided tour is supplemented by an audio guide and a guidebook in Italian or French, suggesting buildings to visit, and how each one of the three senses can be used in each: sight, touch and hearing. This is free and is also available online from the SANP website.\footnote{SANP website: \url{http://www.pompeisites.org/allegati/Percorso-multisensoriale_Ercolano_291110.pdf}}
Educational interpretation

Schools have various options for enhancing the education aspect of their visit. Apart from the tours offered by official guides, schools can choose an itinerary developed by Pierreci, the organization in charge of the educational activities at the Vesuvian sites and the management of the ticket office (see 5.8.2). These itineraries are developed in collaboration with the SANP and include four options: a basic itinerary and thematic itineraries focused on: the eruption of Vesuvius “The volcano tells a story” (Il vulcano racconta); the domestic life and architecture, called “I live /inhabit... therefore I am” (Abito...quindi sono); Roman food, called “Lunch with Apicio” (A pranzo con Apicio). The tours last from 2.5 to 3 hours. The costs range from 160 to 250 Euros depending on the itinerary selection, with a maximum number of 30 students (Pierreci staff 2010, personal communication, Pierreci website). The guides delivering these tours are usually young graduates in archaeology or relevant subjects and are trained by the organization, although they do not need to be qualified as official guides.

Italian schools also have the option of “live” interpretation (visite spettacolo), booked through private agencies. These consist of a site tour with stops at various buildings, where actors dressed in Roman costumes interact with the students and introduce aspects of the life in Roman Herculaneum. These are very popular among young students who seem to enjoy the interactive aspect of live interpretation (Figure 5-21).
Figure 5-21 A group of Italian primary school students taking part in a live interpretation guided visit in May 2011.

The site museum (s)

There are two museum buildings at the site, which are currently both closed to the public. The first one was built recently to host the remains of the Roman boat found at the ancient shore in 1982 (Figure 5-22). However, due to shortage of custodians, the building has been closed to the public since 2010.\(^{13}\) Adjacent to this museum is the Antiquarium, the building which was built in the 1970s for hosting the excavated objects from the site (HCP 2010, 31) (Figure 5-22). The building never functioned as a museum, and today hosts the site Office of Excavations at the SANP. As already mentioned in section 0, the HCP future plans include the creation of a museum complex for exhibiting the excavated objects from the site, of which some were conserved as part of the HCP activities,

\(^{13}\) SANP website: [http://pompeisites.org/allegati/Edifici%20chiusi%202012_120506054541.pdf](http://pompeisites.org/allegati/Edifici%20chiusi%202012_120506054541.pdf)
with the support of PHI. The aim is to recreate the vision of Maiuri for Herculaneum to be turned into an open-air museum\textsuperscript{14} that will include the display of objects from the site in an onsite museum likely to be built at the location of the existing \textit{Antiquarium}, or even re-use the existing building for this purpose.

\begin{figure}
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\includegraphics[width=0.4\textwidth]{fig522b.png}
\caption{The site museum with the boat remains on display, currently closed to public access (left) and the Antiquarium currently used as offices for SANP (right).}
\end{figure}

5.8.6 Visitor management

There is not a coherent visitor management policy at the site, probably due to the fact that so far, numbers have been within manageable levels. A number of measures currently exist, although these they are not efficient nor always enforced.

\textsuperscript{14} \url{http://www.herculaneum.org/hcp-home/ita/museo.html}
A carrying capacity has been set by the SANP, according to the ticket sales office staff (1 2010, personal communication), although it has not been possible to find out how this was decided. It is currently set to 800 persons as the maximum number of visitors to be allowed into the site simultaneously. This capacity has not been reached so far (Ticket sales office staff 1 2010, personal communication).

Apart from the obligatory booking system for schools (see 5.8.3), no other visitor flow controls are used at the site. The use of the booking system for schools is not always enforced by ticket sales office staff resulting in congestion at certain areas within the site, especially during the peak–visiting season (see 8.3).

The custodians are considered the main official tool of the SANP for controlling visitors. They are responsible for site security in general and for controlling visitor access and behaviour during opening hours. In addition, they must report any wider problems to their superiors (for example, any problems on the condition of the fabric in their assigned areas of control, or unauthorised use of cameras). At the time of data collection for this research in 2011, a total of 46 custodians were employed at the site (Figure 5-1). Their average age is 52 years old, with the youngest aged 44 and the oldest at 65 (SANP staff 1 2011, personal communication) (see Appendix 12 for the age of the custodians who were interviewed as part of this research). Custodians have to work in shifts, in the morning, afternoon and evening/night and twelve custodians have to be in the
main area of the site during each shift (SANP staff 1 2011, personal communication). In reality, however, due to the fact that many are approaching retirement, there is not always enough staff to cover these needs, and there are currently only about eight persons onsite per shift. Each person is assigned an area for which he is responsible, and this usually includes half of the main streets, namely *Cardo Superiore* or *Inferiore* in the main archaeological area and additional persons at the two entrances to the site (SANP staff 1 2011, personal communication). According to a recent analysis of the areas in square meters attributed to the total number of custodians working on site there are about 9 custodians for every 7.838 square meters, or 31 buildings (Brandolini 2012), a clear indication of the shortage of staff. It is noteworthy to point out to the fact that despite the re-opening of some areas previously closed to the public, the number of custodians has not increased proportionally. The shortage of custodians is not limited to the Vesuvian Area, but is an issue faced by various *Soprintendenze* in Italy, including that of Rome, where the staff has decreased to half in comparison to the numbers in 1997 (Gratoggi 2013). Overall, custodians are retiring but are not being replaced, primarily due to lack of financial resources.

Another issue central to the way custodians fulfill their responsibilities in controlling visitors and physical access is the unauthorized guided tours that some provide to the visitors in exchange for a small fee, much lower than the
official guides’ charge. This situation was also observed at Pompeii (UNESCO 2011). It has a long tradition in the region, already mentioned as a problem in the tourist guidebooks of the 1920s (Blue Guide 1925).

5.9 Conclusion

This chapter introduced the management context of Herculaneum in terms of its legislative, institutional and administrative framework. It also presented an overview of the conservation approaches at the site with a specific focus on the mosaics, followed by an overview of the visitors and the management of access, including interpretation and visitor management approaches.

The current operational and institutional framework at Herculaneum is particularly complex like all sites under the umbrella of the SANP. This complexity is manifested in the realm of human resources management, and in the planning and implementation of conservation work. The site lacks in-house professional staff, such as conservators and archaeologists, and has recently been faced with a shortage of custodians. Furthermore, inefficient staff cannot be replaced as the site director has no control over the site staff, who are directly managed by the Ministry in Rome. Along with these aspects, the changed approach to maintenance and the preference of the Italian sector to outsourcing as opposed to in-house resources led to an exacerbation of the condition of the
site and to a rapid escalation of decay since the late 1980s. The HCP has succeeded in controlling decay through a site-wide approach to conservation planning and interventions and routine maintenance. The challenge remains as to whether it will successfully translate its approach to guidelines of practice for routine (ordinary) maintenance to be handed over and used by the SANP in managing conservation.

Unlike conservation, site interpretation has received very little attention in the last years at Herculaneum. The interpretive program at the site was developed in 2000 although it could be argued that Maiuri had established the main interpretive approach at the site in the late 1920s, through his vision to transform Herculaneum into an open-air museum. His successors continued along this practice, and thus free, direct physical access has been an essential component of the interpretation at the site.

Similar to interpretation, there are no explicit measures practiced at the site regarding visitor management. The custodians, the only official group for managing visitor movement and behaviour, do not all respond to the responsibilities of their position. This results in an inefficient and understaffed team that cannot be improved or replaced due to the limitations of the Italian system.
Despite the limitations that exist in this complex bureaucratic reality of the Italian system, there are a number of opportunities that have the potential to be used for improving the existing situation at Herculaneum, in terms of visitor management and conservation. These will be discussed in further detail in Chapter Nine. Before doing so, it is necessary to first understand the role of direct access to the visitor experience, as a basis for modifying the existing reality to protect the visitor experience. This is the purpose of the next chapter, Chapter Six.
6 Experiencing Herculaneum: The role of access

Having presented the background context of the case study, this chapter addresses one of the key aims of the research (see 1.2). The chapter considers the role of access to the experience of visitors at archaeological sites as this is explored at Herculaneum. It examines how access into the buildings and on the mosaics influences the ways visitors experience the site.

The chapter presents the results of the data collected and analysed from the visitor surveys in 2009 and 2010 (Appendix 10) and interviews (Appendix 11) supplemented by unstructured observations (see 3.5.6). The first part of the chapter presents the methodological considerations in the development of the visitor survey and interviews and an overview of the data collected with each technique. This is followed by an overview of visitor profiles before presenting and discussing the results of this research component.

6.1 Methodological considerations

The exploration of the role of direct access to the visitor experience followed an iterative approach. It first explored the role of access on the mosaics through the survey in 2009. Reflecting on the data analysis of the open-ended questions on

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experience (questions E1 and E2, Appendix 10.1), the method was modified in 2010, as it became clearer that further insight could be gained through visitor interviews and by broadening the perspective to the buildings with mosaics as a pre-requisite of understanding the role of access to gaining a sense of place. This led to the development of the interview questions in 2010, which formed the main instrument for this research component.

The qualitative responses from the survey and the interviews were transcribed and analysed in Atlas.ti, following the method of analytic induction and the identification of themes, as described in Chapter Three (see 3.7.3). The results are presented in sections 6.4 and 6.5.

### 6.1.1 Visitor survey

The exploration of the role of direct access on the visitor experience was explored in the visitor questionnaire through the questions developed in the themes: *Experience* (questions E1-E3 in 2009 and E1–E4 in 2010), *Motivations* (question M1), *Knowledge* (K1 and K2 in 2010) and *Other sites visited* (S1 and S2 in 2010) (Appendix 10). From these, the most relevant in exploring the role of direct access on the mosaics were those related to the *Experience* theme. The rest contribute to a better understanding of the profile of visitors in terms of their familiarity with
archaeological sites and with Herculaneum, as well as the reasons for coming to the site in the first place.

### 6.1.2 Visitor Interviews

The questions used in the interviews reflect the themes employed in the visitor survey (Appendix 11). The questions were not asked in the same order during the interviews and some questions were not asked as they were answered in a previously asked question.

As already mentioned in Chapter Three (see 3.5.5), if visitors were in a group or in a couple, one person was asked to participate. In the case of couples, however, it frequently occurred that the other person would also participate in the conversation. These responses were also included in the transcription and analysis of the data, as separate interviews.

Overall, visitors were eager to respond to the questions asked. Some were less interested, which made it difficult to engage in a conversation with them. In these cases it was difficult to promote further discussion, particularly with the first interviews I conducted. Upon self-reflection following the interview collection and analysis, this could also partly be attributed to my own lack of experience in carrying out interviews. In these cases, the interviews have more of the format of structured interviews, rather than semi-structured, similar to the format of the
interviews collected by the HCP assistant project manager (see 3.5.5). Nevertheless, I decided to include them in the analysis as they still illustrate the thoughts and feelings of visitors regarding their experience at Herculaneum.

6.2 Overview of data

6.2.1 Overview of quantitative data

A total of 228 questionnaires were used in the analysis and interpretation of data. As mentioned in Chapter Three (see 3.5.4), the questionnaires handed out were 100 in 2009 and 150 in 2010. However, from the latter, 22 were returned almost uncompleted and these were not included in the sample.

Of the rest of the questionnaires, not all of the questions were completed, in particular those with an open-ended format. This was a phenomenon that occurred more frequently in the 2010 questionnaires, which had a higher non-response rate than those in 2009. For example, for question M1, the non-response rate was 50.7% in 2010 as opposed to 39% in 2009. This was attributed to the fact that in 2009 I, the researcher, was the one handing out the questionnaires and explaining to visitors the purpose of the survey. This may have been more convincing as opposed to the students who were distributing the questionnaires on my behalf.
The issue of missing data from the responses to each question, as not all questions were answered by the respondents, was addressed by considering the missing data separately for each question and indicating the number of actual responses in the presentation of the data in the text or in a chart/table.

Another issue that surfaced from the results of the survey relates to the inclusion in the sample of some visitors who were part of a guided or cruise group (Figure 6-7). These types of visitors were not selected as part of the sampled population of the survey, due to lack of time available for them to fill in the questionnaires (see 3.5.4). Those who participated in the survey presumably skipped the free time given to their groups to explore briefly the site on their own. As the decision to focus the survey on independent visitors was based on the difficulty of obtaining data from guided groups (see 3.5.4) and not on a specific focus on independent visitors, it was decided to consider this sample in the data analysis and interpretation.

6.2.2 Overview of qualitative data

The transcribed interviews provided the core material for exploring in more depth the role of access to the visitor experience at Herculaneum. As already discussed in section 6.1.2, although most visitors were eager to engage in a conversation with me regarding their experience at the site, not all responses
were elaborate and extensive. Nevertheless, overall, the data were sufficient for making informed inferences on the broader role of access to the visitor experience at Herculaneum and make sound generalisations on the issue in question.

6.3 Presentation of data

Quotes in the text refer to direct quotes from the visitor survey, while excerpts from the interviews are presented in separate paragraphs in the text. For the latter, a reference number of the respective interview is given, supplemented by a description of the respondent in terms of gender, age and occupation.

6.4 Visitor profiles

6.4.1 Demographics

Visitor survey

The demographics obtained from the survey are presented in Figure 6-1. Most of the respondents were female and 45 to 54 years old. Most came from Europe, and specifically from the UK, France and Germany. The rest came from the US, Australia, while those from Mexico and Japan were placed in the “other” category.
<table>
<thead>
<tr>
<th>Nationality</th>
<th>Gender</th>
<th>Age</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>18-24 yrs</td>
<td>25-34 yrs</td>
</tr>
<tr>
<td>European</td>
<td>Male</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>27</td>
<td>35</td>
</tr>
<tr>
<td>American (U.S.)</td>
<td>Male</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>Male</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Australian</td>
<td>Male</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

Figure 6-1 Nationality and age of the respondents in the visitor survey in 2009 and 2010 presented in terms of gender (n=228)

For the profession variable, data were categorized according to the International Standard classification of occupations (ISCO 2008), as maintained by the International Labour Organisation (ILO). ISCO (2008) provides the following classification of occupations: 1) Managers; 2) Professionals; 3) Technicians and associate professionals; 4) Clerical support workers; 5) Service and sales workers; 6) Skilled agricultural, forestry and fishery workers; 7) Craft and related trade workers; 8) Plant and machine operators and assemblers; 9) Elementary occupations; 10) Armed forces occupations. These are presented in Figure 6-2, together with the housewife, retired and student categories. These were not
included in the ISCO classification but were added in response to these groups as they surfaced from the survey results. As evident from the table, the data are biased towards higher counts in the professional occupations (category 2), with more than 50% of the respondents belonging in this category.

<table>
<thead>
<tr>
<th>Professional Groups</th>
<th>Responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers</td>
<td>18</td>
<td>9.0</td>
</tr>
<tr>
<td>Professionals</td>
<td>113</td>
<td>56.8</td>
</tr>
<tr>
<td>Technicians and associate professionals</td>
<td>17</td>
<td>8.5</td>
</tr>
<tr>
<td>Clerical support workers</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Service and sales workers</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>Skilled agricultural, forestry and fishery workers</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Craft and related trade workers</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Plant and machine operators and assemblers</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Armed forces occupations</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Students</td>
<td>29</td>
<td>14.6</td>
</tr>
<tr>
<td>Retired</td>
<td>9</td>
<td>4.5</td>
</tr>
<tr>
<td>Housewives</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Missing</td>
<td>29</td>
<td>17.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>228</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Figure 6-2 Profession categories using the ISCO classification for the profession variable in the questionnaire for years 2009 and 2010 (n=199)
**Visitor interviews**

Most of the interviewees were female (Figure 6-3). Most were 24 to 34 years and 45 to 54 years old, while the fewest were those aged 18 to 24 and over 65 (Figure 6-4). The majority were Europeans, coming primarily from the UK and France, with a lower percentage of visitors coming from the US (Figure 6-6). The profession variable was analysed using the ISCO classification. Similar to the data collected from the questionnaires, most of the interviewees were professionals (Figure 6-5).

[Figure 6-3 Gender profile of interviewees]

[Figure 6-4 Age profile of interviewees (n=72)]
6.4.2 With whom the visit to the site was made

Most visitors included in the survey and the interviews, came to the site with friends or family, thus suggesting that the visit to Herculaneum was primarily a social activity (Figure 6-7and Figure 6-8).
These findings reflect results from research carried out primarily in museums, where it has been shown that visitors tend to visit museums with other people, as part of a social activity (Merriman 2000; Black 2005; Falk and Dierking 2000; Uzzell 1998).
6.4.3 Visitors’ motivations, prior knowledge and frequency of visits to other archaeological sites

To get an overview of visitors’ familiarity with archaeological heritage, questions were asked regarding motivations, prior knowledge about the site and frequency of visits to other archaeological sites. These were added in the 2010 questionnaire (Appendix 10.2) and further asked in the interviews (Appendix 11).

**Motivations**

The results from the questionnaire on the question (with a non-response rate of 0.4%) regarding the motivations of visitors (question M1) suggest that the World Heritage Status of Herculaneum, chosen by 39%, and learning about archaeology, chosen by 38%, were the main factors for coming to the site (Figure 6-9). Enjoyment was chosen by 19% of the visitors. In the “other” category, seven responses referred to an interest in history; visiting the site again after ten years or because they studied it at school.
The responses from the respective interview question exhibited a great variety. A sample of the verbatim responses is given below:

- “Because we have been before and wanted to see it again”
- “We heard it was better than Pompeii”
- “Because I have been interested in Roman history”
- We read about it in the Lonely Planet guidebook”
- “We are staying at Sorrento and today was the day to visit the area, so we came here”
- “I studied it at school”
- “Because we like ruins, and we went to Pompeii and wanted to see what Herculaneum is like”
- “I was born in Naples, and I came with my family to visit the site.”
- “I am doing research on the history of conservation at Herculaneum”

These answers were coded in Atlas.ti, classified into ten categories and then counted, thus turning qualitative data into quantitative results (Figure 6-10).
<table>
<thead>
<tr>
<th>Categories of response</th>
<th>Reasons for visit</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A return visit</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Cultural tourism</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Comparison with Pompeii</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>General interest</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>Read about the site in books/guidebooks</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Recommended</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Specific Interest</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Studied at school</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>To take others</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>72</strong></td>
</tr>
</tbody>
</table>

Figure 6-10 Classification of responses to the interview question, “Why did you come to the site today?”

The pattern that emerges from the classification is that most visitors came either because they had a general interest in archaeology or history or because of a specific interest in Herculaneum. At the same time, the visit to the site has a strong social element, such as visiting as part of a holiday (cultural tourism). Interestingly, the World Heritage status of the site was not included by anyone as a reason for visiting, compared with the survey results. Of course, motivations for visiting the site are not necessarily mutually exclusive. In his discussion of the findings of his research on people’s motivations for visiting museums, Merriman
(2000, 56) argued that visits to museums stem out of a desire to carry out a social activity, primarily during leisure time, while at the same time they are interested in visiting out of a general or specific interest in that museum *per se*. Considering the findings about companions on the visit (see 6.4.2), it can be deduced that visitors came to Herculaneum because of their desire to visit the site during leisure time with others, and because of a specific interest in the site or in archaeology or history.

*Prior knowledge about Herculaneum*

The level of prior knowledge about Herculaneum was explored through question K1 in the survey in 2010, “How much did you know about Herculaneum before visiting the site?” (Appendix 10.2). About 41% of visitors knew a moderate amount before coming to the site followed by 34% knowing a few details (Figure 6-11). This was further explored through the multiple-choice question K2 in the 2010 survey, on how visitors found out about Herculaneum. School education surfaced as a significant source of knowledge about the site with 24.6% (Figure 6-12). Other sources included television with 22.5% and tourist guidebooks with 17.6%.
Figure 6-11 Responses to question K1 from the survey the 2010, “How much did you know about Herculaneum before visiting the site today?” (n=126).

Figure 6-12 Multiple responses to question K2 from the survey in 2010: “How did you find out about Herculaneum?”

**Frequency of visiting archaeological sites**

Question S2 in the 2010 questionnaire, “How many archaeological sites did you visit in the past twelve months?” explored the frequency of visits to archaeological sites in order to get a better idea of visitors’ perspectives of the
visit to Herculaneum. The majority of visitors (38.3%) had only been to one site apart from Herculaneum in the last twelve months, followed by those that visited two to five sites in the same period (Figure 6-13). The results suggest that visiting archaeological sites is something that visitors do, albeit with variations in the frequency of visiting.

![Figure 6-13 Responses to question S2 from the survey in 2010, “How many archaeological sites did you visit in the last 12 months, apart from Herculaneum?” (n = 126).](image)

**Visiting other sites in Campania**

Relevant to the issue of frequency of visits to archaeological sites was the multiple-choice question S1, “Which other sites have you visited/ Do you plan to visit in Campania?” in the 2010 survey. Most visitors responded that they had already been or planned to visit Pompeii (Figure 6-14). Other archaeological sites in Campania, such as Oplontis, also part of the World Heritage Site, are visited much less.
The responses to the “Other” variable included Vesuvius with 2.3% and the archaeological site of Paestum with 1.5%. The significance of Pompeii is further reinforced by the majority of positive responses to the interview questions “Have you visited / Do you plan to visit Pompeii during your visit?” and “Will you visit other sites in the area?”. These findings accord with the visitor ticket sales data that Pompeii is the most popular site in the region (Figure 5-12).

6.4.4 Evaluation of visitors’ profile

The demographics of visitors from the interviews and questionnaires indicate a bias towards the origin profile, as the majority of visitors were European, and in particular those coming from the UK and France. In both samples, very few visitors were Italian. This is attributed to the fact that this study was conducted on weekdays. According to one member of staff at the site ticket sales office (2010, personal communication), Italian visitors tend to visit on the weekends. A similar
bias is present in the occupation profile, with the majority of visitors having high rank occupations (professionals) (Figure 6-2 and Figure 6-5). As the research did not aim to examine the role of nationality or profession in the ways people experience the site, this imbalance in the sampled population was not seen as a weakness in drawing adequate conclusions regarding their experience of the site.

Apart from demographics (gender, age, profession and nationality, who they visited the site with), other issues were considered such as motivations for visiting the site, frequency of visiting archeological sites and other sites visited in Campania apart from Herculaneum. The datasets suggest that the majority of visitors are European, primarily from the UK and France, with a lower percentage coming from the United States. The majority are professionals, thus inferring a middle class background. Most are familiar with archaeological sites, as the majority have visited at least one other site apart from Herculaneum. Finally, their visit to Herculaneum is, for most, a social activity and has an educational perspective, stemming from their own particular interests, such as history or archaeology. This background helps place their own perceptions of their visit to Herculaneum and particularly their experience in a more informed perspective. The findings regarding the role of direct access to their site experience are presented in the following section.
6.5 Access and experience

Overall, access to the buildings and on the mosaics appears to have had a positive effect on the experience of visitors at Herculaneum in a number of ways. Being inside the buildings allows a form of behavioural insideness (see 2.9.1) that helps achieve a sense of place. The insideness and closeness to the material remains achieves a kind of mindfulness that contributes to learning. At the same time, access to the buildings and especially physical access on the mosaics, makes the experience affective by instigating positive feelings. However, affect is also linked with negative connotations, such as fear of damage from being in direct contact with the mosaics that ultimately points to the visitors’ desire for the sustainability of the resource. Ultimately, these effects lead to an appreciation of the site and to the potential support of its long-term preservation.

6.5.1 Sense of place

Access to the buildings at Herculaneum facilitated behavioural insideness (Relph 1976, see 2.9.1). Being inside the buildings rather than looking in from the outside, visitors could grasp the identity of Herculaneum, by observing the distinctive features of the buildings denoting their function and specific qualities. Once in, visitors were encapsulated by the well-preserved interiors (walls, floor and ceilings). They could observe details in the architectural decoration, link objects with spaces and thus develop their own understanding of the everyday
life of the original inhabitants and users of those spaces. By entering “the heart of the town” (Female, French, Secretary, 25-34 years old, I.4), they could understand the function and meaning of each building as it was used in Roman times:

“Entering into the houses made me imagine how the houses functioned, how the rooms functioned around the central area.” (Male, British, sports coach, 45-54 years old, I.52).

This level of experience helped visitors grasp the significance of the site as a Roman town. More importantly though, the past became alive through direct access:

Author: “Was walking into the buildings an important aspect of your experience at the site?”

Female: “Yes, I think that’s really important...because if you can just peer through the glass screen it would not mean as much. Actually the site today was not that busy so you could actually go into certain buildings and be on your own for a few minutes and... you know... it sort of brought the building alive.” (British, 55-64 years old, accommodation agent, I.33)

The physical closeness with the material remains from the past, allowed the past to achieve a concrete reality, as it was no longer something distant to be observed. It provided a connection with the past as visitors perceived themselves to be part of it:

Female: “Yes...it becomes more real. If you are a kinesthetic learner like I am, I actually understand it much better than if I were to look
at it in the pictures. If you look at it from the outside, you would not understand it. The fact that you are going inside and looking at the structures and everything else that is inside, adds significantly to the experience” (French, 25 – 34 years old, Secretary, I.53).

Female: “I think probably being able to go into more of them [houses]. Like here, you can go in there, and you can walk around and you go into each individual room….It is like…what amazes half the time, it is really this…. it is quite nice…you just come out of the corner and oh!…. It feels like you are just in a completely different place altogether. You’ ve got obviously all the modern houses on the top [of the site] but when you are there…you feel you are part of it, and in a completely different place altogether, which is quite nice…” (British, student, 18-24 years old, I.18).

This connection with the past was enhanced through their experience of walking on the mosaics. This is demonstrated by the results of both the survey and the interviews. In the survey in 2009, 75.3% of the responses to the question “Did walking directly to the mosaics have a positive effect on your overall site experience?” (Question E2, Appendix 10.1) were positive (Figure 6-15).

Figure 6-15 Responses TO question E2 from the survey in 2009, “Did walking directly to the mosaics have a positive effect on your overall site experience?” (n=97).
In 2010, the question was modified to “To what extent did walking directly on the mosaics affect your overall site experience?”, also followed by an explanatory “Why?” question (E2, Appendix 10.2). Visitors had to rate the level of effect using a five-point Likert scale, ranging from “no effect” to “significant effect”. The change was made in order to measure the extent to which walking on the mosaics had an effect on the experience of the site. The positive effect on the experience is evident by the high percentage of the “significant effect” category (39.3%) (Figure 6-16).

![Figure 6-16 Percentage of responses to the survey question E2: “To what extent did walking directly on the mosaics affect your overall site experience?” in the survey in 2010 (n=122)](image)

Responses to the explanatory question revealed that walking on the mosaics brings the past closer to the present: the mosaic floors become a platform for experiencing the internal spaces of the buildings, as the Romans used to experience those places. Examples of verbatim responses in this category include:
“I felt more connected to the building and the people who once walked on the floors”; “felt more a part of it”; “it adds more reality to what life was like”; “more authentic experience”; “experience the past”; “direct contact with the past”.

The frequent use of “more” in describing their experience of walking on the mosaics signifies that for the visitors, the experience of being at Herculaneum was perceived to be authentic and “real”, and direct contact with the mosaics enhanced this authenticity. Being in contact with the material remains from the past makes the past more concrete and more real. This is reflected in the responses of the following female interviewee (Female, French, secretary, 25-34 years old, I. 53):

Author: “Was walking directly on the mosaics an important part of your experience of the buildings?"

Female: Yes. It’s better for the experience. We are in more contact with the real material… In a way we see how it’s like to be Roman, imagine how the life was like inside the houses.

Author: Why? 

Female: Because other people have walked on this floor 2,000 years ago.

Author: And why is this important? 

Female: Because it is not very often that you get to experience places like this, in this way. Personally I have not been to another place similar to Herculaneum, where I could just walk through the buildings and on the mosaics and feel that I go back in time”.
The freedom of access to the site and the absence of protective platforms or barriers facilitates what Relph (1976) defines as authentic sense of place, which is achieved by being at a place without having limits or someone else to determine the experience (see 2.9.1). This level of access encourages visitors to make their own sense of the character of the place as it is, and not as a museumified space:

Author: “If you walk on the wooden platforms instead, how does the experience change?

Female: You are more like in the museum where you have to follow a pathway. And if there would have been a wooden platform to it, you would be able to enjoy more the place (any place). Here, following this path and that path…it is not the same. It is like a museum where you enter and you have an arrow telling you go this way, go that way, instead of going in one place where you can walk on the mosaic, and you can go from one place to another as you feel like it”. (Belgian, University student, 25-34 years old, I. 56):

Thus access on the mosaics appears to have a powerful effect, by enhancing the connection between the past and the present through access into the buildings. Furthermore, this physical contact creates some form of connection with the people of the present and the people of the past. Visitors felt they were “more connected with the buildings and the people who once walked on the floors” (verbatim response from the survey). This effect is similar to the experience of people who were in touch with the Hilton of Cadboll cross-slab in Scotland, when it was excavated in the early 2000s. According to Jones, people felt a sense of connection with the people who had erected the slab and touched it in the past,
and wanted to touch it, as “if this would achieve some magical communion with
the past” (2010, 193). In the case of the Hilton of Cadboll cross-slab, members of
the local community felt that the fragment created some form of connection with
their local past and their ancestors. Although this is not the case with the tourists
at Herculaneum and the mosaics, being in touch with the materiality of the
Roman past as manifested by the mosaics is important in the experience of
authenticity. The age value of the mosaics surfaces as critical in this relationship.
This is in contrast with the more recent constructivist discourse of authenticity
that sees it divorced from the material quality and age value of objects (see 2.9.4).

6.5.2 Mindfulness

Access to the buildings and especially direct contact with the mosaics was a
surprise for many visitors, although not always positive, as will be discussed in
section 6.5. For the majority it was a positive surprise, as reflected in the response
of a male visitor (Dutch, biologist, 45-54 years old, I. 44):

“... It is amazing that you can walk on them, actually. I was
surprised by that. Normally it is not allowed, so it is really
nice...[...]. It is definitely the nice part about it that you are able
to walk on them and go through the houses. You can really see
them this way.”

The experience of the unexpected appears to have instigated positive feelings in
visitors about their experience, such as excitement, and an enhanced awareness
of their actions. This surprise and novelty in the situation appears to have contributed to a state of mindfulness (see 2.7.8). According to Moscardo (1996), mindful visitors are people who are active, interested and questioning of their surroundings and ultimately more inclined to learn from their visit and appreciate the past in more depth. Thus the free movement and intimate access at Herculaneum helps visitors develop their own understanding of the past and its significance, as evidenced in the following responses:

“People tend to think that the past as being some kind of far off, nothing to do with us now, but walking around this site, it gives you the idea that 2,000 years ago human beings were walking around having the same interactions like today.” (Male, British, Scientist, 25-34 years old, I.4)

“Because it feels so important for trying to get an understanding of where people have come from, and how actually similar things are, like with the take-away shops.” (Female, British, charity, 25-34 years old, I.3)

“I think for me the most interesting thing of seeing these places is in many ways things have not changed. You see the pavements, shops, the houses are a bit different, but basically in two and a half millenia things have not changed that much.” (Male, British, Health and Safety consultant, 65+ years old, I.9)

This level of engagement and understanding of the past partly stems from visitors’ own interest in history and archaeology (see 6.3). As Falk and Dierking (2000, 22) point out, this interest can be more than what someone likes; it can be a psychological construct that includes attention and continued curiosity, which
are important motivating factors in learning in free-choice settings like a museum or an archaeological site.

Furthermore, mindfulness stemming from the level of access at Herculaneum has the potential to lead to what Relph defined as empathetic insideness: a deeper sense of place than the one achieved by behavioural insideness (see 2.9.1).

### 6.5.3 Affect

This experience of the “unexpected” and the very act of walking on the mosaics and having some form of physical contact with the past instigated affective responses in visitors, as evidenced by their description of the role of access on their site experience. Eleven respondents from the survey illustrated the significance of walking on the mosaics through the affect it had on them (question E2, Appendix 10) such as, “felt good”, “felt special”, “emotional”, “it felt amazing” or “exciting”. Although these responses are rather superficial and generic they nevertheless do suggest a positive emotional response. Similar responses were included in the interviews, as illustrated below:

“*It felt right, it enhanced the experience*. (Female, USA, housewife, 25-34 years old, I. 25)

“It reinforces the experience and the feelings”. (Male, German, teacher, 35-44 years old, I. 12)
“Because it is a feeling. Because you enter a past city and you can imagine how it was”. (Female, Belgian, University student, 25 - 34 years old, I. 56)

“I think being able to touch something and to feel something does (make the experience special).” (Female, USA, art therapist, 45-54 years old, I. 66)

“It was amazing being able to touch and walk on things!” (Male, British, scientist, 25-34 years old, I.29)

Walking on the mosaics provoked a thrill of sensing what it would be like to walk in the footsteps of the Romans (Deleuze as cited in Narkiss and Tomlin 2008, 167). This parallels what Classen (2005, 77) describes in terms of touch in museums, the thrill of sensing what it would be like to be an artefact’ s original owner.

In some cases, contact with the mosaics was transformed into an almost ritual performance, as visitors took their shoes off and walked barefoot on the floors:

“I even too k my shoes off to walk on them barefoot!”
(Female, French, accountant, 35-44 years old, I. 23)

From my fieldwork onsite in 2011, I observed this act four times, where visitors took their shoes off to feel the floors. They were fascinated by the fact that they could touch the mosaics and feel their smooth and shiny texture, as one female visitor commented in the House of the Beautiful Courtyard. This act is almost similar to a ritual performance like the one carried out in mosques.
The significance of access in terms of physical contact in engendering powerful, affective responses has also surfaced from other research in the field. For example, recent research in Australia and New Zealand on visitors’ perceptions about *in situ* archaeological sites as opposed to museums indicates that the level of access and openness of archaeological sites appears to be deeply “affective”, as it provokes an emotional response in the visitor (Ireland 2012). This issue has been examined in more depth in the museums field, and especially regarding the issue of access to museum collections (Saunders *et al.*, 2008, Pye 2007). As Pye (2008, 163) commented, touching an object or one that belonged to a significant person can provide a powerful thrill. Various initiatives in museums, particularly in the UK, demonstrate the positive effects of touch in experiencing these objects (Macdonald 2007, Cassin 2007, Khayami 2007). For example, at the BlindArt exhibition, “Sense and Sensuality” held in London in 2005 at the Royal College of Art, visitors, both blind and sighted, were allowed to touch all the artworks (Khayami 2007, 187). Following their visit, they had to evaluate their experience. Overall their responses were positive, and, in a way similar to the participants in this research, they felt nervous and excited touching the art (Khayami 2007, 188).
6.5.4 Access as a distinctive quality of Herculaneum

Visitors frequently described the significance of accessing the buildings at the site through a comparison with other sites, primarily in their own country, such as the following interviewee:

“Back in our country, you cannot go into everything for health and safety. Everything is cordoned off for conservation or for health and safety reasons.” (Male, British, public worker, 35-44 years old, I. 34).

The level of access facilitated at Herculaneum appears to be unparalleled to any other site visitors have been to in the past. In fact, some visitors from the UK commented that back home it would have been impossible to get so close to ancient remains:

“I can tell you that back in England, you would not be able to do that, would you? If you take Stonehenge for example, you can’t walk into Stonehenge. I don’t know where they’d allow you to do that back there.” (Male, British, health and safety consultant, 65+ years old, I. 9)

Thus access to the buildings stands out as one of the distinctive qualities of the site and achieves a positive effect on experience. This is reinforced by the words of the following interviewee:

“I think it is better here. The very fact that you can go into the rooms and experience it. In lots of other places they are roped off. You don’t get the same experience like here. In other places you are just looking rather than actually being.” (Male, British, museum assistant, 55-65 years old, I. 10)
Direct access on the mosaics also enhances the distinctive quality of the experience at Herculaneum stemming from access. Again, this is achieved through a comparative perspective of visitors’ experience with other sites with mosaics:

“[…]. a lot of sites you go to, a mosaic floor is cordoned off and you look at it and you think, what a beautiful mosaic, but if it’s cordoned off and you can’t walk on it, you can’t get into the heart of the building [...].” (Female, British, accommodation agent, 55-64 years old, I. 33)

“So often you go to these places and you are not allowed to touch or walk and you are just kept away and you don’t really get a feel for it”. (Female, British, accountant, 35-44 years old, I. 42)

The level of access and experience at Herculaneum as one of its distinctive qualities has the potential to become its competitive advantage (Liwieratos 2009): a quality of Herculaneum that distinguishes it from other archaeological sites and has the potential to become a primary reason for attracting visitors to the site. As such it can be used as a management framework for balancing the demands of conservation with the need for access and experience. This issue is further explored in Chapter Nine (see 9.3.1).
6.6 Access and sustainability

Along with the positive effect of access on the visitor experience, what further surfaced from the survey and interviews is a strong sense of awareness of how walking directly on the mosaics may impact on their sustainability. Although the majority of visitors were pleasantly surprised to have such a direct experience, this surprise was accompanied by a concern and apprehension regarding the fragility of the floors. A number of visitors were aware that this special experience may be counter-effective to the sustainability of the mosaics. A question using a five-point Likert scale in the 2010 questionnaire, “To what extent would walking on platforms and not directly on the mosaic floors have an effect on your experience of the site?” followed by an explanatory “Why?” question (question E3, Appendix 10.2) was posed. This was done in an attempt to gain a better understanding of the significance of access on the mosaics.

![Figure 6-17](image.png)

Figure 6-17 Responses to question E3, “To what extent would walking on platforms and not directly on the mosaic floors have an effect on your experience of the site?” from the survey in 2010 (n=123).
Interestingly, the responses to this question (Figure 6-17) are nuanced when compared to the responses to question E2 in the 2010 survey (Figure 6-15). Most visitors (33%) responded that walking on a wooden platform and not directly on the mosaics would have “little effect” on their experience, followed by “much effect” (24.4%) and “a lot of effect” (22.3%). Surprisingly, only 6.7% felt that this would have a “significant effect” on their experience. This nuance was better understood from the responses to the respective interview question (Appendix 11).

In the explanatory part of the question E2 in the survey, a total of 19 respondents were positive about walking on the mosaics as it was a unique experience, but they nevertheless felt that such an act may negatively impact on the preservation of the floors. They felt guilty and uncomfortable when walking on the floors and were worried about the damage they may cause. This contradiction is clearly expressed in comments such as, “loved the experience of walking and touching things of a great age. But was worried about the damage”; “It was nice to be so close to them, but I felt guilty about walking on them”; “It is a point of contact with people of almost 2,000 years ago but I fear that the constant feet of many tourists will damage them”. The interviewees expressed similar feelings of surprise and apprehension:
Author: “Was walking on the mosaics something special to your overall site experience?”

“Of course, it was. But the mosaics are not endangered? I found it very strange the fact that visitors are allowed to walk on them” (Male, French, professor, 35-44 years old, I.1).

“Well, I was a bit shocked … Of course it makes the visit very special, but it is a shame for the mosaics, because after a while they will disappear” (Male, French, teacher, 35-44 years old, I.19)

“It’s incredible (to be able to walk on them)! Only that it must not be very easy from the conservation point of view, as we (visitors) are too many that walk on them. We are a bit selfish because we can do it for now, but who knows for how long this can continue (before the mosaics disappear) (Female, French, IT, 25-34 years old, I.2).

The preference for protecting the mosaics over the benefits to the experience was clear in the responses to question E3 in the survey in 2010, as suggested by 18 verbatim responses, such as: “I would get the feeling they would be better preserved”; “Because this way they would not be damaged”; “It is normal to preserve archaeological sites”; “It can be better preserved for others to enjoy in years to come”; “I prefer the mosaics are preserved”.

Similarly, although the interviewees acknowledged the positive effect that walking on the mosaics had on their overall experience, when it came to answering whether walking on platforms instead would have a negative effect on their experience, many responded negatively. An example is given by the response of a female interviewee (British, charity, 45-54 years old, I.44) below:
Author: “How has the fact that you were able to walk on the mosaics contributed to the experience of the buildings?”

Female: “We actually said that as were going around. If we were in the UK, you would not have been allowed to walk on these floors. It is something special that adds to the experience…. But as to how sustainable it is…. I don’t know!”

Author: “If you were not able to walk direct on the mosaics but instead on a wooden platform, would that affect your experience of the buildings?”

Female: “You don’t need to walk on the floors. You could put wooden floors or something transparent so that you can see through.”

Author: “But then it would not feel the same.”

Female: “No, it would not, but you would also have to respect it, and think of sustainability. You could also limit your access so that you can go into certain areas and not others.”

Visitors are aware, not only of the potential damage that access may cause to the floors, but also of the need to sustain the floors for the future.

Author: “Do you think the walking on a walkway instead of walking directly on the mosaics, would affect your experience in the buildings?

“Yes, and no. The reason I say yes and no is that it must be preserved. So we can’t allow it to just be worn away completely. So, if it needs to be covered occasionally, so be it!” (Male, British, engineer, 45-54 years old, I.26).
Visual access rather than physical access was seen by many as sufficient to their experience in order to preserve the mosaics. Ten survey respondents to question E3 in 2010 (Appendix 10.2) felt that as long as they can see the mosaics they do not need to walk on them directly. Similar feelings were expressed by some interviewees, who suggested that walking on a transparent cover that allowed viewing of the mosaics, would be sufficient for the experience:

Author: “Was walking directly on the mosaics something special to your experience of the buildings?”

“Yes, it was good to walk on them, but I was concerned at the same time because of the fact that so many feet walk on the mosaic stone. So personally I tried to keep off the mosaics, because it’s a concern especially when you consider how popular this site is and how many people are likely to be walking on them. If they had clear Perspex, or something that you could walk across and see the floor underneath, and not walk on the surface ... I was conscious of that”. (Male, British, public worker, 35-44 years old, I. 70)

Author: “Do you think that walking on a walkway instead of walking directly on the mosaics, would affect your experience in the buildings?

“Yes that’s very good, the experience is very nice, but I always wonder whether this will last for the next two thousand years. Well, probably not, if everybody can walk around. I don’t think that’s very good, you could see it from the outside, go near but you don’t have to step on it!” (Female, German, lawyer, 55-64 years old, I. 27)

The predominance of visual over direct access for protecting the mosaics was further elicited through question E4 in the survey in 2010, where visitors had to choose one method they felt was the most appropriate for controlling impacts on
the mosaics (Appendix 10.2). Most visitors felt that indirect access should be allowed using transparent coverings over the mosaics (Figure 6-18). Full access to the mosaics and increased maintenance was chosen by 19% of the respondents, while restriction of access received about 11.1%.

![Figure 6-18 Responses to question E4 from the survey in 2010, “Which one of the following do you think is the most appropriate way to control the impact of visitors on the mosaic floors inside the buildings at the site?”](image)

For some interviewees, although the need for protection was acknowledged, they nevertheless felt that access is important and a middle ground solution could be found by allowing access in some areas and not others:

Author: “Would walking on a platform rather than the original floor impact on your experience of the site?”

“ I think I could understand doing that to preserve it, but I think that if you have one area that you are able to touch or feel, have something that you allow people to feel and protect the rest if you need to”. (Male, USA, engineer, 45 – 54 years old, Int. 67)
“…You have to respect the mosaics and think of sustainability. You could also limit your access, so that you can go into certain areas and not others”. (Male, British, Teacher, 45-54 years old, I. 55)

“I think it would because walking through, with the walls and the floor, and walking in the same path where the Romans did gives an important feel to it. But in some areas….I don’t think you have to walk on everything. You just sometimes walk on a portion and then the important mosaics can be kept away, then that’s fine”. (Female, Australian, Occupational therapist, 45-54 years old, I. 64)

The findings clearly suggest that visitors are supporters for conservation and sustainability. These findings contribute to current research on public attitudes on the importance of conservation at cultural heritage sites. For example, a visitor survey carried out at Stonehenge for exploring visitor attitudes to current management revealed that more than 50% of the 234 respondents agreed that access to the monument should be restricted for conservation reasons (Mason and Kuo 2008). Interestingly, however, visitors at Herculaneum felt that some form of access should be accommodated over no access, and an alternative way for managing access should be sought that accommodates the two.

6.7 Conclusion

This chapter has presented the results of data on the role of access to the experience at Herculaneum. Access as a form of interpretation yields a number of intangible benefits to visitors and their experience. Access to the buildings achieves behavioural insideness, through which visitors can gain a deep sense of
place for Herculaneum. By entering the “heart of the town” they can grasp its identity and its significance, as a Roman town in 79 AD. This intimacy and closeness with the ancient remains enhances this sense of place as it brings the past alive and enhances visitors’ understanding and appreciation. Walking on the mosaics adds to this authentic experience by establishing a physical connection with the material remains of the past, which makes their experience of that past more authentic and real.

As a form of interpretation, access makes visitors more mindful and more aware of their encounter with the buildings and the mosaics. It instills excitement, engagement and it provides cognitive stimulation by helping visitors draw their own inferences about living in the past. This in turn contributes to the learning process. Furthermore, the experience of Herculaneum is shaped through visitors’ own experiences and, in relation to other sites to which they have been. Direct access surfaces as the “unexpected” experience and in turn becomes one of the distinctive qualities of Herculaneum. It becomes part of its identity. Access also produces an affective response in visitors. This affect is a response not only to the unexpected experience provided through access, but also to the fact that they can come into direct contact with the material past, thus experiencing the site beyond the visual sense.
Along with these positive aspects, access on the mosaics also has negative connotations for a number of visitors. Although many visitors acknowledge the positive effects of access to their experience, they have feelings of guilt and apprehension in relation to the impact access may have on the mosaics. For others, access on the mosaics is only perceived as negative and a sign of neglect and lack of care. There was a clear concern for sustaining the resource for the future, and prioritizing this need over their experience in the present was seen by many as a way to sustain the resource.

Finally, a small group felt that a middle ground solution could be found that accommodates the need for conservation and the benefits from access. This view, which responds to the main issue of this research, is discussed further in Chapter Nine. Such a task requires primarily an understanding of how access impacts on the fabric in the first place. This is the focus of the next chapter (Chapter Seven), which presents the development and application of a methodology for assessing visitor impacts on the mosaic floors at Herculaneum.
7 Understanding and assessing visitor impacts on the mosaic floors at Herculaneum

The aim of this chapter is to examine the impact stemming from direct visitor access on the mosaic floors at Herculaneum. This is essential for getting a holistic understanding of the role of physical access in the instigation of damage to the archaeological resource, in order to respond to the broader aim of this research to suggest how physical access should be managed sustainably (see 1.2).

A specific methodology has been developed for the case study, for assessing damage on the mosaics, whose methods have been described separately in Chapter Three. At the core of the approach is the association of visitor movement and behaviour, recorded through observations (see 3.5.1 and 3.5.6) with mosaic phenomena that indicate visitor-induced damage.

Before introducing the methodology, the data collection and the analysis, it is necessary to first provide a wider context for the assessment. This includes the nature and structure of mosaic floors, their archaeological context, and possible agents of deterioration.
7.1 The nature and structure of mosaic floors

A mosaic is a decorative surface technique involving the setting of small pieces of stone, terracotta, glass and other hard material into mortar or plaster (Ling 1998, 6). In antiquity, mosaics were used to decorate architectural surfaces. In this context, the term “mosaic” is most often used to refer to the most characteristic type, opus tessellatum, which has been the most widespread form of floor decoration in antiquity from the fourth century BC to the early Christian period (Ling 1998, 6). The technique consists of small, square-shaped pieces of hard materials, called tesserae, ranging in size from 0.5 cm\(^2\) to 3 cm\(^2\) and placed at the top of a series of mortar-based layers of different thickness and texture (Figure 7-1) (Ben Abed 2006, Lemaitre 2009). The tesserae are usually made of different types of stone, such as limestone, sandstone, marble, ceramic and/or glass. They can be made of one material or several, and be mono-chrome or have several colours.

Figure 7-1 A fragment of mosaic, showing its stratigraphy, from the House of Dionysus in Paphos, Cyprus. Source: GCI 2005
Archaeological and literary evidence, mainly from Vitruvius (Book vii, 1) (Rowlands and Howe 2001), provides information on the technology of ancient mosaics. The process followed in antiquity was more or less standard but with variations in the number and thickness of layers and the proportions of their constituent materials (Dunbabin 1999, 282). Usually, a mosaic had five layers, as illustrated in Figure 7-2. The first layer was the *statumen*, consisting of large stones pushed into the ground and set with a coarse crushed stone-rich mortar to create a leveled surface, whose thickness can vary. This was done in order to stabilize the ground and to avoid settlement and deformation. The *statumen* was followed by the *rudus*, a mixture of lime and large aggregates, such as crushed ceramic or crushed bricks. A third, thinner layer was applied on top, the *nucleus*. This layer consisted of a lime mortar with fine aggregates, such as crushed terracotta. The bedding layer was a very thin layer of mortar, rich in lime to keep it soft and workable until the completion of the insetting of the *tesserae*. The *tessellatum*, the only visible layer, was made of quadrangular pieces of stone, terracotta or glass, usually 5 to 20 mm wide (Roby *et al*. 2011). Once the *tesserae* were set, the surface was rubbed down and smoothed with marble dust, sand and lime and then leveled using emery (Michaelides 1992, 11). The purpose of this was to avoid any surface irregularities, which would lead to a gradual disintegration of the pavement.
Due to their materials and structure, mosaics were considered in antiquity as one of the most durable forms of decorative art together with *opus sectile*, able to withstand decay from constant use. They were extensively used to pave the floors of private and public buildings, including bath complexes (Dunbabin 1999). Herculaneum is one such example of how mosaics were used both in a domestic and public context (see 4.4 and 4.5).
7.2 Mosaics in their archaeological context

Archaeological sites are an amalgam of material evidence that has survived through time since they were created, occupied and finally abandoned (Corfield 1996, 32). Many agents and phenomena transform sites over time and in different ways, such as natural and cultural processes, including natural decay mechanisms and human actions (Matero 2003b, 41). Mosaic floors are part of this amalgam, experiencing a life cycle of use, repair, abandonment and burial, recovery and reuse. These processes translate past actions and events into present conditions (Matero 2003b, 41). Considering the complexity of this cycle and the transition from one phase to the other that is critical to their survival, it is astonishing that so many mosaics have survived from antiquity to the twenty-first century.

During burial, mosaics are subjected to the chemical and microbiological effects of the new environment, soil conditions and site hydrology (Corfield 1996, 32). For example, as the materials of the tessellatum and the bedding layers are porous, they can absorb water and salts from the soil, and in combination with soil acidity, their mineral components (of constituent materials of the mosaic) may dissolve (De Guichen 1995; Mora 1985, Steiger and Charola 2011, 257).

Excavation introduces mosaics to a new and fluctuating environment. The “trauma” from their exposure to the open-air, caused mainly by the change from
a relatively stable to an unstable environment, activates deterioration processes. An array of mechanical, physical, chemical and biological agents present in this new environment can instigate deterioration (see 7.3), which gradually may impact on the integrity of the mosaics and ultimately lead to loss of fabric (Mateini and Moles 1984, Mora 1985, Torraca 2008). For example, the new unstable environment may lead to the migration of water with damaging soluble salts towards the surface of the mosaics (De Guichen 1995, 26). The constant changing environmental and climatic conditions of archaeological sites, such as variations in humidity, temperature, light and rain also contribute to deterioration, whose effects vary depending on the state of preservation and conservation of the buildings of which mosaics are a part (for example whether they are under a roof or not). Furthermore, as integral elements of an archaeological site open to public access, mosaics may be subjected to human threats, such as poor site management, including lack of regular maintenance and uncontrolled visitor access and behaviour.

The diverse threats stemming from the exposure of mosaics as a result of excavation and contributing to deterioration are discussed in detail in the following section.
7.3 Mosaic deterioration

Deterioration is “the unintentional and undesirable change in state, which is part of an ongoing process” (Appelbaum 2007, 38). Deterioration processes weaken the physical integrity of the mosaics by leading to gradual loss of the original properties of their constituent materials and to the separation of their components. Mosaic materials are inorganic in nature (see 7.1), but have diverse physical properties and mineralogical composition. The characteristics of each material determine its relative stability when faced with the processes of deterioration stemming from their archaeological site context.

The list developed by Michalski (1990, 589) on the main agents of deterioration applicable primarily to museum collections but, also to archaeological sites, has been adapted for this study as a framework for explaining the numerous ways in which mosaics deteriorate. The main sources of deterioration of mosaic floors are the environment and human activities. These are explained in detail in the following section, by presenting the agents of deterioration stemming from each source. Agents such as natural disasters, earthquakes and fire are excluded, as they are rare events.
7.3.1 Environment

Interaction with the environment is the prime threat to the survival of mosaics, as it instigates decay mechanisms manifested in various modes. The concentration of soluble salts towards the surface of the mosaics and their subsequent crystallisation as a result of their exposure to the open air is the most significant factor of deterioration of the tessellated floors (Mora 1995, 92). Changing weather conditions including variations in relative humidity and temperature are key environmental causes of deterioration mechanisms, although water is the key agent in almost all deterioration phenomena.

The mechanisms of deterioration stemming from the environment can be physical (the breakdown of the structure of materials causing voids between the layers, detachment and cracks); chemical (the alteration of the chemical composition of materials), and biological (mechanical weakening of materials) (Cronyn 1992).

Water

Water can initiate deterioration of many different kinds. These range from processes where it is essentially the only agent (such as the swelling and shrinking of mortars), processes in which it is the principal factor (such as salt weathering), and to processes where it is a necessary condition (such as bio -
deterioration). Most material deterioration is associated either with very high or very low moisture contents, or with changing moisture levels (Odgers and Henry 2012, 63). Porosity and other properties of the *tessellatum* are the main factors determining water absorption and transport of salts and decomposition products within the material (Weber and Zinsmeister 1991, 22).

Sources of water may include groundwater, relative humidity, rainwater and the air, especially when it is humid enough to cause condensation (Mora 1985; Roby et al. 2011). Groundwater may be coming from a high water table (rising damp) or from other sources such as poor drainage. Through capillary rise, water rises to the surface of the mosaics where it evaporates in the drier air (Figure 7-3).

![Figure 7-3 Capillary rise of water to the mosaic’s surface. Source: Roby et al. 2011, 79](image)

Capillary water is held by capillary action, the process by which soil moisture moves through fine pores under the influence of tension forces developed
between pores and the water (Pavia and Bolton 2000, 105). As mosaics are the interface between ground water and air, they are affected by the interchange of moisture between the two (Corfield 2003, 129). Rainwater is a catalyst for other forms of deterioration. It can penetrate the mosaics, particularly if the material of the tessellatum has a high porosity or has open joints or cracks. It can also contribute to the crystallization cycles of soluble salts.

The state of conservation of the overall site plays a vital role in the ways in which water affects the mosaics. Absent or malfunctioning roofs and drainage systems (for floors and roofs) or uneven floor surfaces may lead to water accumulation on the mosaics’ surface, or to the concentration of water below their surface, which create mechanisms that initiate deterioration. Similarly, although not always the case, water can derive from tourist guides and tourists, who wet the floors to saturate the colours of the tessellatum and increase their legibility and aesthetic impact (Costanzi Cobau and Nardi 2003, 331). The most frequent water-related deterioration mechanisms are the following:

- Mobilisation and crystallisation of salts below and on the mosaic’s surface

Salts are one of the most important causes of stone decay as they can cause damage to the stone of the tessellatum in several ways (Price 1996, 15). The mosaics absorb water either from above or from below. Changes in the relative
humidity and temperature, lead to water evaporation, sometimes bringing harmful salts closer to the surface of the mosaics, which may accumulate as efflorescence on the surface or as invisible cryptoflorescence below the surface (Arnold and Zehnder 1999, 109) (Figure 7-4).

![Figure 7-4 Salt crystallization. Source: Roby et al. 2011, 80.](image)

The movement of salts between the mosaics’ bedding layers can cause detachment and voids. Additional pressure caused by the movement of water can lead to the swelling of mortar and its supporting layers, causing cracks or detachment (Veloccia 1978, 41). The pressure caused at the moment of crystallization within the pores of the tesserae themselves leads to flaking or powdering of the stone or ceramic (Mora 1985). The presence of certain hygroscopic soluble salts can absorb moisture from the surrounding air, as these salts absorb much higher quantities of water from the air than what would be possible as a result of ordinary condensation or by capillary condensation (Weber
and Zinsmeister 1991, 30). This leads to dissolution of salts, which allows them to move through the pores of the stone leading to a greater potential of damage to a larger area of the mosaic.

Frequent rainwater can rinse away soluble deleterious salts so that they no longer occur near the surface (and the environmental drivers for crystallization) and are therefore less damaging to the tessellatum (Weber and Zinsmeister 1991, 41).

- Expansion and contraction of the different layers of the mosaics

The unstable conditions of temperature and relative humidity create cycles of expansion and contraction of the tessellatum and its support layers. This has the potential to cause detachment and cracks between the layers, and further weakening the adhesion of tesserae to the bedding layer (Solar 1992, 19).

- Freeze-thaw cycles of materials

The presence of water in porous components and in the layered structure of a mosaic as a result of a freeze-thaw cycling can lead to structural damage (Piqué et al. 2008, 36; Bassier 1978, 69; Weidmann et al. 2003, 170). When water in the pores of the tessellatum solidifies and expands at freezing temperatures, cracks can occur (Lazzarini and Laurenzi Tabasso 2010, 45).
**Temperature**

Fluctuations in temperature are most important in the effect they have on moisture, although they may cause direct deterioration as well. Repeated temperature changes lead to expansion and contraction of the constituent materials of the mosaics. Very cold temperatures lead to the freezing of water and instigate freeze-thaw damage.

**Relative Humidity (RH)**

Constant RH fluctuations affect moisture content, for example condensation (Pavia and Bolton 2000, 105). Due to thermal inertia, condensation is more likely to occur on the stone *tesserae* that are colder than other adjacent surfaces. Condensation leads to mobilisation and crystallisation of salts.

**Pollutants**

Natural pollutants, such as marine salts, can increase the problem of salt crystallization on the surface layer of the mosaics. This can be exacerbated by fluctuations of moisture and RH, leading to their dissolution and their penetration into the surface of the mosaics, thus contributing to salt crystallization under the surface (Neguer and Alef 2008, 197).

Chemical pollutants can also be damaging through a number of different
mechanisms, depending on the physical structure, the chemical composition and the reactivity of the stone (Odgers and Henry 2012, 68).

**Bio-deterioration agents**

The presence and activity of organisms and micro-organisms can change the properties of the mosaics and initiate deterioration processes. The growth of plants is detrimental to the mosaics. Roots can grow either below the *tessellatum* or between the supporting layers causing detachment and cracks and dislodging of *tesserae* (Chantriaux-Vicard 1990, 296). As plants, trees or grass, they grow through the *tessellatum* and cause detachment and dislodging of *tesserae*. These effects facilitate water penetration. As roots they can penetrate the areas with least resistance, such as mortars, and lead to detachment of the *tessellatum* and collapse (Pinna and Salvadori 2008, 17).

The growth of micro-organisms, such as bacteria and algae on the surface of the mosaics depends on climatic conditions (relative humidity, temperature, light) of the site, and the degree of susceptibility depends on the mineralogy and porosity of the materials of the mosaics (Odgers and Henry 2012, 72). The main types adhering mostly to the surface of mosaics are algae, lichens and mosses. The growth of these organisms may change the porosity of the mosaics and their chemical characteristics by keeping them damp, and consequently render them
more susceptible to deterioration by other factors (Not 2004; Piqué et al. 2008, 36).

Animals can lead to structural damage either by digging tunnels within or under the mosaics, or by walking or pulling up plants that are rooted close to the mosaics (Roby et al. 2011). This in turn makes mosaics susceptible to other environmental agents instigating deterioration.

**Wind**

Through the transfer of sand and marine salts onto the surface of the mosaics, wind contributes to the erosion of the mosaics' surface and to salt weathering (Price 1996, 18).

7.3.2 Human action

**Inappropriate past and current conservation interventions**

The use of materials during past interventions now considered damaging, such as iron-reinforced concrete or repairs using cement mortar, have detrimental effects on the condition of mosaics and can be significant instigators of deterioration (Piqué et al. 2008, 37). Cement mortars have high compressive strength and as such, they are too strong when used in the repair of mosaics. In the case of differential movement, the stress will be submitted to the original parts of the mosaics leading to collapse of the *tessellatum* (Peroni et al. 1982, 64).
They also have a large thermal expansion coefficient that can result in stress and damage of the ancient materials of the mosaics. Most importantly, they form soluble salts while setting and leaching of soluble salts can continue when the mortars come in contact with rainwater (Peroni et al. 1982, 64). Finally, cement mortars have a low porosity, which may not allow evaporation of moisture.

The use of lime-cement mortars as a substitute for Portland cement can also be damaging, especially when the cement proportion is high, as they includes high amounts of soluble salts that cause similar problems as cement (Peroni et al. 1982, 65).

**Inadequate or lack of maintenance**

Maintenance is a regular inspection of condition, followed by, if needed, planned interventions to protect and stabilise the mosaic (Roby et al. 2011, 4; Zizola 1999, 317).

Absent or infrequent maintenance accelerates the effects of natural deterioration on the mosaics and weakens their physical integrity. This factor has been identified as one of the main accelerating agents of deterioration of mosaic floors. As Piqué et al. (2008, 37) conclude, “...the lack of regular maintenance is now recognised as a major contributor to the rate and extent of deterioration and loss
of excavated mosaics.”

### Summary

The agents of deterioration in an archaeological context are multiple, affecting the mosaics in different ways and often working in combination. These agents stem from the exposure of the mosaics to an unstable environment following their excavation. Structural and/or surface deterioration depends on how the materials of the mosaics are able to withstand the effects of these environmental agents. Water and variations in temperature and relative humidity are perhaps the most significant. Apart from the environment, mosaics in their new context are subjected to human agents of deterioration, such as poor management, inappropriate previous interventions and materials.

It is in this context that mosaic floors are exposed to direct visitor access at sites where this is allowed, such as the case of Herculaneum. The following section explains the ways in which the physical force on the mosaics’ surface as a result of foot traffic impacts the floors.

#### 7.4 Visitor impacts

The force stemming from foot traffic can lead to physical damage, which is the undesired immediate or cumulative physical change stemming from external
forces (Cather 2003, 66). In accordance with Lloyd and Lithgow (2006, 56) in defining mechanical damage, in the case of mosaics, mechanical damage caused by foot traffic, or wear-and-tear, is the undesired change to the mosaics’ physical integrity caused by the recurrent motion of physical force from the contact of visitors’ feet with the tessellatum, Such change may be immediate or cumulative and it may affect the surface and structure of mosaics in various ways.

7.4.1 Surface damage

The surface of mosaics is damaged by abrasion, the scraping or wearing away of the surface. This type of damage is cumulative, but it can also be immediate if the surface of visitors’ shoes is sharp, and can lead to scratches on the surface. The level of abrasion depends on the hardness of the material of the tessellatum. This is determined by its mineralogical composition and moisture content (Siegesmund and Dürrast 2011, 190). If the tessellatum is made of stone, its hardness can be measured in terms of abrasion resistance: how much a rock can resist forces related to walking (Siegesmund and Dürrast 2011, 190). The Böhme test\(^\text{15}\) is one method for determining the abrasion resistance of rocks. The table below (Figure 7-5) presents the values of abrasion resistance of several rock types.

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\(^{15}\) This test consists of taking a rock specimen with a quadratic base of specific dimensions (71 x 71 x 25 mm) and pushing it with a defined weight on a grinding wheel, and then grinding it by using a defined grinding medium or abrasive. At the contact between the specimen and the wheel, shear and tensional cracks occur resulting in a drastic softening of the rock fabric (Siegesmund and Dürrast 2011, 192).
Figure 7-5 Böhme test abrasion values for different rock types, including their range of dispersion. Higher values indicate a rock having a lower abrasion resistance, while lower values indicate a higher abrasion resistance. Adapted from Siegesmund and Dürrast (2011, 193).

Of interest are the main materials used in the making of the mosaics included in the assessment. Volcanic tuff (6 – 60 cm³/50cm²) has a lower abrasion resistance than compact limestone (25 – 39 cm³/50cm²), while marble has the highest of all (18 – 38 cm³/50cm²). Indeed, through direct observation onsite and as evidenced from the survey, volcanic tuff degrades to a deeper level than the other stones (Figure 7-6).
Abrasion resistance levels depend on the frequency of footsteps and the material hitting the stone on the floor, such as bare-feet or shoes. Continuous heavy loading over long periods and repetitive movement stemming from large visitor numbers accelerate the effects of foot traffic (Lloyd and Lithgow 2006, 57). The greater the number of people accessing the floors, the greater the rate of abrasion stemming from visitor access (Ashley-Smith 1999, 249).
Soiling (aggregates, sand, soil, loose debris) on the surface of the mosaics can further abrade the surface through foot traffic (acting like sand paper). Although not a form of damage, the accumulation of deposits on the floors can create the medium through which plants can grow. They can impact on the aesthetic integrity of the *tessellatum*.

### 7.4.2 Structural damage

Foot traffic can impact on the structural integrity of the mosaics in various ways. It can lead to loss of the *tessellatum* when the mosaic has structural weaknesses. For example, it can dislodge *tesserae* that may not be well adhered to their bedding layer due to a deteriorated mortar in the bedding layer or in the interstices (Figure 7-7) or even due to faulty production.

The latter may be the outcome of wide interstices, or poorly made mortar (as a result of incorrect proportions of the constituent materials used or environmental conditions may be interfering with its setting properties), or incorrect application of mortar (not applied to the same level of the *tesserae*, thus exposing the *tessellatum* to foot traffic).

Foot traffic can also lead to growth of existing *lacunae* if the edges of the *tessellatum* are exposed (Figure 7-8). It can also lead to loss of mortar repairs and
consequent growth of loss, if the mortar is poorly made and has low resistance to mechanical force.

Figure 7-7 Deteriorated mortar in the bedding layer of the northwest corner mosaic, Susiya Synagogue, Israel, 1997. This condition can lead to dislodged tesserae and loss that may be exacerbated by foot traffic. Source: The illustrated Glossary, Mosaics in situ Project 2003, 8

Figure 7-8 Area of loss in 2010 (left) and growth of loss in 2011 (right) on the mosaic in room 8 in the House of the Black Saloon at Herculaneum, facing southeast. The loss increased as the edges of the tessellatum were not repaired and were left exposed to foot traffic. The area is located on a visitor path.
If the *tessellatum* is detached (Figure 7-9) or affected by bulging, the pressure placed from foot traffic can cause collapse of its surface and instigate loss. Similarly, the presence of wide cracks or subsidence may also contribute to the instigation of damage as a result of access.

These effects are exacerbated by the type and material of visitors’ footwear. High heels or shoes with a rubber sole-boot type allow for loose aggregates like gravel to be trapped inside the sole, and can instigate the dislodging of *tesserae*, especially when these are not well secured in their bedding.

Overall, structural damage as a result of foot traffic depends on the stability of the mosaics and their resistance to other agents of deterioration (see 7.3) (Figure 7-10). For example, the absence of protective roofs, or the presence of water pooling on the surface of the mosaics, can exacerbate decay through deterioration processes related to water, and increase their susceptibility to foot traffic-induced...
damage. Particularly significant is the lack of regular maintenance, as it can lead to the creation of new and the growth of existing *lacunae*. Lack of maintenance of adjacent floors is another factor that may contribute to the instigation of visitor-induced damage, as foot traffic will transfer loose aggregates on to the mosaics’ surface, or scratch the surface through the aggregates lodged in visitors’ shoe soles.

Figure 7-10 Loss of the *tessellatum* by foot traffic of a mosaic fragment located on a main visitor path at the site of Caesarea in Israel. The documented loss occurred from April 22 (top) to May 13, 1999 (bottom). Photos: Rand Eppich
Relevant to this issue is the use of materials in preventive conservation that have the potential to instigate damage to the mosaics stemming from access. For example, the deliberate use of gravel most commonly used as a perimeter ground around mosaics with no landscaping or as a measure for preventing soil erosion, can be an indirect cause of damage if this is located on a visited path leading to a tessellated floor area. Furthermore, the movement of visitors’ feet from one surface to the other, particularly when gravel is lodged in the soles of visitors’ shoes is likely to contribute to surface and structural damage.

7.4.3 Summary
The extent and severity of damage stemming from foot traffic depends on the exposure of mosaics to visitor access in terms of visitor numbers and shoe sole types and from the capacity of the mosaics to withstand impact from physical force. The latter is determined by the inherent properties of their constituent materials and the extent to which they are exposed to agents of deterioration that may weaken their ability to resist change stemming from visitor access.
7.5 Assessing visitor impacts on the mosaics: Towards a methodology

Having presented the archaeological context of *in situ* mosaic floors and defined visitor impacts, this section presents the methodological approach for their assessment, as it was developed and applied at Herculaneum. The aim of the assessment is to understand how visitors cause damage and under what circumstances.

It is necessary to clarify that the aim of the assessment at Herculaneum is not to identify the causes of deterioration of the mosaics. The main cause of deterioration of the mosaics at Herculaneum is water, either from above or below, as this has already been identified by the HCP (Pesaresi and Martelli Castaldi 2007). This assessment aims to distinguish damage likely to have been caused by visitor access as opposed to damage stemming from other agents of deterioration.

As Matero (2003b, 41), points out, “...the physical condition of any structure or site, is a record of the interaction of many different determinants over the course of its existence”. Condition phenomena may be the outcome of more than one agent of deterioration to the mosaics. For example, loss of the *tessellatum* may be caused by visitors but also by contraction/expansion or collapse of areas affected by bulging or detachment (see 7.3.1). These phenomena are caused as a result of
the presence of water and temperature variations.

On an already damaged floor, growth of *lacunae* and loss of existing mortar repairs could be taken as evidence of mechanical damage as a result of access, when these are located on a visited path. The same is the case with surface damage manifested as abrasion. In both cases, in order to establish an association between visitors and observed damage, it is necessary to primarily identify the main visited areas and any evidence of damage on these areas likely to have been caused by visitors. Thus, the assessment aims to identify damage likely to have been caused by visitors and establish an association with recorded visitor movement, numbers and behaviour.

The methodological approach of the visitor impact assessment consists of the following components: 1) The identification and recording of mosaic phenomena indicating damage stemming from visitor access, and an assessment of the mosaics’ context; 2) The recording of visitor access patterns in terms of movement, numbers and behaviour; 3) The spatial association of damage with visitor access. The methods used for the collection and analysis of data are explained in the following section. Although these have already been presented in Chapter Three, further detail is given here for the sake of clarity.
7.6 Methods

An array of methods was used for the collection of data for each component of the assessment. Mosaic damage and context were assessed following the process used in condition assessments. The recording of visitor movement was carried out using structured observations, as used primarily in the built environment for understanding movement throughout built and urban landscapes. Additional input was sought from the visitor survey in examining the type of visitors’ shoes most frequently used at the site in 2009 and 2010 (question C1 in Appendix 10.1 and 10.2 respectively). These are explained in detail in the remaining part of this section.

7.6.1 Recording mosaic damage and context

The documentation of mosaic damage and context followed the process used in a conventional condition survey: preliminary research and site survey. The recording approach adopted consisted of a systematic quantification of condition with numeric rating scores (see 3.5.2) preceded by a preliminary research in visual and textual mosaic documentation (see 3.5.3).

Preliminary Research

This component entails the compilation of existing written and graphic records related to the history of condition and conservation interventions to the mosaics.
since their excavation. Of particular significance is the collection of visual documentation, in order to provide a comparative perspective of mosaic condition change in terms of damage. Various methods were used for obtaining this type of data, such as visual and textual research in the archives of the SANP and HCP and other information sources (see 3.5.3) and interviews with the custodians and the staff of HCP and SANP (previous and current) (see 3.5.5 and 3.5.6) on the conservation history at the site. The latter method provided a more informed insight into conservation practices, especially where visual and textual documentation was not available.

- Visual and archival research

A vital part of the survey was the research into the photographic and archival documentation of the mosaics at Herculaneum. The collation of documentation on past conservation interventions was necessary for understanding mosaic damage and its rates of loss over time. Furthermore, this type of information helps to understand conservation treatments to the mosaics, and to assess the role of the frequency and effectiveness of maintenance and previous treatments.

The main method adopted for collecting information on past mosaic condition and conservation interventions was research in the archives of the SANP and HCP at the HCP site premises. In terms of past textual documentation, the site
diaries of Maiuri of which a copy was available from the HCP, were useful in getting information on past mosaic interventions. However, such information was of a generic nature and did not refer to any specific mosaics. Nevertheless, it was useful in extracting information on the methods used at the time in mosaic restoration and conservation (Appendix 6.1). For example, ordinary and extraordinary mosaic maintenance, included routine cleaning and infilling of lacunae with cement or tesserae during the post-excavation conservation interventions in 1942 onwards (Maiuri 1942, 970; Appendix 6.1).

Additional information on past methods of conservation was provided by a previous site director of Herculaneum, who had worked with Maiuri prior to becoming the site director in 1977 until 1982-1983. For example, according to him, infillings of losses were carried out first with tesserae that the excavation workers would collect (SANP archaeologist 1 2010, personal communication; Appendix 6.1). Additional information on the history of interventions of the mosaics was supplemented by library-based research in the journals and other publications of the SANP (Appendices 6.2 – 6.11).

Past visual documentation was collected through numerous searches at various

academic institutions in the UK and in Italy. For example, the archives of the Library of Classical Studies in London and ICCROM, the British School, the American Academy and the Institute of Photographic Archives (ICCD) in Rome were extensively researched. In addition, numerous scholars and individuals with an interest in mosaics in Italy and Herculaneum were contacted, requesting any photographs of the mosaics at the site dated up to 2011. More specifically, requests were sent to ASPROM members (as I was a member of the ASPROM committee at the time) for photographs they may have from past visits to the site especially of the years prior to the commencement of HCP (until 2001). Scholars and academics, whose research interests include Herculaneum or Roman mosaics, were also contacted requesting material they may have from the period 1930-2011. A list of the institutions and academics contacted is presented in Appendix 9.

The collection of textual and visual material related to the mosaics was mainly carried out prior to the final fieldwork at Herculaneum in 2011. However, additional photographs were discovered during the post-fieldwork phase, which contributed significantly to understanding how the physical integrity of the mosaics changed over the years. These were sourced from the website of the University of Auckland in New Zealand (UANZ) project of a virtual tour of Herculaneum with panoramic photographs of the interiors of the buildings with
mosaics, documented in 2001 and 2003\textsuperscript{17}. Nevertheless, due to the panoramic format of the photographs, it was not possible to have close ups of selected areas in high quality resolution.

Despite the extensive efforts in sourcing past visual mosaic documentation, the amount of photographs actually found was very limited, with the exception of those from the UANZ source. The absence of photographic material has been attributed to the nature of the mosaics, being simple in design and with limited iconography, with the exception of the figurative panels in the Central Baths of the Forum. As such, the majority was not perceived as important to be photographed by the archaeologists and academics that worked at the site. The little available background documentation of the mosaics is one of the limitations of this assessment.

Although the absence of early visual and textual documentation is a frequent characteristic of archival material from archaeological sites, the lack of systematic documentation by the HCP could be characterized as unusual, and is one of the limitations of the project. Despite its ten years’ presence at Herculaneum, no attempt has taken place to systematically documenting architectural surfaces or buildings in general. This survey contributes to infilling this gap by providing a

\textsuperscript{17} \url{http://www.proxima-veritati.auckland.ac.nz/Herculaneum/}
more systematic photographic documentation of the mosaics.

- Interviews with the custodians, SANP and HCP staff

Unstructured interviews with the custodians at Herculaneum were carried out in eliciting information on past conservation interventions to the mosaics (see 3.5.6). Interviews were also carried out with professional staff from the SANP and the conservator-restorer working for the HCP (see 3.5.5), with the aim of gaining a better understanding of the history of conservation practice at Herculaneum and the activity of HCP in mosaic conservation.

Site survey

The site survey entailed a broad assessment of each mosaic and its context. As already described in Chapter Three (see 3.5.2), the survey was initially based on the numeric quantification of each recorded mosaic condition as developed by the GCI-IAA-EH initiative on the assessment of the role of shelters in mosaic deterioration. The final format and method of the recording, however, evolved through pilot testing in 2010 and consequent modification (see below). The first template form was based on the form of the GCI-IAA-EH initiative with additional input from the condition assessment templates developed by the GCI and the Institut National du Patrimoine de Tunisie (INP) for the Technicians Training course in maintenance for in situ mosaics (Roby et al. 2011, 19). The
mosaic glossary of the GCI and IAA (Getty Conservation Institute and Israel Antiquities Authority 2003) was primarily used to assist in the definition of mosaic phenomena selected for the recording, with input from the ICOMOS glossary on the deterioration of stone (ICOMOS 2010). The initial and final recording forms are presented in Appendix 7.1 and 7.2 respectively.

- **Elements selected for the recording**

In condition surveys, the level and form of recording of selected phenomena is determined by the aim and ultimate use of the survey and by the time and resources available, which are fundamental considerations when developing a methodology for recording (Matero 2003b, Piqué 2000; Wong 2003, 50). In the case of this research, the survey had to be completed in the time available for this task from the fieldwork at the site in 2010 and 2011. Furthermore, as the survey’s aim was to understand the role of access as a major cause of damage to the mosaics, and to ultimately contribute to its better management, the elements to be recorded had to be those that indicate damage likely to be caused by visitors, and elements likely to instigate or exacerbate damage as a result of visitor access (see 7.4). Guided by these considerations, the elements selected for the recording were the following:

- **Mosaic materials**

The mosaics were described in terms of materials used for the *tessellatum* and the
supporting layers, including the type of their integrity, for example whether they are on original mortar bedding or lifted and re-laid on new bedding.

As no materials analysis has been undertaken by the HCP for the identification of the type of stone used for the *tessellatum* of the mosaics at Herculaneum, nor for the bedding layers, such information was sought in the literature. Unfortunately, no relevant research has yet been published for the mosaics at the site. Hence the main source of information was the conservator-restorer of the HCP. According to her (HCP staff 2 2011, personal communication) the stone used for the white *tesserae* is a type of limestone, while the one used for the black *tesserae* is tuff stone, a type of volcanic rock. Polychrome stone pieces used as insets in the mosaics made in *opus scutulatum* are made of different types of marble.

The description of the materials used for the *tessellatum* was based on the classification of their decorative schemes (see 4.4.1). This classification allows the identification of the primary and secondary types of stone used for each mosaic. For example, the *tessellatum* category of bi-chrome black-on-white suggests that the main material is limestone with the additional use of tuff stone for the

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18 A publication is in progress on the materials of the mosaics at Herculaneum by Federico Guidobaldi, but the author refused to grant access to the relevant information prior to the publication of the research
borders, while the white-on-black category indicates the main material is tuff stone with limestone *tesserae* used for the borders (Appendix 7).

Information, albeit limited, on the mortar used in the bedding layer of the mosaics was obtained from the recording forms of the HCP and from the conservator-restorer of the HCP (HCP staff 2 2011, personal communication). The main materials of the preparatory layers of the mosaics include volcanic inserts, such as the mosaic in room 2 of the Women’s section of the Central Baths (HCP form 19B) or calcareous inserts, such as the mosaic in room 5 of the Men’s section in the Central Baths (HCP form 35B).

- *Damage phenomena*

The selection of the phenomena indicating damage likely to be caused by visitors was based on the definition of visitor-induced damage (see 7.4). These are: *surface damage* as *abrasion* and *structural damage* manifested as *lacunae and their growth* and *loss of mortar repairs*. *Lacunae* may be caused by visitors, but as already mentioned in section 7.4 above, there may be other decay mechanisms causing surface loss. Nevertheless, the association of these symptoms with visitor access routes, together with past evidence of condition and previous interventions can contribute to a diagnosis of the specific symptom and if it is a sole outcome of foot traffic.
Additional features were also noted (but not recorded on the maps), such as deposits (gravel, sand, soil) that may have contributed to the instigation of recorded damage on the floors.

- **Site context features**
  
  Site features were recorded to describe the context of the mosaics, such as exposure (whether the mosaics are under a roof or not).

- **Type and frequency of mosaic maintenance and previous interventions**
  
  Information on the type and frequency of maintenance and previous interventions for each mosaic was obtained by the conservator-restorer of the HCP and through textual research in the HCP archives.

- **Pilot testing of recording method**
  
  As already mentioned, the method of recording evolved through pilot testing in 2010. Initially, the first template form described damage phenomena in terms of extent and severity, based on the recording method used in the GCI-EH-IAA project (see 3.5.2), as shown in Appendix 7.1. This included numerical scoring on an ordinal scale, with ratings 1 to 4 for both extent and severity of each recorded damage type for each mosaic. Extent of deterioration was described as
insignificant (1) to extensive (4), while severity was only used to describe abrasion, described as insignificant (1) to high (4).

This method was pilot tested in May 2010 for all mosaics open to access. Following the evaluation of the preliminary data collected, it became clear that extent of each recorded phenomenon had to be spatially mapped and not only noted, as this would allow spatial association with the recorded visitor routes in GIS.

It also became clear that the ordinal scale used for the severity of abrasion from 1 to 4 should be simplified to 1 to 2, as it was difficult to determine four levels of severity, while doing a broad rapid survey of this kind. The revised ratings were described as superficial (1) and deep (2) based on the depth of surface loss (Figure 7-11).

<table>
<thead>
<tr>
<th>Phenomena</th>
<th>Severity</th>
<th>Rating score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrasion</td>
<td>Superficial</td>
<td>1</td>
<td><em>Tesserae</em> display a worn surface</td>
</tr>
<tr>
<td></td>
<td>Deep</td>
<td>2</td>
<td><em>Tesserae</em> display a deeply worn surface</td>
</tr>
</tbody>
</table>

Figure 7-11 Description of severity ratings used for surface abrasion

Another issue that surfaced from the pilot testing was the need to identify and describe the materials of the mortars used in the repairs. This not only helped in the assessment of past conservation practices but also in assessing their role in
the exacerbation of existing structural damage. Different categories were created based on their composition and the proportions of the main binders used, based on visual examination.

The categories used for the mortars were based on the information derived from the conservator-restorer of the HCP. Most of the mortars used in the repairs to the mosaics at Herculaneum since the early 1990s, consist mainly of lime and volcanic sand with a percentage of cement added to make them more durable, ranging from 2-10% (HCP staff 2 2011, personal communication). Their proportions are broadly 1:3 lime: volcanic sand and 2-10% cement (HCP staff 2 2011, personal communication). An exception to this are the interventions carried out by qualified conservator-restorers, as they use only lime mortars (HCP staff 2 2011, personal communication). As they have only been allowed to take on projects by the SANP in the late 1990s onwards (HCP staff 2 2011, personal communication), most of the repairs on the mosaics at the site dated prior to 2000 include a percentage of cement, which may range from 2% to 100%, depending on the period of intervention. The mortars used by the SANP in mosaic conservation until the 1980s were of cement or included large quantities of cement (SANP personnel 2 2011, personal communication). Although the use of cement has been reduced, it has not been entirely abandoned, but the ratio of the ingredients used are not documented or otherwise known (SANP personnel 2 2011, personal communication). Based on this information and from visual
examination, the mortar repairs were classified as lime, lime-cement and cement. These are described in detail in the visual glossary in Appendix 8.

Following these changes, the template form was revised accordingly (Appendix 7.2). Maps of each mosaic were then created on a scale of 1: 50 m, printed on an A4 size paper. Two copies of each map were printed, so that surface and structural damage could be recorded separately, for clarity and ease of data processing off the field.

The revised method was then tested on the mosaics in the House of the Wooden Partition and House of the Black Saloon in May 2011, as these buildings included various types of mosaics in different contexts. For example, they had different levels of exposure, with a variety of adjacent floor areas and different levels of access in terms of visitor numbers due to their location on the main access routes inside the buildings, as evident from micro-scale observations.

The initial aim was to use a GPS for recording the location of each condition. As the GPS device was not working inside the buildings, spatial mapping was achieved by taking approximate measurements of extent (area of the surface affected) and their distance from fixed points visible on the map (such as walls and/or columns). These were noted on the respective map, in order to be digitized in GIS at the data processing stage.
Final data collection

The final survey was carried out from the 30th May to the 10th June 2011, and included all mosaics currently open to access. A total of 32 floors in 9 buildings were surveyed (Appendix 3.1). The template form for recording context and mosaic characteristics/materials was completed for each mosaic and an identification number was provided corresponding to the room numbering system used by the HCP. Damage phenomena were mapped and given a severity rating where applicable. It was important to keep consistency in the time spent on each mosaic for the recording, which was estimated to be about 10 minutes per square metre. The surface was cleaned with a brush to allow better legibility of the tessellatum, where necessary. Each phenomenon was marked with different coloured pens. All documented features and their respective severity levels were also recorded photographically, using a high-resolution digital camera (Canon X90) and a scale.

7.6.2 Recording visitor movement, numbers and behaviour

The second major component of the assessment of visitor – induced damage was the recording of visitor movement and behaviour. Structured and unstructured observations were used for the collection of data. The rationale for the methods used for the collection of this type of data was presented in Chapter Three,
section 3.5.1. More details regarding the method and its application at Herculaneum are presented in the following sections.

**Macro-scale observations**

The recording of visitor movement at the site level aimed at understanding site use and visitor numbers to the buildings with mosaics open to public access. As already mentioned (see 3.5.1), the recordings took place in seasons from 2009 until 2011. They resulted in the collection of 120 routes, representing a total of 40 routes per visitor type (independent visitors, guided groups, school groups) (Figure 3-2).

These were recorded on A4 size site maps. Each route was recorded on a separate map and given an identification number. In addition to the route recording, a template form was created to describe each route and subject followed in terms of the following attributes: starting/end time; start/end point; number of visitors; age; guiding device used. The form was in a tick-box format to allow the collection of data in a systematic way. The form is presented in Appendix 1.

The recording of routes commenced by following the first group passing through the ticket control counter at the start of observation time. This was followed by the next group entering, once the previous recording was completed. It was
necessary to follow people from a distance, to ensure that their route was not influenced and to avoid making them feel uncomfortable. For this reason a different recording method was used for recording visitor movement inside the buildings (see 3.5.1 and below).

Observations took place in the morning from 9:00 hours until 13:00 hours and from 14:00 hours to 18:00 hours. As already mentioned, a sign was posted at the ticket office, informing visitors that observations were taking place on site (see 3.5.1).

**Micro-scale observations**

Micro-scale observations were recorded in the buildings with a complex spatial layout that allow for more than one route to be followed in their interior (see 3.5.1). This type of observation followed the method employed in the macro-scale observations, albeit modified (see 3.5.1). The main difference is that this type of observations necessitated the presence inside the buildings with mosaics selected for the recording, rather than following visitors. This was achieved by positioning myself in a location with visual access to the interior of the building. The recordings took place in 2010 (Figure 3-3).

The route of the first group entering the building from the start of the recording session was recorded until the exit, followed by the next group to enter after the
completion of the previous recording of route. The recording sessions lasted about one hour each and were repeated at least twice in each of the buildings at different time intervals. Each route was recorded on an A4 size map of each building and was given an identification number. Notes were taken for each route on visitor numbers and type, and the time observations began and finished (Appendix 2.2).

Additional notes and photographs were taken of particular phenomena related to visitor behaviour, such as sitting, jumping, or picking up tesserae from the mosaic floors.

**Unstructured observations**

Unstructured (systematic and ethnographic) observations were used understanding visitor behaviour and how it may potentially contribute to mosaic damage (see 3.5.1 and 3.5.6).

**Recording visitor shoes**

The shoes worn by visitors were examined in terms of their potential to contribute to the instigation of surface and structural damage to the mosaics. This was observed through unstructured observations but also from a question included in the visitor survey in 2009 and 2010 aiming at the identification of the
main visitor shoe types used at the site (Appendix 10.1 and 10.2 respectively). A multiple choice question was used (Question C1) asking visitors to select the type of shoe that best represented their own at the day of their visit to Herculaneum.

7.7 Data processing

7.7.1 Processing of visual and archival information on the mosaics

The textual data collected on previous interventions for each mosaic were inserted in a spreadsheet, indicating the date of the interventions and the source from which the information was extracted (Appendix 6).

Photographs of the mosaics taken in 2011 with available previous matching documentation (mainly collected from the SANP archive and the researcher’s photographs since 2008) were rectified in order to be able to measure the total areas of loss for each year for which information was available. This was done in AutoCAD (version 2013 for Mac) by scaling the dimensions of the area to be measured to real dimensions, using the tesserae dimensions as the basis. Then a polyline was drawn around the areas of loss in order to measure the area in square meters (see Figure 7-12). For mosaic 1 in the House of the Skeleton and mosaic 7 in the House of the Wooden Partition, sufficient documentation was available for the years before and after 2008 for a visual reconstruction of loss over the years (Appendix 9, Figure A9.4 and Figure A9.10). Photographs were
rectified and then stitched together or superimposed for a visual display of loss over the years in Adobe Photoshop CS5 (Mac version 2013).

Figure 7-12 An example of the image processing carried out in AutoCAD for measuring areas of loss on the mosaics for each year to enable comparisons and understand the rate of change.

The photographs collected from the website of the University of Auckland in New Zealand (UANZ) were used as a comparative baseline with photographs of the same locations taken from 2009 to 2011, to understand change (see 3.5.3). Unfortunately, due to the low resolution and format of the panoramic photographs by UANZ, it was not possible to obtain through rectification the exact measurements of the observed losses as lacunae or mortar repairs visible in the photographs. These data allowed only for the dating of losses in terms of pre- or post-2003.
The collected visual documentation from background research and respective photographs taken in 2011, were organized digitally by building and mosaic in a chronological order. They are presented in Appendix 5.

7.7.2 Transfer of data in Geographic Information Systems platform (GIS)

The data collected from the site survey and structured observations were imported into a GIS (see 3.7.1). The damage phenomena were digitized in two separate layers, called “structural” and “surface” damage. Then each was described by a set of attributes: type of damage, building name, mosaic name and severity where applicable. For structural damage an additional attribute was added, describing the date of the loss, if available (see Dating mosaic losses section below).

The database of HCP in GIS was particularly useful in providing some layers of information necessary for the assessment of damage, such as roofs and water pooling. Certain site features necessary for the assessment that were not available in the HCP GIS database had to be created, such as floors in opus signinum, in cocciopesto or adjacent areas to the mosaics paved with gravel. The absence of these layers by the HCP could be seen as an indication of the secondary importance given to these types of flooring, as they had not been fully documented on the GIS by the time I carried out my research at the site.
Data from macro- and micro-scale observations were digitized in separate layers respectively. The data collected on the template forms for describing each route were added as separate attributes to each feature. For example, each macro-scale visitor route was described in terms of starting point, finish point, start time, end time, total time in minutes, group type, guiding device used, number of visitors and average visitor group age. Similarly, attributes were added to micro-scale routes, such as building name, group type, visitor numbers, start time and end time.

**Dating mosaic losses**

To understand better the relationship between visitors and structural damage (*lacunae* and mortar repairs), the latter was dated based on past photographic evidence. This was carried out in GIS by creating an additional attribute for the layer “structural damage”, called “date”. Each loss was dated using a set of numeric ratings from 0 to 4. Each rating responded to a dating period as defined by a set of criteria presented in Figure 7-13.
<table>
<thead>
<tr>
<th>Rating</th>
<th>Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Losses dated before and until 1950</td>
<td>These were identified from photo documentation from the archives of SAP. Where no such documentation was available, they were assigned a likely date based on their location, extent and in the case of repairs, materials. For example, large cement repairs found along the edges of the rooms likely to date to the excavation of the site were included in this category.</td>
</tr>
<tr>
<td>1</td>
<td>Losses dated between 1951 and 2003</td>
<td>This phase includes all losses visible in 2003 or earlier documentation.</td>
</tr>
<tr>
<td>2</td>
<td>Losses dated between 2004 and 2008</td>
<td>This phase includes any losses that have occurred from 2004 and before 2008, not visible in the 2001 documentation. Most of the evidence for dating these losses derives from the comparison of photographs taken at the site in 2008 and 2009 with the 2001 or 2003 documentation. Additional evidence stems from the archive of HCP.</td>
</tr>
<tr>
<td>3</td>
<td>Losses dated between 2009 and 2011</td>
<td>This phase includes losses that have occurred and recorded during the fieldwork seasons of the research project at the site since 2009.</td>
</tr>
<tr>
<td>4</td>
<td>1951-2008</td>
<td>Losses that could not be dated precisely, but there is evidence that they are likely to have been caused in the post-1950s period and prior to 2008.</td>
</tr>
</tbody>
</table>

Figure 7-13 Definition of the numeric ratings used for dating mosaic loss found on the recorded visitor routes in the interiors of the buildings with mosaic floors.

The criteria were established based on the visual documentation collected from background research and the year the site was opened to the public. The year 1950 was taken broadly as the starting point, as the mosaics were excavated in the 1920s to 1940s and all buildings included in this research were opened to the public by the 1950s. The UANZ archive proved significant in the dating process.
as it provided substantial visual documentation of the mosaics in 2001 and 2003, of which the latter was used as a benchmark for the dating. Visual documentation available from 2008 to 2011 was used to create additional dating periods to get a better overview of the rate of loss that occurs to the mosaics.

The level of precision of the dating is limited by the lack of sufficient visual documentation, especially for the period starting with the excavation of the site in the late 1920s until 2003. For example, in some cases visual documentation dated in the pre-2003 period may be available for current losses, but no information exists to precisely state the exact year the loss occurred. For this reason, an additional dating period was used for the losses that are likely to have occurred after 1951 and before 2008. Despite these limitations, the process of dating surface losses provided an overview of the occurrence and rate of loss, particularly in the years before and after 2003.

**Calculation of visitor numbers into the buildings with mosaics**

To understand the role of visitor volume in the instigation of impacts on the mosaics, visitor numbers per type and their respective percentages were calculated for each building with mosaics, based on the sample collected from macro-scale observations. This was calculated in GIS.
First, the total numbers for each visitor type were calculated, using the “summarise” query for the “visitor type” layer. A total of 2432 visitors were recorded, consisting of 122 independent visitors, 1190 visitors in the “guided group” category and 1120 in the “schools” category (Figure 7-14).

<table>
<thead>
<tr>
<th>Visitor type</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent visitors</td>
<td>122</td>
</tr>
<tr>
<td>Guided groups</td>
<td>1190</td>
</tr>
<tr>
<td>Schools</td>
<td>1120</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>2432</strong></td>
</tr>
</tbody>
</table>

Figure 7-14 Total visitor numbers recorded per type from macro-scale observations in 2009 to 2011

The distribution of numbers of each visitor type in each building included in the survey was examined using a location query. An example of the execution of the query is illustrated in the map below (Figure 7-15). This allowed for the calculation of the sum of total visitors per type from the intersecting routes with each building, and for the data to be exported to a spreadsheet package (Excel) for further analysis (Figure 7-16).
Figure 7-15 Example of the process of selecting features from one layer intersecting another for counting visitor numbers in the buildings with mosaics. The features from the “Route” layer, highlighted in light blue, intersect the House of the Wooden Partition, highlighted in purple.
The core of the assessment was the spatial association of recorded structural damage with visitor movement, based on the recorded micro-scale and unstructured observations.

This association was based on the assumption that access patterns inside the buildings with mosaics are likely not to have changed since their opening to the public (see 5.8.1). All open areas in the buildings included in the survey are likely not have had any changes to the way they can be accessed in their interiors since their opening to the public as no visual, textual or oral historical evidence was found to suggest otherwise, except the rooms with barriers: room 3 in the Men’s
section (Appendix 6.10) and room 2 in the Women’s section (Appendix 6.9) of the Central Baths. All barriers were added by the HCP in 2006. Furthermore, all buildings have always been open to access, with the exception of the House of the Wooden Partition, which was closed periodically for a few months in 1981 (Appendix 5, Figure A5.7; Appendix 6.3) and the House of the Black Saloon, which was closed periodically in the 1990s (Appendix 6.7) (see 5.8.1).

The spatial association was established by examining the location of damage in relation to the observed visitor movement from micro-scale and unstructured observations. This was achieved in GIS via the creation of the “access” field for the “structural damage” layer that described whether the damage was on a visitor route or not. For example, if the loss was located close to the wall of the room, then it was more likely that it would not be accessed by visitors, and thus unlikely to have been caused by visitor access. The association was described with a numeric rating from 0 to 1 (0 was used when there was no association, and 1 when there was).

This association helped distinguish damage falling on access routes and likely to have been affected by visitor access from damage not meeting these criteria. Based on this association, it was possible to calculate the total areas of loss for each mosaic likely to have been caused by access and the respective rates of loss. These data provided a better insight into the role of access in the instigation of
impacts as well as the role of maintenance in controlling damage (see 7.10.2 and 7.10.5).

To achieve this, a series of selection queries were carried out in GIS. First, the layer “Structural damage” was chosen, the field “Access” was set to 1 and the “Date of damage” was also set to higher or equal to 1, to exclude damage that likely dates in the period prior to the opening of the site to the public (see 7.7.2 and Figure 7-13). This led to the selection of losses falling on the main access routes inside the buildings with mosaics. The map in Figure 7-17 illustrates the identified features of “structural damage” dated in the post–1950 period and falling on the main visitor access routes.

To calculate the sum of the total area of loss coinciding with visitor access routes for each mosaic, the percentage of the area lost from the total tessellated surface of each mosaic was calculated for the two main dating periods 1951-2003 and 2004-2011. This formed the basis for calculating the rates of loss for each mosaic for each period (see 7.10.2 and 7.10.5).
Figure 7-17 The recorded structural damage associated with access routes in the buildings of Insula VI, highlighted in light blue and dated in the post-1950s period. The buildings are: the House of the Black Saloon (*Casa del Salone Nero*), the Women’s section (*Terme Centrali Femminili*) and the Men’s section (*Terme Centrali Maschili*) of the Central Baths.
7.9 Assessment Results

The result of the visitor impact assessment are presented in this section. The mosaic survey results are presented in Appendix 9. The assessment results are presented by building and in two sections, as follows:

1. Visitor movement and access

This section presents the recorded movement from micro-scale observations in the buildings with mosaics with complex spatial layout, where more than one route is possible in the interior, and the recorded numbers per visitor type from macro-scale observations for each building (see 3.5.1). Supplementary visual documentation regarding visitor behaviour and movement is presented where necessary to highlight and clarify points raised by the assessment.

2. Association of mosaic damage with visitor access

This section examines the association, if any, between the recorded damage for each mosaic as presented in Appendix 9 and access, in terms of movement and numbers.

The results are followed by a discussion of the findings in terms of the extent to which visitors are a cause of damage to the mosaics, and how this damage relates to numbers, behaviour and movement. Factors contributing to the instigation of damage are also discussed.
7.9.1 House of the Skeleton

Room 1 is located at the entrance of the house, which is covered with a roof and it is open on the north and south sides. The mosaic has an area of about 6.20 m². Room 17 has a roof and is exposed on the north side towards room 21 (Figure 7-18). The mosaic has an area of about 7.87 m². Room 21 is exposed and its floor has an area of 7.9 m² (Figure 7-18).
Figure 7-18 The mosaics and their context in the House of the Skeleton. The mosaics included in the survey are 1, 17 and 21.
Visitor access

The distribution of visitors per type to the house from macro-scale observations suggests that this house has lower visitor numbers in comparison to other buildings with mosaics (Figure 7-16). It has a lower number of guided groups and schools in comparison with independent visitors (Figure 7-19).

<table>
<thead>
<tr>
<th>Visitor type</th>
<th>Numbers</th>
<th>% of total visitors per type recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>52</td>
<td>43%</td>
</tr>
<tr>
<td>Guided groups</td>
<td>390</td>
<td>33%</td>
</tr>
<tr>
<td>Schools</td>
<td>240</td>
<td>21%</td>
</tr>
</tbody>
</table>

Figure 7-19 Recorded numbers per visitor type in the House of the Skeleton and their respective percentages out of the total visitor numbers recorded for each type from macro-scale observations

Micro-scale observations suggest a differentiation of access per visitor type. A total of 41 visitors were recorded, all independent visitors (Appendix 2.3).
Figure 7-20 Micro-scale observations recorded in the House of the Skeleton

Mosaic 1 is accessed by all visitors who enter the building. It is accessed mainly along the central panel (Figure 7-20 and Figure 7-21), although as suggested by observations, the entire surface is subjected to traffic when large groups visit the
house. They stand along the mosaic for viewing room 2, where access is limited, as it does not have a capacity for groups of 20 to 30 people.

Figure 7-21 Visitors walking along the central panel of mosaic 1 in the House of the Skeleton.

In contrast, mosaics 17 and 21 are accessed mainly by independent visitors, as this was the only group recorded to have accessed the building during micro-scale observations (Figure 7-20). They are mainly used as a path and a viewing platform to rooms 18 and 19 that are currently not accessible. The lower frequency of visitors to this part of the house, as opposed to the rest of the building, was further confirmed through unstructured observations and while carrying out the survey of the mosaics.
Association of recorded damage with visitor access

- Mosaic 1

The recorded damage on mosaic 1 (Appendix 9.1.1) and visitor movement observations indicate that visitors cause severe surface abrasion on the main panel of the mosaic. Due to its location at the entrance of the house, the mosaic receives increased pressure, as all visitors have to walk on it in order to enter and exit the building.

Based on the evidence stemming from micro-scale and unstructured observations, all the recorded losses (evidenced as mortar repairs and lacunae) on the mosaic dated to post–1950s (Appendix 9.1.1, Figure A9.5) may be linked with visitor access as they all fall on the main access areas of the floor.

However, the context of the mosaic and the presence of other conditions suggest that the floor is affected by other agents of deterioration that make it particularly susceptible to foot traffic. For example, the exposure to rainfall of the east side of the mosaic close to the opening to room 2 (Appendix 9.1.1, Figure A9.6) may contribute to deterioration processes, which make the mosaic susceptible to structural damage as a result of access. This is further suggested by the progressive formation of lacunae recorded in that area (Appendix 9.1.1, Figure A9.4), and the deteriorated bedding layers visible through the lacunae.
• Mosaic 17

Despite the infrequent and limited access to the mosaic, the recorded lacunae are located on areas that visitors walk on (Appendix 9.1.2, Figure A9.7). Thus it can be deduced that visitors have contributed to the increase of loss at the northwest corner (Appendix 5, Figure A5.5). The re-laid support of the mosaic as visible in Figure A5.5 (Appendix 5), may have contributed to the detachment and dislodging of tesserae that led to further surface loss as a result of access.

• Mosaic 21

As the only repair on the mosaic is related to the lifting and relaying of the tessellatum in the 1980s without any further losses recorded after that, it is deduced that access is not associated with surface loss (Appendix 9.1.2, Figure A9.7).

7.9.2 House of the Wooden Partition

The tablinum of the house is covered with a roof and enclosed on three sides (Figure 7-22), with the north side exposed through a wooden door with openings along the upper part, which was installed after 1962 (Appendix 5, Figure A5.7). Its tessellated floor is the only mosaic of the house open to access. It is on its original support and has an area of about 15.33 m² (Figure 4-32). It belongs to the black-on-white floor category.
Figure 7-22 The mosaics and their context in the House of the Wooden Partition. The mosaic included in the survey is mosaic 7.
**Visitor access**

The distribution of visitors per type to this house, stemming from macro-scale observations, suggests that this building is popular for all visitor types and receives high visitor volume (Figure 7-23). It is particularly popular for guided groups as indicated in the table below.

<table>
<thead>
<tr>
<th>Visitor type</th>
<th>Numbers</th>
<th>% of total numbers recorded for each type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>69</td>
<td>57%</td>
</tr>
<tr>
<td>Guided groups</td>
<td>875</td>
<td>74%</td>
</tr>
<tr>
<td>Schools</td>
<td>574</td>
<td>51%</td>
</tr>
</tbody>
</table>

Figure 7-23 Recorded numbers per visitor type in the House of the Wooden Partition and their respective percentages out of the total visitor numbers for each type recorded from macro-scale observations.

Micro-scale observations from 2010 and 2011 suggest that most visitors who enter the house also enter room 7 (Figure 7-24). They do so from the central opening of the wooden partition, although some enter and exit from the side openings. Most pressure is placed on the southeast border in front of the wooden partition, as this is accessed twice for entering and exiting the room. The surface of the central panel of the mosaic and the northwest border are accessed in their entirety, especially when large groups access the room (Figure 7-25).

Furthermore, visitors stand on the northern frame towards the door opening to the garden of the house, which is currently closed to access. The mosaic is thus
used as a viewing platform for that part of the house (Figure 7-26).

Figure 7-24 Recorded micro-scale observations in the House of the Wooden Partition
Figure 7-25 A school group inside room 7 in the House of the Wooden Partition in 2009.

Figure 7-26 A group of independent visitors stand along the northwest border of mosaic 7 and look towards the garden of the House of the Wooden Partition in 2009.
Association of recorded damage with visitor access

Visitors are the cause of abrasion to the black *tesserae* of the mosaic (Appendix 9.2.1, Figure A9.8 and Figure A9.11). In terms of structural damage, as visitors tend to access all areas of its surface, but especially the southeast border and the central panel, they are likely to have contributed to the instigation of the recent losses in these areas, as well as to the growth of loss manifested as a repair on the central panel (Appendix 5, Figure A5.10; Appendix 9.2.1, Figure A9.9-10). Thus, the losses dated to post-1950s can be correlated with visitor access.

However, the detached *tessellatum* and the deteriorated bedding layers along the southeast side suggest that the large numbers of visitors exacerbate the already poor state of conservation of the mosaic as a result of other agents of decay. This is further demonstrated by the frequency of interventions to the floor in the years 2006 to 2009 (Appendix 4.1; Appendix 5, Figure A5.11 and Appendix 6.3).
7.9.3 House of the Alcove

Room 17 is exposed, and the tessellated part of its floor in room 17 is about 3 m². The mosaic is on its original support and belongs to the white-on-black polychrome typology (Figure 4-34). Cryptoportico 21 has openings on the east and north sides (Figure 7-27). The roof has recently been replaced (Appendix 6.4). The mosaic is on its original support and has an area of 21.75 m². It belongs to the black-on-white typology (Figure 4-35). Room 28 has a recently installed roof, similar to the one in room 21 and its north side has openings on the upper side. The mosaic is on its original support and has an area of 3.5 m². It belongs to the black-on-white typology (Figure 4-36)
Figure 7-27 The mosaics and their context in the House of the Alcove. The mosaics included in the survey are 17, 21 and 28.
Visitor access

Data from macro-scale observations suggest that this house receives very few visitors in comparison with other buildings (Figure 7-16). A total of 287 visitors were recorded to have accessed the building, equal to 11.8% of the total visitor numbers recorded. Independent visitors were the majority with 24% out of the total visitor numbers recorded for this type, followed by 16% of the total numbers of visitors in guided groups and 6% of schools (Figure 7-28).

<table>
<thead>
<tr>
<th>Visitor type</th>
<th>Numbers</th>
<th>% of total visitors per type recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>29</td>
<td>24%</td>
</tr>
<tr>
<td>Guided groups</td>
<td>186</td>
<td>16%</td>
</tr>
<tr>
<td>Schools</td>
<td>72</td>
<td>6%</td>
</tr>
</tbody>
</table>

Figure 7-28 Recorded numbers per visitor type in the House of the Alcove and their respective percentages out of the total visitor numbers recorded for each type from macro-scale observations

Micro-scale observations indicate access patterns to the three mosaics (Figure 7-29). Only 8 groups were recorded and all were independent visitors (couples and one single visitor) (Appendix 2.3). From these, only 4 groups (a total of 8 visitors) accessed the area of the house with the mosaics included in the survey. Although the observations are limited, they suggest that those who access this part of the house do so for viewing primarily the objects on display in rooms 18 and 19 (Figure 7-30) and then visit room 21 if they decide to do so.
Figure 7-29 Recorded micro-scale observations in the House of the Alcove
Visitor access to mosaic 17 in the House of the Alcove. Visitors use the floor as a viewing platform to rooms 18 and 19 instead, those who do access rooms 21 and 28 walk all the way to reach the alcove room, after which the house is named.

*Association of recorded damage with visitor access*

- **Mosaic 17**

Visitors are responsible for the abraded surface of the mosaic, which is exacerbated by the adjacent gravel (Appendix 9.3.1, Figure A9.12). They are likely to be the cause of the growth of lacunae on the main fragment of the floor, as these are located on the main route they take to view rooms 18 and 19 (Appendix 5, Figure A5.14 – 16; Appendix 9.3.1, Figure A9.13).

- **Mosaic 21**

Visitors are likely to have contributed to the growth of loss around the cement mortar repair on the central panel, close to the opening to room 20 (Appendix 5,
However, the presence of cement mortar and the exposure of the area to rainfall may have instigated the loss in the first place. Furthermore, the frequent presence of water on the surface of the mosaic (Appendix 9.3.2) and the recorded frequency of interventions (Appendix 4.2 and Appendix 6.4), as opposed to the low visitation rates, suggest that the mosaic is likely to be affected by other agents of deterioration that weaken its structure and make it particularly vulnerable to visitor access.

- Mosaic 28

As the cement mortar infills date to the post-exavation period (Appendix 9.3.2, Figure A9.14, and Appendix 9.3.3) without any further growth of surface loss, they cannot be associated with foot traffic.
7.9.4 House of the Stags

Figure 7-31 The mosaics and their context in the House of the Stags. The mosaics included in the survey are 1, 9, 30 and 31.
The entrance to the house is covered with a new wooden roof (Figure 7-31). It has a polychrome mosaic with an area of about 4.67 m² (Figure 4-40). Room 9 is covered with a new roof that is open on the sides (although not documented on the HCP layer in GIS). The floor is on its original support and belongs to the black-on-white typology. It has a total surface area of 6.62 m² (Figure 4-41). The south cryptoportico is partly covered and partly exposed (Figure 7-31). The covered part has a wooden walkway running along the centre of the floor, placed over the mosaic after the 1980s (SANP staff 2 2011, personal communication), and it is thus not directly accessible (Figure 7-32). The polychrome mosaic is about 70.82 m², while the accessible area (not covered by the walkway) is about 43.42 m². Room 31 has two polychrome mosaics, north and south (Figure 7-31). The mosaics are covered with a new roof. Both parts of the room with the mosaics have side openings: the south has full openings on the east and north sides and partial opening on the south and west, while the north has full openings on the south and partial opening on the west side. The south mosaic is about 27.25 m² (Figure 4-43). The north is about 27.78 m² of which only 19 m² are accessible, as the rest of the pavement is covered with the wooden walkway (Figure 4-44). The walkway used to extend until the end of the tessellated area in 2001, when it was removed in 2008 (Appendix 5, Figure A5.28). Both tessellated sections are on their original support.
Visitor access

This house is one of the most visited buildings of Herculaneum (Figure 7-16). Based on macro-scale observations, the house was visited by 58% of visitors in the guided group category, 57% of independent visitors and 39% of schools (Figure 7-33).
<table>
<thead>
<tr>
<th>Visitor group type</th>
<th>Visitor numbers</th>
<th>% of total numbers per group type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>70</td>
<td>57%</td>
</tr>
<tr>
<td>Guided groups</td>
<td>694</td>
<td>58%</td>
</tr>
<tr>
<td>Schools</td>
<td>432</td>
<td>39%</td>
</tr>
</tbody>
</table>

Figure 7-33 Recorded numbers per visitor type in the House of the Stags and their respective percentages out of the total visitor numbers recorded for each type from macro-scale observations.

From my participation in the guided groups and during the mosaic survey and overall presence at the site, it was clear that visitors tend to follow two routes inside the building. Guided groups usually access the cryptoporticos, to see the frescoes along the walls of the corridors and to access the garden of the house. As the mosaics in corridors 29, half of 30 and 32 are covered with a raised wooden platform, visitors do not come to direct contact with the mosaics. They only walk directly on the southeast part of mosaic 30 and on mosaic 31. Usually guided groups and schools spend more time in room 31 where there is additional interpretive material on the wall of the south side (Figure 7-34).
Alternatively, independent visitors and some schools were observed to be more explorative in their visit, by also accessing rooms 6 to 10 (Figure 7-31).

**Association of recorded damage with visitor access**

- Mosaic 1

The observed scratches on the marble insets (Appendix 9.4.1, Figure A9.15) are the outcome of visitor access.
• Mosaic 9

As the northeastern fragment is covered by earth and has been barely visible since 2003 (Appendix 5, Figure A5.23), visitors don’t notice it and walk on it as on their way to room 10 (Figure 7-35). They thus contribute to the dislodging and loss of the *tessellatum* in that area.

![Figure 7-35 Visitors walking to room 10 and passing from the area with the mosaic fragment located on the main visitor access path in room 9.](image)

The main fragment of the floor is unlikely to be accessed by visitors as it is off the main access route to room 10. It cannot be ascertained, however, if the loss of *tesserae* (Appendix 9.4.2, Figure A9.17) is associated with visitor access.
• Mosaic 30

Visitors cause abrasion to the black tesserae (Appendix 9.4.3) and do contribute to structural damage, indicated by the presence of surface loss on the main access route of the mosaic (Appendix 5, Figure A5.25; Appendix 9.3.3, Figure A9.18 and Figure A9.21).

• Mosaic 31

The extensive repairs on the surface of the mosaic (Appendix 9.4.4, Figure A9.23) and the high visitor numbers to the room suggest that visitors may exacerbate the poor state of conservation of the mosaic, likely to be mainly caused by underground moisture and root growth under the tesserae and exposure to rainfall (Appendix 9.4.4, Figure A9.22).

7.9.5 House of Neptune and Amphitrite

Room 3 is covered with a new roof and is exposed on the northwest side towards the atrium (Figure 7-36). The tessellated area of its floor belongs to the black-on-white typology, it is on its original support and has an area of about 2.22 m² (Figure 4-48)
Figure 7-36 Mosaics and their context in the House of Neptune and Amphitrite. The mosaic included in the survey is in room 3.
Visitor access

This house receives a high number of visitors. Macro-scale observations recorded the highest number of visitors of all buildings with mosaics (Figure 7-16). They included 83% of total visitors in the guided group category, and 65% of students in the schools category (Figure 7-37). The House is one of the highlights of the site due to the wall mosaic depicting Neptune and Amphitrite from which it takes its name (see 4.5.5). As access to the room with the wall mosaic is restricted, visitors have to access room 3 to have visible access to the wall mosaic. Hence all visitors who access the building walk on the mosaic floor (Figure 7-38).

<table>
<thead>
<tr>
<th>Visitor group type</th>
<th>Visitor numbers</th>
<th>% of total numbers per group type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>58</td>
<td>48%</td>
</tr>
<tr>
<td>Guided groups</td>
<td>992</td>
<td>83%</td>
</tr>
<tr>
<td>Schools</td>
<td>725</td>
<td>65%</td>
</tr>
</tbody>
</table>

Figure 7-37 Recorded numbers per visitor type in the House of Neptune and Amphitrite and their respective percentages out of the total visitor numbers recorded for each type from macro-scale observations.
Figure 7-38 Students visiting the House of Neptune and Amphitrite, in front of room 3 with others in the background viewing the wall mosaic.

**Association of recorded damage with visitor access**

The *lacunae* and the cement mortar repairs on the tessellated fragments towards the centre of the floor (Appendix 9.5.1, Figure A9.24) may be linked to visitor access, as this area is accessed by all visitors who want to see the wall mosaic. There is no evidence of deterioration affecting the mosaic, further suggested by the absence of previous interventions to the floor (Appendix 4.4 and 6.6).
7.9.6 House of the Beautiful Courtyard

All mosaics in this house are bi-chrome, belonging to the black-on-white typology and they are all enclosed.

Figure 7-39 The mosaics and their context in the House of the Beautiful Courtyard. The mosaics included in the survey are 3, 4, 5, 12, 13 and 19.
Room 3 is the courtyard of the house from which the latter takes its name. It is covered with a paneled glass roof. The floor is on its original support covering an area of 20.58 m² (Figure 4-50). The large tablinum has a floor area of about 46.64 m² (Figure 4-51). The area of the floor in room 5 is about 5.36 m² (Figure 4-52). About 40% of its surface consists of reintegrated tesserae. It appears slightly deformed, but adhered on its support. The entrance room is partially exposed on the north side through a window and the entrance opening. Its floor has an area of about 28.42 m². The mosaic in room 13 has an area of about 3.55 m² (Figure 4-54), and the mosaic in room 19 has an area of about 1.44 m² (Figure 4-55).

Visitor access

Macro-scale observations indicate the frequency of visitor access to this house, considered one of the popular buildings with mosaics (Figure 7-16). All types of visitors were recorded, with the highest percentages attributed to guided groups (63%) followed by independent visitors (48%) and schools (36%) (Figure 7-40).
<table>
<thead>
<tr>
<th>Visitor group type</th>
<th>Visitor numbers</th>
<th>% of total numbers per group type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>59</td>
<td>48%</td>
</tr>
<tr>
<td>Guided groups</td>
<td>750</td>
<td>63%</td>
</tr>
<tr>
<td>Schools</td>
<td>405</td>
<td>36%</td>
</tr>
</tbody>
</table>

Figure 7-40 Recorded numbers per visitor type in the House of the Beautiful Courtyard and their respective percentages out of the total visitor numbers recorded for each type from macro-scale observations.

Micro-scale observations indicate how the house is used (Appendix 2.3). Most visitors access rooms 12, 3, 5, and 4, 13, with the exception of independent visitors who also access corridor 18 to view the west area of the building (Figure 7-41). Rooms 4 and 5 are visited by all visitors. As room 4 displays skeleton casts of people who died in the eruption of 79 AD, they are considered the highlight of the building (see 4.5.6). Interestingly, many visitors tend to exit the upper part of the building (rooms 3 and 5) from room 3, by jumping to room 13, instead of using room 20 that acts as the connecting area between rooms 5 and 12. This puts mosaic 13 at risk as it causes vibrations, especially when jumping on the floor. Visitors were also observed to rest on the floors located at a higher level, such as room 5 and 3 (Figure 7-42).
Figure 7-41 Recorded micro-scale observations in the House of the Beautiful Courtyard
Associating the recorded damage with visitor access

- **Mosaic 3**
  The recorded abrasion (Appendix 9.6.1, Figure A9.26) is associated with visitors who use the room as a connecting point between the lower areas of the house and room 4.

- **Mosaic 4**
  Observations suggest that most recorded damage (Appendix 9.6.2, Figure A9.27) dated to post-1950s correlates with visitor movement and behaviour. Visitors may be an exacerbation of an existing problem, such as the loss of adhesion of the *tessellatum* as suggested by the conservators of HCP (Appendix 9.6.2).
• Mosaic 5

The recent repairs on the mosaic (Appendix 9.6.3, Figure A9.26) can be associated with visitor access as they are located in an area that is used both for viewing the upper areas of the house and the courtyard, but also for resting (Figure 7-42).

• Mosaic 12

The early-recorded damage on the mosaic is not associated with visitor access (Appendix 9.6.4, Figure A9.28). The lime-cement mortar repair may be associated with visitor movement as it is close to the route used by independent visitors to corridor 18 and close to the opening to room 14 to which access is restricted (Appendix 9.6.4, Figure A9.28).

• Mosaic 13

The recorded losses are not associated with visitor access, as they date to the post excavation period (Appendix 9.6.5, Figure A9.28).

• Mosaic 19

There is no damage on the mosaic that can be associated with visitor access (Appendix 9, Figure A9.28).
7.9.7 House of the Black Saloon

Room 4 is covered (Figure 7-43). The floor has an area of about 12 $\text{m}^2$ (Figure 4-57). Room 5 has a roof but is partly exposed through the opening on the west wall towards room 6 (Figure 7-43). The floor has an area of about 13 $\text{m}^2$ (Figure 4-58). Room 8 is covered (Figure 7-43). The mosaic floor is on its original support and has an area of 6.30$m^2$ (Figure 4-59). Room 9 is covered (Figure 7-43). The mosaic is on its original support and has an area of 7.6 $\text{m}^2$ (Figure 4-60).

The peristyle corridor 16 is exposed (Figure 7-43). The mosaic is on its original support (Figure 4-61). It has a total area of about 23.77 $\text{m}^2$. The peristyle corridor 17 is fully exposed (Figure 7-43). Most of it is lost (Figure 4-62). It has an area of about 32.82 $\text{m}^2$ and the tessellated part appears to be on its original support (Figure 7.43). The floor has an area of about 28.46$m^2$ (Figure 4-63). The floor acts as a viewing platform for room 7 where access is currently restricted (see 4.5.7). Peristyle corridor 19 is under a roof except the southwest side, and fully exposed on the east side (Figure 7-43). Its floor has an area of about 19.9$m^2$ (Figure 4-64).
Figure 7-43 The mosaics and their context in the House of the Black Saloon. The mosaics included in the survey are 4, 5, 8, 9, 16, 17, 18 and 19.

Mosaics 4, 5 and 9 belong to the black-on-white typology, whereas mosaics 8, and 16 to 19 to the white-on-black typology.
Visitor access

This house receives mainly independent visitors and a lower percentage of large groups as compared to the rest of the buildings (Figure 7-16). Macro-scale observations suggest that the building is visited mainly by 68% of the total number of the recorded independent visitors (Figure 7-44). This is followed by 53% of the guided group category and 16% of schools (Figure 7-44).

<table>
<thead>
<tr>
<th>Visitor group type</th>
<th>Visitor numbers</th>
<th>% of total numbers per group type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>83</td>
<td>68%</td>
</tr>
<tr>
<td>Guided groups</td>
<td>630</td>
<td>53%</td>
</tr>
<tr>
<td>Schools</td>
<td>182</td>
<td>16%</td>
</tr>
</tbody>
</table>

Figure 7-44 Recorded numbers per visitor type in the House of the Black Saloon and their respective percentages out of the total visitor numbers recorded for each type from macro-scale observations.

Micro-scale and unstructured observations confirm the higher frequency of independent visitors to this building (Appendix 2.3). These, together with unstructured observations, have indicated certain patterns of movement throughout the house. The peristyle attracts all visitors entering the building. Although the official entrance to the building is on Decumanus Maximus, visitors do access the house from the entrance on Cardo IV Superiore that functions as another access point (Figure 7-48).

Visitors walk around the peristyle to view its surrounding rooms. Rooms 4 and 5 tend to be accessed by independent visitors. Visitors who enter room 5 are also
likely to visually, if not physically, access room 6. All visitors access room 18 to view the room of the Black Saloon, from which the house takes its name (see 4.5.7) (Figure 7-46). Mosaics 8, 16 and 19 are also frequently accessed, as they all act as connecting floors to other areas of the house and especially to corridor 18. Visitors, and particularly students, do not walk along the central areas of the peristyle mosaics but access their entirety, as documented by unstructured observations (Figure 7-47). Visitors rarely access room 9, as they have visual access from room 8, as the room is dark and there is nothing particular to see. Furthermore, they use the shaded areas of the house to rest, particularly during the warm months of the summer (Figure 7-45).

Figure 7-45 Students resting on the wall opening of room 5 towards room 19 in the House of the Black Saloon.
Figure 7-46 Visitors standing on the mosaic in room 18 to view the room of the Black Saloon.

Figure 7-47 Visitor movement in the House of the Black Saloon, showing use patterns along the peristyle. Visitors do not stay along the central area of the mosaics but cross the peristyle from the colonnade and thus access the borders of the mosaics.
Figure 7-48 Micro-scale observations in the House of the Black Saloon
Association of recorded damage with visitor access

- Mosaic 4

The recorded damage is unlikely to be associated with visitor access. This is because the area with losses and repairs on the northwest border along the northwest wall of the room (Appendix 9.7.1, Figure A9.29) cannot be accessed with ease by visitors, due to its proximity to the wall and the subsided area in front of it.

- Mosaic 5

The repairs at the threshold to room 6 may be linked to visitor access due to their location on a frequently accessed point (Appendix 9.7.2, Figure A9.30). The exposure of the area to rainfall is likely to weaken the structure of the floor, making it more susceptible to damage.

- Mosaic 8

The recorded losses on the mosaic may be linked to foot traffic, as they are all located on frequently accessed areas (Appendix 5, Figures A5.37; Appendix 9.7.3, Figure A9.31). The absence of maintenance in 2008 left the tessellatum exposed to foot traffic, which led to the growth of loss (Appendix 5, Figure A5.40-42).
• Mosaic 9

The recorded loss on the threshold to room 8 (Appendix 9.7.4, Figure A9.32) is likely to be linked to visitor access (Appendix 5, Figure A5.43-44; Appendix 9.7.4) due to its location and the use of the area as a viewing point into the room.

• Mosaic 16

The extensive recent losses dated to post-2003 and the growth of those dated to post-1950s identifiable as repairs or lacunae, particularly along the centre and the eastern border with rooms 11 and 12, may be linked to visitor access as these areas are located on a highly accessed visitor route (Appendix 9.7.5, Figure A9.33). However, the exposure of the mosaic to the environment and especially to rainfall and rain pooling is likely to make it susceptible to damage stemming from foot traffic (Appendix 9.7.5, Figures A9.34-35).

• Mosaic 17

The losses dated to post-1950s could be linked to visitor access (Appendix 9.7.6, Figure A9.36). Although these are located mainly on the north border and not on the main panel of the mosaic, they are still accessed by visitors, as confirmed by unstructured observations. Nevertheless, like mosaic 16, the exposure of the floor to the environment and to rainfall may contribute to its susceptibility to visitor-induced damage.
• Mosaic 18

Most of the losses on the mosaic dated to post-1950s may be related to visitor access, as they all coincide with visitor movement on the mosaic (Appendix 9, Figure A9.37). However, the exposure of the south border along the colonnade to rainfall weakens the integrity of the mosaic (Appendix 5, Figure A5.53-54). Thus access leads to surface loss (Appendix 9.7.7, Figure A9.37).

• Mosaic 19

The losses on the mosaic dated to post-1950s (Appendix 9.7.8, Figure A9.39) may be linked to visitor access, although as with mosaic 18, those found along the colonnade may be linked primarily to other deterioration processes that exacerbate with visitor access (Appendix 9.7.8).
The tepidarium is about 57.27m² (Figure 4-68). It is enclosed, with an opening on the south side towards the caldarium (Figure 7-49). Almost half of the floor has collapsed, as a result of the volcanic eruption (Figure 4-68). The caldarium is exposed (Figure 7-49) and its mosaic is about 65 m² (Figure 4-69).

Visitor access
The Men’s section of the Central Baths is one of the most visited buildings with mosaics (Figure 7-16). Macro-scale observations suggest that the building is
popular for schools, recorded with 78% of the total students in the schools category, followed by 43% of guided groups and 39% of independent visitors (Figure 7-50).

<table>
<thead>
<tr>
<th>Visitor group type</th>
<th>Visitor numbers</th>
<th>% of total numbers per group type</th>
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</thead>
<tbody>
<tr>
<td>Independent visitors</td>
<td>47</td>
<td>39%</td>
</tr>
<tr>
<td>Guided groups</td>
<td>504</td>
<td>43%</td>
</tr>
<tr>
<td>Schools</td>
<td>870</td>
<td>78%</td>
</tr>
</tbody>
</table>

Figure 7-50 Recorded numbers per visitor type in the Men’s section of the Central Baths and their respective percentages out of the total visitor numbers recorded for each type from macro-scale observations.

Unstructured observations indicate the use and access patterns inside the building. All visitors enter into room 3 and 5. The former is accessed twice for entering and exiting the latter. As half of the area of the mosaic in room 3 is restricted to prevent access to the figurative panel, the remaining part of the room receives increased pressure, including the threshold opening to room 5. This is further exacerbated by the way the visit is carried out. Guides and teachers use this room to illustrate the effects of the eruption and describe the figurative panel and thus spend more time in this room than in room 5 (Figure 7-51). In contrast, although room 5 tends to be accessed by all visitors, some choose not to enter the room and only have visual access from the threshold opening with room 3.
Figure 7-51 Students visiting the tepidarum mosaic in the Men’s Section of the Central Baths.

**Association of recorded damage with visitor access**

- **Mosaic 3**
  The lime mortar repairs and their growth are linked to visitor access, as they are located on the visitor route inside the building (Appendix 9.8.1, Figure A9.40). However, the repeated interventions, primarily as stabilization of the *tessellatum*, to the mosaic during the HCP campaign of 2005 to 2008 (Appendix 4.4), suggests that the *tessellatum* is detached from its bedding layer and thus susceptible to surface loss from access.

- **Mosaic 5**
  The recorded losses on the mosaic do not relate to visitor access, as these are early interventions (Appendix 9.8.2, Figure A9.41 and 42).
Figure 7.9.9 Central Baths, Women’s Section

The mosaics and their context in the Women’s section in the Central Baths. The mosaics included in the survey are the southwest part of mosaic 2 and mosaics 3, 4 and 5.

All mosaics in this building are open to access, except some areas on mosaics 2
and 4, and they are all enclosed. They are all of the black-on-white typology.

Room 2 has a floor area of 18.39 m² (Figure 7-49). It is on its original support with various tesserae re-integrations (Figure 4-71). The tepidarium (room 3) has a floor area of 15.32m² (Figure 4-72). The mosaic is on its original support. The caldarium (Figure 4-73) has a floor area equal to 31.8 m² (Figure 7-52). About 50% of the floor has subsided towards the east side, and this area is restricted from access with a barrier made up with a rope secured on wooden barriers, which was placed in 2006 (Appendix 6.9). The entrance floor to the baths is paved with a geometric mosaic with an area of 6.46 m² (Figure 4-74).

Visitor movement and association

The building is one of the most popular buildings with mosaics at the site (Figure 7-16). Macro-scale observations suggest it is particularly popular with guided groups (Figure 7-53). Unstructured observations indicate visitor circulation inside the building. Visitors access all rooms, with the exception of the areas in rooms 2 and 4 restricted to access (Figure 7-52). Due to the spatial layout of the building, they have to access the rooms twice for viewing the entire building. This places increased pressure to the mosaics, particularly to the threshold areas between rooms 2 and 3 and 3 and 4.
### Visitor group type

<table>
<thead>
<tr>
<th>Visitor group type</th>
<th>Visitor numbers</th>
<th>% of total numbers per group type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent visitors</td>
<td>66</td>
<td>54%</td>
</tr>
<tr>
<td>Guided groups</td>
<td>870</td>
<td>73%</td>
</tr>
<tr>
<td>Schools</td>
<td>312</td>
<td>29%</td>
</tr>
</tbody>
</table>

Figure 7-53 Recorded numbers per visitor type in the Women’s section in the Central Baths and their respective percentages out of the total visitor numbers recorded for each type from macro-scale observations.

**Association of recorded damage with visitor access**

- **Room 2**

  The abrasion on the volcanic *tesserae* is caused by foot traffic (Appendix 9.9.1, Figure 9A.43). The loss recorded on the threshold to room 3 as a repair could also be linked to visitor access as it is found on a frequently accessed path of the building (Appendix 5, Figure A5.63).

- **Room 3**

  Similar to room 2, the recorded surface abrasion results from visitor access (Appendix 9.9.2, Figure A9.44). The early repairs on the mosaic may be linked to visitor access due to their location at the thresholds to rooms 2 and 4.

- **Room 4**

  The increase of the area of loss recorded as repairs around the drain of the mosaic may be linked to visitor access, as this is a frequently accessed area inside the
room (Appendix 9.9.3, Figure A9.45).

- Room 5

The abrasion of the black squares is associated with visitor access. The recorded repairs at the entrance of the room could also be associated with visitor access (Appendix 9.9.4, Figure A9.43).

7.10 Discussion

This final section provides a discussion of the results of the survey. First of all, it identifies the main types of mosaic damage likely to have been caused by visitors at Herculaneum. Secondly, it examines the role of visitor access in terms of numbers, movement and behaviour in the instigation of mosaic damage. Finally, it discusses the role of site management and conservation in contributing to visitor impacts on the mosaics.

The recorded condition of the mosaics and their association with visitor access patterns suggest that visitors do cause surface and structural damage. The severity of visitor impacts, however, depends on the actual state of conservation of the mosaics and their context, including their exposure to other agents of deterioration, the frequency of visitor access and numbers and the practice of conservation interventions and especially maintenance.
7.10.1 Visitor access and surface damage

All recorded areas with abrasion were recorded on black tuff stone *tesserae*. This is due to the low level of abrasion resistance of the volcanic stone, as opposed to limestone used for the white *tesserae* (see 7.4.1). Some marble fragments were also noted to have scratches on their surface but with no surface reduction, such as the marble insets of mosaic 1 in the House of the Stags (Appendix 9, Figure A9.15).

Abrasion was more extensive and severe on tessellated areas made with tuff stone used as entrance points to buildings or between rooms, such as the mosaic 1 in the House of the Skeleton (Appendix 9.1.1) and the peristyle corridors in the House of the Black Saloon (Appendix 9.7). It is worth noting that the rooms of the Women’s section of the Central Baths (Appendix 9.8) were only affected by abrasion, mainly at the entrance thresholds between rooms 2, 3 and 4. As these areas are narrower and located at areas that necessitate access for entering or exiting a room or building, they receive increased pressure than larger floor areas in other rooms (Figure 7-54).
Evidence of severe abrasion on black *tesserae* on mosaic areas located at critical access points: Close-up of the peristyle mosaic 18 in the House of the Black Saloon (upper left); mosaic 1 in the House of the Skeleton (right); and on the threshold of room 3 to 4 in the Women’s section of the Central Baths (lower left).

The survey also demonstrated that many mosaics are affected by soiling that disturbs the aesthetic integrity of their surface, especially of those in the white-on-black category, such as the peristyle mosaics in the House of the Black Saloon (Appendix 9.7).

### 7.10.2 Visitor access and structural damage

The results of the assessment suggest that foot traffic may cause structural damage to the mosaics (see 7.4.2), manifested as loss to the *tessellatum*, although
this is more difficult to differentiate from other types of damage, due to the many variables that have the potential to lead to structural damage. However, evidence suggests that structural damage occurs when visitors access areas where the *tessellatum* is exposed, either through *lacunae* or through decay or loss of the mortar used for infilling *lacunae*. Impacts also occur when the mosaics are affected by other agents of deterioration that impact on their capacity to withstand pressure from visitor access. The following factors have surfaced from the survey as significant in making the mosaics susceptible to structural damage.

*Factors contributing to mosaic susceptibility to structural damage*

- Mosaic maintenance

The survey suggests that infrequent maintenance can exacerbate loss of the mosaics as a result of access. When a *lacuna* occurs on a frequently accessed area and the *tessellatum* is left exposed to foot traffic without being repaired, then exposed *tesserae* become dislodged. This was the case for many mosaics at Herculaneum, such as mosaics 5 and 8 in the House of the Black Saloon (Appendix 9.7; Appendix 5, Figures A5.36 – 41), mosaic 17 of the House of the Alcove (Appendix 5, Figure A5.12, Figure A5.14-15; Appendix 9.3.1), mosaic 7 in the House of the Wooden Partition (Appendix 5, Figure A5.10; Appendix 9.2.1) and mosaic 4 in the House of the Beautiful Courtyard (Appendix 5, Figure A5.30-31; Appendix 9.6.2).
Materials and methods used for repairs

The materials and the methods used for past and recent repairs surfaced as an important factor in the instigation of structural damage on frequently accessed areas.

In terms of recent repairs, some cases demonstrated that the method and mortar used for infilling surface losses contributed to the growth of existing losses on main visitor routes. For example, the repairs to the mosaics by the HCP as part of the maintenance and emergency campaigns since 2005 consisted of the full infill of the lacuna with hydraulic lime mortar or the repair of the edges of the exposed tessellatum with hydraulic lime mortar (that had to be soft so as to be easy to remove) (see 5.7.4). The latter type of intervention as opposed to the full infill was used when the areas were not included in the planned interventions, as they were not prioritised as urgent (see 5.7.4) and were provisionally treated to prevent further damage. This type of infill was recorded on mosaic 7 in the House of the Wooden Partition (Appendix 5, Figure A5.10, Appendix 9.2) and on mosaics 8 and 16 in the House of the Black Saloon (Appendix 5, Figure A5.40-41 and Figure A5.49; Appendix 9.7).
Furthermore, the use of mortar with high cement content during the early interventions (identified by its hardness and colour) (Appendix 5, Figure A5. 22) indirectly exacerbates visitor impacts to the mosaics. Cement has high content of harmful soluble salts, high compressive strength and low permeability (Stewart 2014). Its use in mortars leads to decay in the associated ancient fabric. As it is prone to fracturing, it allows the penetration of rainwater, which, however, cannot evaporate due to its impermeable nature. It can thus contribute to detachment of the tessellatum and ultimately to disengagement of tesserae when visitors walk on it. Various areas found on popular visitor routes were recorded with early repairs made with cement mortar that exhibited cracks and the repairs had displayed an adjacent increase of surface loss. Such cases include mosaic 21 in the House of the Alcove (Appendix 5, Figure A5.18), mosaics 8 (Appendix 5, Figure A5.41) and 9 (Appendix 5, Figure A42-44) in the House of the Black Saloon, or mosaic 31 in the House of the Stags (Figure 7-55).

Figure 7-55 Cement mortar used in repairs on the south border of the south part of mosaic 31 in the House of the Stags. The repair is found at the entrance to room 30. It was smaller in 2001 (see Appendix 5, Figure A5. 22) but has since increased in surface area.
Mosaic capacity in withstanding visitor impacts

Visitors cause structural damage when the mosaics have a low capacity to withstand visitor pressure, either as a result of poor quality in structure or materials, or as a result of their exposure to environmental agents of deterioration (see 7.4.2).

In terms of the former, there are cases where the tessellatum loss its adhesion to the bedding layer as its mortar was friable. These areas are also recorded with losses, which are extensive where frequent foot traffic takes place. The best example is mosaic 4 in the House of the Beautiful Courtyard (Appendix 9.6.2). Thus, the large numbers of visitors (see 7.9.6) led to extensive losses to the mosaic (Appendix 5, Figure A5.31).

In terms of deterioration, the presence of water from above or from below contributes to susceptibility to visitor-induced damage. Herculaneum is frequently exposed to rainfall due to the high precipitation in the region (Figure 4-2). The role of exposure to rainfall in weakening the capacity of mosaics to withstand traffic is evident by the fact that all tessellated areas that are fully or partially exposed to foot traffic and on frequent access routes were also recorded with surface loss. For example, mosaic 1 in the House of the Skeleton (Appendix
9.1.1) mosaic 21 in the House of the Alcove (Appendix 5, Figure A5.18; Appendix 9.3.2), mosaics 5 (Appendix 5, Figure A5.36-37; Appendix 9.7.2) and 18 (Appendix 5, Figure A5.54; Appendix 9.7.7) in the House of the Black Saloon are some examples of this phenomenon.

The presence of water may also lead to the growth of plants or roots and increase the susceptibility of mosaics to visitor impacts, as clearly demonstrated by the growth of roots between the preparatory bedding layers and the tessellatum on the mosaics 30 and 31 in the House of the Stags (Appendix 9.4.3 and Appendix 9.4.4, Figure A9.21).

The role of exposure to the environment in causing structural damage is clearly evident in the Women’s section of the Central Baths, where all rooms were roofed and the only damage recorded was abrasion.

- Presence of loose aggregates

The presence of loose aggregates close or on the surface of the mosaics on visitor routes increases their susceptibility to visitor impacts. This is indicated by the fact that many mosaics were observed to have loose aggregates on their surface that coincided with areas of loss. The sources of loose aggregates to the mosaics at Herculaneum stem from adjacent areas in opus signinum or cocciopesto, or from
areas covered with gravel as a preventive measure for soil erosion. These are transferred to the mosaics’ surface by visitors’ shoes and dislodge tesserae, especially when the tesserae are exposed to foot traffic or detached from their bedding layer. Such examples were observed on mosaic 17 in the House of the Alcove (Appendix 5, Figure A5.14-16; Appendix 9.3.1) and mosaic 16 in House of the Black Saloon (Appendix 9.7.5, Figure A9.33-34).

**Visitor numbers and structural damage**

The role of visitor access in the instigation of structural damage was further explored by looking at the rates of loss for each mosaic and how this relates to the percentages of visitors recorded in each building with mosaics from macro-scale observations (Figure 7-56).
Figure 7-56 Percentages of all recorded visitors to Herculaneum in the buildings with mosaics. The respective names of the buildings in English can be found in Appendix 3.2.

The annual rates of loss for each mosaic included in the survey were estimated for the two main periods used for dating the losses found on visitor access routes (see 7.8), by taking 2003 as the benchmark: 1951 to 2003 and 2004 to 2011 (Figure 7-57 and Figure 7-58). The mosaics with losses dated in 1951-2008 were not included in the estimations, as these could not be dated with certainty (see 7.9).
Figure 7-57 Annual rates of loss for each mosaic for the period 1951-2003. The names of the mosaics consist of the HCP acronym and the room number as listed in the table in Appendix 3.1.

Figure 7-58 Annual rates of loss for each mosaic for the period 2004-2011. The names of the mosaics consist of the HCP acronym and the room number as listed in the table in Appendix 3.1.
Looking at the rates of loss for each mosaic and the visitor percentages in the respective building for the two periods, it can be argued that there is no proportional relationship between the two variables. For example, the rate of loss of mosaic 4 in the House of the Beautiful Courtyard (CBC_4) for the period 2004-2011 is about 0.4 m$^2$ and the mosaic receives about 50% of all visitors recorded in macro-scale observations, as micro-scale observations suggest that all visitors recorded in this house also accessed room 4 (see 7.9.6) (Figure 7-56). On the contrary, the rate of loss of mosaic 3 in the House of Neptune and Amphitrite (CNA) is 0.01m$^2$ but the house and the mosaic receive the highest number of visitors of all buildings with mosaics, about 73% (Figure 7-56). Another good example for comparison is the rate of loss of mosaic 1 in the House of the Skeleton for the period 2004-2011 (SCH_1) equal to 0.13m$^2$, which is high when compared to other mosaics, while the percentage of visitors accessing the mosaic is low, equal to 28% (Figure 7-56).

Although these observations are not based on a representative sample of visitors for each mosaic for the entire period used for dating the mosaic losses and can only be used for deducing anecdotal observations, they nevertheless point out to the fact that the rate of loss on the mosaics is not proportional to the increase of visitor numbers. This confirms the primary role of other agents of decay in the susceptibility of mosaics to visitor-induced damage. It further suggests that the extent of structural damage does not always depend on visitor numbers: even a
small number of visitors can cause damage if the mosaics have low resistance to visitor access.

7.10.3 Visitor behaviour

Unstructured and micro-scale observations provided a better understanding of the ways visitor behaviour may contribute to the instigation of impacts on the mosaics.

Certain types of visitor behaviour were observed that have the potential to exacerbate or instigate damage to the mosaics. For example, in a few instances, visitors entered the buildings with mosaics with baby strollers, posing a threat to the mosaics for instigating surface loss, especially in the presence of lacunae or detached areas in the tessellatum (Figure 7-59).
Furthermore, as observed in the House of the Beautiful Courtyard (see 7.9.6) and in the House of the Black Saloon (see 7.9.7) visitors use the mosaics as a resting area, particularly in the summer months when temperatures in the region are high (see 4.1). This can be potentially damaging as it can exacerbate or instigate surfaces losses.

### 7.10.4 Visitor shoes and damage

The results from the frequency analysis of the responses to question C1 from the 2009 and 2010 visitor survey exploring visitor shoes (see 7.6.2) suggest that most visitors wear flat sandals with rubber sole (49.8%) such as flip-flops, trainers
(34.8%) and hiking boots (7%) (Figure 7-60). These results were further reinforced by unstructured observations on site.

<table>
<thead>
<tr>
<th>Shoe type</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat sandals- rubber sole</td>
<td>113</td>
<td>49.8</td>
</tr>
<tr>
<td>Trainers</td>
<td>79</td>
<td>34.8</td>
</tr>
<tr>
<td>Hiking boots</td>
<td>16</td>
<td>7.0</td>
</tr>
<tr>
<td>Shoes with medium heel</td>
<td>11</td>
<td>4.8</td>
</tr>
<tr>
<td>High - heel shoes</td>
<td>7</td>
<td>3.1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>227</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Figure 7-60 Types of shoes used by the respondents to question C1 in the survey in 2009 and 2010. One survey respondent did not answer this question in the 2009 questionnaire, hence the 227 responses out of the total 228 respondents.

The soles of these shoe types allow for the transfer of gravel to the mosaics’ surface, leading to surface abrasion and to the dislodging of tesseræ and instigation of loss. When soiling is deposited on the surface of the mosaics, even flat soles can contribute to abrasion by rubbing sand and other aggregates on the surface of the mosaics. Thus, visitor shoes do play a role in the instigation of abrasion and loss.

### 7.10.5 Maintenance and damage

The survey results point to the lack of frequent maintenance in the instigation of structural damage as a result of access. Although this issue has been referred to
in section 7.10.2., it is further discussed here due to its significance in limiting visitor impacts on the mosaics. The presence of HCP at the site since 2004 has succeeded in reducing the rates of loss for the majority of the mosaics (Figure 7-57). However, for some mosaics (see mosaic 4 in the House of the Beautiful Courtyard, mosaic 21 in the House of the Alcove, mosaic 5 in the House of the Black Saloon) the rates of loss for the period 2004-2011, have increased. This suggests that emergency interventions or maintenance were not as frequent as they should have been and they did not include all mosaics open to access. As demonstrated in the survey, in various instances, the exposure of *tessellatum* from *lacunae* or loss of mortar from existing repairs was not repaired expeditiously, thus leading to its further loss. The lower frequency of condition checks and maintenance interventions post-2008 could be attributed to the shifting of priorities of the HCP in 2008 from a site-wide campaign of controlling decay to the campaign of extraordinary maintenance focused on selected areas of the site (see 5.7.4). This finding points to the necessity of establishing a system of regular care as demonstrated by the effectiveness of the programme of HCP onsite until 2008, when conservators-restorers were constantly present at the site.

7.10.6 Documentation

The survey results further point out to the need for a more effective and systematic documentation of the mosaics at Herculaneum. The inadequacy of
documentation of the mosaics and conservation interventions since their excavation has been one of the obstacles in collecting data for this research. The lack of early documentation is a frequent phenomenon one comes across at archaeological site archives. Undoubtedly, the HCP has contributed significantly to the recording of the site and to more complete archive of conservation documentation of the mosaics. Nevertheless, as this survey demonstrates, reflected by the history of interventions to the mosaics (Appendix 6), the documentation system developed by the project was not fully implemented in practice. Not all interventions were recorded, or even if there were, there was a lack of a coherent system of archiving these.

7.11 Conclusion

This chapter presented a methodology developed for assessing visitor impacts on the mosaics at Herculaneum and the results of the assessment. The assessment suggests that visitors are a cause of surface and structural damage to the mosaics. The extent and severity of surface abrasion is determined primarily by the abrasion resistance levels of the stone of the mosaics. At Herculaneum, volcanic stone is significantly affected by abrasion, due to its low abrasion resistance value. Severity is further determined by the presence of loose aggregates and soiling on the mosaics’ surface and by the shoes of visitors. Visitor numbers are proportional to the extent and severity of abrasion, as clearly manifested with the
stone with low abrasion resistance value. In contrast, the extent of structural damage is not always proportional to visitor numbers. It depends primarily on the presence of other factors that make mosaics susceptible to visitor impacts. These relate to the stability of the mosaics, their exposure to environmental agents of deterioration and especially water, and to past conservation interventions. The importance of maintenance in the control of visitor impacts is perhaps one of the most important findings of the assessment.

The findings of the survey suggest that although visitors do cause damage to the mosaics, if effective conservation and management measures are put in place, these can be reduced and controlled. This is significant as it shifts the focus from solely controlling visitors as the main cause of damage to the mosaics to a more holistic approach that aims at reducing the susceptibility of mosaics to visitor access, while simultaneously controlling visitor movement and behaviour.

These issues are discussed in more detail in Chapter Nine, as part of the recommendations for a sustainable approach to the management of visitors and their impacts. For this to be achieved, it is necessary to first examine in detail the way access is managed at the site in the following chapter, Chapter Eight.
Volume II
8 Assessment of physical access

Having identified how physical access impacts on the mosaics at Herculaneum in Chapter Seven, this chapter explores the way physical access is managed in terms of movement and behaviour patterns. This is necessary for understanding the factors that lead to the recorded visitation patterns to the buildings with mosaics as presented in Chapter Seven. Through this assessment, the role of site interpretation in shaping access is also examined and problems in the way access is managed are identified.

The chapter begins with an analysis of access patterns, followed by a discussion on the overall management of access, including stakeholder interactions and behaviour. Spatial and statistical analysis is applied to macro-scale observations (referred to as first data set in the text) (see 3.5.5 and 7.6) and relevant data from the visitor survey is also used (questions A1, A2, I1 and I2, Appendix 10.1; questions A1, A2, I1, Appendix 10.2) (referred to as second data set in the text), with further qualitative data stemming primarily from the custodians, the official guides, the site staff of Pierreci and the staff of SANP. This evidence is supplemented by unstructured observations from the overall time spent onsite and from my participation in the guided tours.
8.1 Designated access into the site

Physical access has significantly improved since the commencement of the HCP, as many buildings have opened to the public (Figure 8-1), particularly in the urban area, which is the area within the walls where all domestic structures are located. A total of about 4,000 square meters have been conserved and most of them re-opened since 2005, including the Samnite House and the House of Galba. The re-opening of *Decumanus Maximus* in 2011 had a positive effect on spreading visitor flow, as it made an additional series of buildings along the east side of the street visually, but not yet physically, accessible. As already mentioned (see 5.8.1) important buildings (in terms of their archaeological, historical and artistic significance) have been closed for more than 15 years, such as the House of Bicentenary (since the 1980s), and the House of the Two Atria (since the 1990s).

Access to the suburban area at the site is limited to the Sacred Area and the terrace of Marcus Nonius Balbus (TNB) outside the Suburban Baths (see Figure 8-7 for the location of the TNB). The Baths, although conserved and ready to be opened, have remained closed due to a shortage of custodians (HCP staff 2 2011, personal communication). At the time of data collection, the arcades with the skeletons (see *) along the coastal area were closed for conservation purposes\(^\text{19}\).

\[^{19}\text{http://pompeisites.org/allegati/Edifici%20aperti%202012_120506054458.pdf}\]
Figure 8-1 Areas open to the public in 2005 (left) and in 2012 (right) as a result of the activity of HCP at Herculaneum.

8.2 Access itineraries into the site

There are currently two points of access to the archaeological area: The tunnel that descends to the ancient coastline (Figure 8-2 and Figure 8-3) and the bridge on Cardo III Inferiore (Figure 8-2). Until October 2009, the bridge was located at the House of the Hotel. This is the access used in the routes recorded in the macro-scale observations in 2009 (Figure 3-1).
Figure 8-2 The two access points to the site of Herculaneum (not to scale) as highlighted on the section (bottom) of the site map (left): The tunnel, in blue, leads to the suburban area and to *Cardo V Inferiore* and the bridge, in green, leads to *Cardo III Inferiore*. The map at the bottom also shows the location of the old bridge, which led to the House of the Hotel.
Figure 8-3 The entrance to the tunnel (top) and the tunnel (left) used as one way to get to the archaeological area. The entrance to the tunnel is located at the southwest side of the archaeological site, close to the audio guide booth.
The data from macro-scale observations were analysed using descriptive statistics to understand current access patterns into the site. A cross-tabulation of the “start point” and “end point” variables, filtered through the “visitor type” variable, suggests that the itinerary that starts and ends at the bridge is the most popular (47%), while the one that starts from the tunnel and ends at the bridge is the least used (19%) (Figure 8-4).

In terms of access patterns per visitor type, the results show an equal use of the bridge as an access and exit point by schools and guided groups (50% for each). Independent visitors use the bridge to enter and exit the site as much as they use the bridge to enter and the tunnel to exit (40% for each). In contrast, entrance from the tunnel and exit from the bridge is the itinerary least used by all groups (20% of independent visitors and guided groups and 17.5% of schools).

Frequency analysis of the responses to questions A.1, “Where did you enter the archaeological area from?” and A.2, “Where did you exit the archaeological area from?” from the 2009 and 2010 surveys (Appendix 10) confirms the validity of the findings on independent visitors from the first data set analysis. The second data set analysis suggests that most independent visitors (47%) used the bridge as the main entrance and exit point to the archaeological area, followed by those who use the bridge-tunnel itinerary (34%). A very small number of
visitors (2.6%) followed an additional itinerary that started and finished at the tunnel (Figure 8-5).

Figure 8-4 Entrance and exit patterns into the site per visitor type as recorded in macro-scale observations for the years 2009 to 2011 (n=120)

Figure 8-5 Responses to questions A.1, “Where did you enter the archaeological area from?” and A.2, “Where did you exit the archaeological area from?”, from the visitor survey in 2009 and 2010, following cross-tabulation of the results (n=228)
To examine whether the visitors who use the bridge as an entrance and exit point actually descend to the suburban area, further analysis was carried out in GIS. The routes with “start point” and “end point” variables equal to “bridge” were identified and highlighted on the map. It was then possible to select those descending to the suburban area. Only 4 groups of independent visitors (3.3% of this type) were included in this final selection. Thus, this evidence suggests that the majority of visitors are limited to the urban area of the site when using the bridge as an entrance and exit point to the archaeological area. As such, the disproportionate use of this area in comparison to the suburban one suggests that they place increased pressure on the buildings in this area.

8.3 Visitor movement patterns

Visitor movement patterns were examined first through spatial analysis of the density of the lines representing the recorded routes in GIS. The radius used was equal to 3 m, as this was wide enough to ensure the inclusion of all routes along all streets in the analysis. The results were classified using four natural breaks, not equally divided, as this allowed a better presentation of the results (Figure 8-7). Then a second analysis was carried out aiming at counting visitor numbers in the buildings open to access, using the attribute and location selection queries, based on the same process carried out for the buildings with mosaics, as described in Chapter Seven (see 7.7.2). The results were grouped in four
categories based on percentages of the total visitor numbers recorded, so as to obtain a comparative perspective: 1) 75-100%, 2) 50-75%, 3) 25-50%, 5) 0-25%.

Most traffic occurs at the crossroads of the three cardini, and especially Cardo IV, with Decumanus Inferiore (Figure 8-7). Cardo IV Superiore has the highest visitor use, with visitor numbers ranging from 42 to 380. High traffic was recorded in front of the House of Neptune and Amphitrite (CNA), which is one of the most visited buildings at the site (Figure 7-16), the House of the Beautiful Courtyard (CBC), the House of the Black Saloon (SLN) and in front of the women’s section of the Central Baths (TCF). All these ranked in the second group in terms of access levels (75-50%). The Samnite House was the least visited house on the street, ranked in the third category. In contrast, Cardo IV Inferiore appears to be less used, with the only exception of the House of the Wooden Partition (TRL) that was ranked in the first group. The remaining buildings were ranked in the fourth category (2-25%).

Cardo III Inferiore has more traffic than Cardo III Superiore, due to its use as a connecting passage between the bridge and the main archaeological area (see 8.1). The Thermopolium (THP) and the House of the Hotel (ALB) were ranked in the first category. These were followed by House of the Skeleton (SCH), the House of Argus and the House of Aristides, all classified in the third group. The high numbers recorded in the House of the Hotel are also due to its use as a
connecting point between the two streets, *Cardo III* and *Cardo IV* on the north and south sides. Furthermore, the high numbers are also attributed to the use of the house as the main entrance point to the archaeological area until 2010 (see 8.1). Along *Cardo III Superiore*, most traffic is observed at the entrance to the men’s section of the Central Baths (TCM) and in front of the College of the Augustales, both classified in the first group. The House of Galba (GLB), the only other building open to access on this street receives very few visitors.

Similar patterns of use were recorded on *Cardo V*. *Cardo V Inferiore* is more accessed than its upper side, as it acts as a connecting axis of the main archaeological area with the suburban area. High traffic was recorded in front of the House of the Stags (CER), which was ranked in the second category, and the House of the Telephus Relief (RTF), placed in the third category. The area at the crossroad with *Decumano Inferiore* was also recorded with high visitor numbers ranging from 99 to 380. In contrast, *Cardo V Superiore* receives fewer visitors, particularly along the northeastern side, with numbers as low as 2 to 41. It is worth noting that very few buildings are accessible along this street, including only one house, the House of the Corinthian Atrium (ATC). All buildings along this street received very few visitors, and were thus classified to the fourth group (Figure 8-8).
Equally limited use was recorded on the south side of *Decumanus Maximus*, mainly attributed to the fact that there are no buildings open to access on this side of the street. In contrast, the northern side leading to the House of the Black Saloon and the College of the Augustales has more traffic (Figure 8-7). Finally, the suburban area has, as already discussed in section 8.2, limited traffic. Both the Sacred area (TAS) and the terrace of Marcus Nonius Balbus (TMB) were ranked in the fourth group as their visitor numbers range from 2 to 41.

These results point to a number of observations regarding the use of the site. First of all, all buildings with mosaics were ranked in the first and second groups in terms of popularity, with the exception of the House of the Skeleton (SCH), recorded with 25-50%, and the House of the Alcove (ALC) with 2-25%. Secondly, there is disproportionate use of the site, among the three *cardini* and between the two *Decumani*. The central axis of the town, *Decumanus Inferiore* and *Cardo IV* are the most used streets, as it is on the latter where most open buildings are located. Similarly there is a marked low use of the buildings found on the streets recorded with low visitor numbers, namely *Cardo V Superiore* and *Decumanus Maximus*. However, these streets do offer views into public and private buildings, even though they are not all accessible. The ruinous state of most of the areas least visited, without any roofs or pavements could explain their low levels of popularity.
Finally, the recorded access patterns suggest that there may be an issue of congestion at the areas located at the crossroads of the *cardini* with *Decumano Inferiore*. Indeed, unstructured observations in late spring confirm that during May, when schools coincide with other groups, there tends to be overcrowding at these points. Furthermore, overcrowding is also an issue especially along *Cardo IV Superiore*, where visitors queue outside popular buildings (Figure 8-6). These phenomena are only a concern during peak-visiting hours. As demonstrated from the data from the visitor counters these range from 12:00-14:00 hours (see 5.8.4; Appendix 2.4). Again, however, this issue is not as critical as it is at Pompeii that has serious issues of overcrowding and congestion. Visitors who had also visited Pompeii felt that Herculaneum was calmer and more peaceful, especially when visited in the early and late hours of the day.
Figure 8-6 Students (right) and adult visitors (left) waiting to enter in the buildings on *Cardo IV Superiore* in May 2009 and 2011 respectively.
Figure 8-7 Visitor movement showing patterns of use based on a line density analysis of recorded visitor itineraries of macro-scale observations. The respective acronyms of the buildings open to access are presented in Appendix 3.2.
Figure 8-8 Visitation levels to the buildings open to access at Herculaneum from the data recorded from macro-scale observations together with the areas of the site currently open to access.
A breakdown of visitation patterns per visitor type better illustrates the use of the site by each type. Guided groups reflect similar patterns to overall visitation (Figure 8-9). They visit fewer buildings and these include those with mosaics that tend to be popular. In contrast, the other two groups show greater variability in their use of the site. Independent visitors are the most explorative of all, as they visit almost all buildings open to access. This explains the ranking of most buildings for this type in the second and third categories (Figure 8-10).

Interestingly, school groups tend to visit fewer buildings (Figure 8-11). This is evidenced by the low number ranked in the first category, which includes the Thermopolium (THP), the Men’s Section of the Central Baths (TCM), the College of the Augustales (SAU) and the House of Neptune and Amphitrite (CNA). In contrast, the majority of buildings recorded with school groups were ranked in the third category. This access pattern suggests that schools tend to spend more time inside the buildings as opposed to guided groups, who include more buildings in their itinerary and spend less time in each. This comparison can be made as both groups spend more or less the same time on site during their visit, about 92 to 93 minutes (Figure 8-12). In contrast, the visit of independent visitors ranges in time from 67 to 91 minutes (Figure 8-12).
Figure 8-9 Visitation levels to the buildings open to access at Herculaneum for guided groups as recorded from macro-scale observations
Figure 8-10 Visitation levels to the buildings open to access at Herculaneum for independent visitors as recorded from macro-scale observations.
Figure 8-11 Visitation levels to the buildings open to access at Herculaneum for schools as recorded from macro-scale observations.
This analysis helps clarify access levels into the buildings with mosaics as explained in Chapter Seven. It illustrates that these buildings are very popular, especially among guided groups. Placing these results in the context of the broader use of the site, the findings suggest that there is potential for diversification of visitor movement and dispersal of visitor volume from the buildings with mosaics receiving high numbers of visitors to less visited areas. As most visitor volume is concentrated along the central street of the excavated part of the town, Cardo IV, with the other streets receiving fewer visitors, there is potential for dispersing visitors to the less visited areas and releasing pressure from the buildings with mosaics, of which the majority are located along Cardo IV. This is particularly the case for guided groups and schools that constitute the bulk of visitor volume and are thus a concern in terms of their impacts on the mosaics.

<table>
<thead>
<tr>
<th>Visitor type</th>
<th>No. recorded</th>
<th>Average time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals</td>
<td>4</td>
<td>67.25</td>
</tr>
<tr>
<td>Dyads</td>
<td>19</td>
<td>91.00</td>
</tr>
<tr>
<td>Guided groups</td>
<td>40</td>
<td>93.35</td>
</tr>
<tr>
<td>Families/ small groups</td>
<td>17</td>
<td>88.76</td>
</tr>
<tr>
<td>Schools</td>
<td>40</td>
<td>92.15</td>
</tr>
</tbody>
</table>

Figure 8-12 Average time recorded for each visitor group per type from macro-scale observations.
Modifying onsite access necessitates a deeper understanding of what defines these observed patterns, and especially a better understanding of the role of interpretation.

8.4 Interpretation and access

To understand better the role of interpretation in shaping current access patterns as described in sections 8.2 and 8.3, the relationship between access and interpretive devices was examined using descriptive and inferential statistics. The data from macro-scale observations were first analysed in terms of the interpretive device used per visitor type (Figure 8-13). The results suggest the high rates of use of guides as an interpretive device (56%).

<table>
<thead>
<tr>
<th>Group type</th>
<th>Audio guide</th>
<th>Map and guidebook</th>
<th>Other guidebook</th>
<th>Official guides</th>
<th>Teacher/Pierreci guide</th>
<th>Nothing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Couples</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td>Families</td>
<td>2</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Guided groups</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Schools</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>23</td>
<td>17</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td><strong>15</strong></td>
<td><strong>10</strong></td>
<td><strong>67</strong></td>
<td><strong>17</strong></td>
<td><strong>4</strong></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

Figure 8-13 Contingency table showing the relationship between interpretive device and visitor type as recorded in macro-scale observations

To examine the role of interpretation in shaping access into the site as analysed in section 8.2, the relationship between “start point” and “end point” variables
was examined, filtered through the “guiding device” variable. This was also
done for the respective data from the visitor survey. Inferential statistics were
used to assess the probability of a significant relationship between access and exit
patterns to the site for each device category, in other words, to test the suggestion
(or null hypothesis) that there is no relationship between entrance and exit
patterns into the site for each device category used.

For the first data set, the counts for each attribute of the “device” variable are
small and thus limit what possible relationship we can hope to infer between the
two variables (Figure 8-14).

<table>
<thead>
<tr>
<th>Interpretive Device</th>
<th>Entrance</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bridge</td>
</tr>
<tr>
<td>Official Guide</td>
<td>Entrance</td>
<td>Bridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tunnel</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Map and guidebook</td>
<td>Entrance</td>
<td>Bridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tunnel</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Audio guide</td>
<td>Entrance</td>
<td>Bridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tunnel</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Other guidebook</td>
<td>Entrance</td>
<td>Bridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tunnel</td>
</tr>
<tr>
<td>Teacher</td>
<td>Entrance</td>
<td>Bridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tunnel</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Nothing</td>
<td>Entrance</td>
<td>Bridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
</tr>
</tbody>
</table>

Figure 8-14 Contingency table showing access patterns into the site per interpretive
device used from the recorded macro-scale observations
The only exception is the “official guide” attribute, which suggests that visitors assisted by an official guide are likely to use the bridge as an entrance and exit point. A Fisher’s exact test (the test suitable for testing statistical significant relationships for counts less than five in the cells of the cross-tabulation tables) demonstrates the presence of a statistically significant relationship between entrance and exit from the bridge when “official guides” are used as an interpretive device (Hannagan 1986) (Figure 8-15). This means that when guides are used as a guiding device, visitors are more likely to use the bridge both as an entrance and exit point as opposed to the rest “device” options.

<table>
<thead>
<tr>
<th>Official Guide</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
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<tr>
<td>Pearson Chi-Square</td>
<td>6.017</td>
<td>1</td>
<td>.014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>4.443</td>
<td>1</td>
<td>.035</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>9.389</td>
<td>1</td>
<td>.002</td>
<td></td>
<td>.014</td>
</tr>
<tr>
<td>Fisher’s Exact Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>5.928</td>
<td>1</td>
<td>.015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 8-15 Chi-square testing results, including Fisher’s Exact Test, for the “official guide” variable when used as an interpretive device for entering and exiting the site by visitors included in the recorded macro-scale observations. The p value for the test has to be smaller than 0.05.
When asked through the interviews (see 3.5.5) to describe and justify their itineraries, nine out of thirteen guides mentioned that use the bridge to enter and exit the archaeological area, as opposed to the tunnel. As one guide pointed out (Guide 9 2010, personal communication), the suburban area (at the time of data collection) did not offer a lot of particular interest to the visitors. Access was only possible to the terrace of Marcus Nonius Balbus and the Sacred Area (see 8.1). Time is another factor significant in the definition of their itineraries, as expressed by ten guides. This is vital for cruise groups that have limited time for their visit. As such, the bridge offers a shorter and faster way into and out of the site as opposed to the tunnel. Finally, the bridge was seen by three guides as a much easier way to physically access the archaeological area as opposed to the tunnel, which is steep and long and thus especially strenuous for elderly visitors, who form a large part of the population of guided groups.

The implications of these findings for the control of access to the site are significant as they point to the role of guides in controlling most visitor volume on site and as such they limit visitor circulation and movement in the main part of the archaeological area. These findings also help explain the visitation patterns recorded for guided groups (Figure 8-9) that have higher percentages of access to buildings with vulnerable and decorative surfaces, including those with mosaics. Ultimately, these results point to the limited role of the SANP in having
direct control of visitor movement and access at the site. This issue is further discussed in section 8.6.3.

For the second dataset, a frequency analysis of the responses to question I1 “Which interpretive device did you use for your visit today?” from the 2009 and 2010 survey (Appendix 10.1 and Appendix 10.2), suggest that most independent visitors used the official site map and guidebook (48%), followed by the audio guide (18%) (Figure 8-16). The contingency table and chi-square test for the same variables (Figure 8-17) demonstrate that there is a statistically significant relationship between access from the tunnel and exit from the bridge when the “audio guide” is used as an interpretive device (Figure 8-18).

![Figure 8-16 Responses to question I1, “Which interpretive device did you use for your visit today?” from the visitor survey in 2009 and 2010 (n=228)
Thus, when an audio guide is used, visitors are more likely to use the tunnel to enter and the bridge to exit. Interestingly, despite the fact that audio guide, site map and guidebook users employ the same base map as their main interpretive tool when moving into and around the site, the results point to a different access pattern for each device.

<table>
<thead>
<tr>
<th>Interpretive device</th>
<th>Exit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bridge</td>
<td>Tunnel</td>
</tr>
<tr>
<td>Official guide</td>
<td>Entrance</td>
<td></td>
</tr>
<tr>
<td>Bridge</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Tunnel</td>
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<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Official map and guidebook</td>
<td>Entrance</td>
<td></td>
</tr>
<tr>
<td>Bridge</td>
<td>56</td>
<td>43</td>
</tr>
<tr>
<td>Tunnel</td>
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<td>2</td>
</tr>
<tr>
<td>Total</td>
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<td>45</td>
</tr>
<tr>
<td>Audio guide</td>
<td>Entrance</td>
<td></td>
</tr>
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<td>Bridge</td>
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<td>10</td>
</tr>
<tr>
<td>Tunnel</td>
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<td>1</td>
</tr>
<tr>
<td>Total</td>
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</tr>
<tr>
<td>My own guidebook</td>
<td>Entrance</td>
<td></td>
</tr>
<tr>
<td>Bridge</td>
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<td>7</td>
</tr>
<tr>
<td>Tunnel</td>
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</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td>Nothing</td>
<td>Entrance</td>
<td></td>
</tr>
<tr>
<td>Bridge</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>6</td>
</tr>
</tbody>
</table>

Figure 8-17 Contingency table showing access patterns to the site per interpretive device from the visitor survey data in 2009 and 2010 (n=228)
Figure 8-18 Chi-square testing results for the “audio-guide” variable, including the Fisher’s Exact Test, from the visitor survey data from 2009 and 2010.

One possible explanation could be the vicinity of the audio guide kiosk to the tunnel entrance. The lack of signage to the tunnel as opposed to the visibility of the bridge from the ticket office area as the only means of entrance into the site could explain the patterns of entrance to the site of map users.

To understand better the use of the audio guide, question I2 “Why did you not use an audio guide today?” was asked in the survey in 2009 (Appendix 10.1). Most visitors (47.4%) did not use an audio guide because they do not like using it when visiting a site, followed by those who did not use it as they found it too expensive (32.1%) (Figure 8-19). The category “other” (16.7%) included responses such as: “I did not know about it”, “I did not see the sign”, “I prefer to use persons as guides” and “I prefer to have my own personal experience”. 
Figure 8.19 Responses to question I2, "Why did you not use an audio guide today?" from the survey in 2009 (n= 78)

These results suggest that the audio guide has the potential to be used as an effective tool for controlling flow into the site for independent visitors. However, as suggested by the survey responses, this potential is limited by the fact that most visitors do not like using audio guides, and that the way it is managed, it fails to meet visitors’ expectations and preferences.

8.4.1 Guided interpretation

The results of the spatial analysis of visitor movement in terms of site use suggesting the dominant role of guides in the control of visitor access patterns were further verified, particularly in terms of the role of guides in guiding school groups on site. This was achieved through a frequency analysis of the data available for school bookings for the period from November 2008 to July 2009. Most of the visits (86%) were held by an official guide or a teacher (Figure 8-20).
Anecdotal evidence from the ticket office staff at the site (2010, personal communication) suggests that the majority of schools are accompanied by a guide and not by a teacher.

Figure 8-20 Itineraries of schools based on bookings with Pierreci for the months of November 2008 to July 2009 (n= 1838)

The preference of schools for official guides over Pierreci guides could be attributed to the cost of the visit: the tours with official guides cost about 103 Euros for a group of 8-25 students\(^{20}\) (data obtained for 2009), whereas for Pierreci guides the costs are about 160 - 250 Euros for a class of 25-30 students,\(^{21}\) depending on the itinerary chosen. The rates for the former are set by the Regional Council of Campania (Regione Campania) (see 5.8.5). In contrast, Pierreci sets its own fees, as it does not work with official guides. According to the site

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\(^{20}\) Bollettino Ufficiale della Regione Campania 2009

\(^{21}\) Pierreci
staff of Pierreci (Pierreci Staff 1 2010, personal communication) the number of guides working for Pierreci is very limited (about 10 guides for both Pompeii and Herculaneum) and this could also explain their limited use by schools, as they cannot accommodate all groups that come to the site, especially in the peak-visiting season in spring.

The significance of guides in the control of visitor movement and on site visitation patterns was further explored through the interviews with the guides to shed light on the factors that shape their choice of itinerary when on site. A question was asked as to what is the message they wish to communicate to the visitors when giving their tour that guides their choice of the buildings to visit. Five out of thirteen guides stated that the main message is the grandeur of the Romans and how advanced they were, and “how good life at Herculaneum was at the time of the eruption” (Guide 7 2010, personal communication). The eruption of Vesuvius and its destructive effects was another important aspect of the site for six guides. Their responses were corroborated through my own participation in their tours (see 3.5.6). This explains their choice of buildings with high artistic and architectural significance, including the mosaics as discussed in section 8.3. Instead, for schools they choose buildings that can be better linked to an interpretive theme or to an interactive activity, such food and the thermopolia or the taberne.
Apart from the main interpretive message they wish to communicate to visitors, their itinerary also depends on building accessibility and whether visitors have visited or intend to visit Pompeii (Guides 3 and 5 2010, personal communication). Relevant to the former is the closure of buildings without an advanced notification that inevitably influences their itinerary when on site (Guide 2 2010, personal communication). They felt that this has a negative impact on the interpretive experience they provide to visitors (Guide 3 and 5 2010, personal communication). In the case of the latter, the focus at Herculaneum is on the private and domestic aspect of the ancient town. This is predominant at Herculaneum as opposed to Pompeii that offers a better view of public life, through the Forum and the temples that are not visible at Herculaneum. This factor also explains the observed access patterns into the site and the limited use of the suburban area as opposed to the urban part. Furthermore, the majority of guides felt that SANP should manage visitors more effectively and inform them in advance about the closure or opening of houses. Despite these issues, all guides, however, felt that these concerns were not major issues at Herculaneum as they are at Pompeii due to the fact that Herculaneum does not have the same problem of over visiting (see 5.8.4).
### 8.4.2 Soprintendenza Archeologica di Napoli e Pompei interpretation

As already discussed in section 8.3, independent visitors are the most explorative group of all types as they have a broader access to the site. As illustrated from the analysis of data from macro-scale observations and the visitor survey, the majority of independent visitors used the guidebook and the map of the SANP to navigate through the site. Although using the map does not necessarily imply that visitors have to strictly follow the suggested itinerary when onsite, it does suggest that overall the SANP itinerary does offer the broadest level of access to the site. To corroborate this, the suggested itinerary was mapped in GIS and was compared to the use of the site of independent visitors from macro-scale observations (Figure 8-21).

The SANP itinerary encourages broad access. It starts from the tunnel and exits from the bridge and includes a view of the entire town, through access to all streets and most of the buildings currently open. However, as it has not been updated since 2000, it includes some buildings that are currently closed because of conservation works or safety reasons, and excludes others currently open, such as the House of Galba (GLB) or other parts of the site not so well preserved, such as small domestic units (CAR) (Figure 8-21). Furthermore, the sequence of buildings to be visited is somehow confusing, as it takes visitors backwards and forwards at certain locations, such as at the crossroads of Decumanus Inferiore with Cardo IV and Cardo V.
Figure 8-21 The itinerary suggested by SANP through the site map and audio guide.
8.4.3 Educational interpretation

In contrast, the Pierreci thematic itineraries offer more limited access. This is likely to be due to the longer time needed to explain the function and significance of each building to school groups (Figure 8-22). All itineraries start from the tunnel and end at the bridge, with the exception of the “Roman houses” (Abito..quindi sono) theme that starts and ends at the bridge. This is the most popular itinerary of all (Pierreci staff 2 2010, personal communication). It is interesting to note that only the “Food” (Cibus) thematic itinerary takes groups to Decumanus Maximus and to Cardo IV Superiore, which are the least visited streets, as evidenced from the analysis of visitation patterns in section 8.3. Similarly, no itinerary includes the Sacred Area, located at the suburban section of the town, also underused by the majority of guided groups and independent visitors. This suggests that educational itineraries are developed without taking into account overall access patterns to the site and their potential impact on the physical fabric.
Figure 8-22 Educational itineraries offered by Pierreci to schools visiting Herculaneum. These include a basic and three thematic itineraries as options.
8.5 Control of behaviour

Although the role of visitor behaviour in the instigation of damage to the mosaics has already been discussed in Chapter Seven (see 7.10.3), this section provides further insight on the management of behaviour, addressing not only that of visitors, but also of custodians and official guides. This was examined during the recording of systematic and unstructured observations (see 3.5.1). My participation in the guided tours also proved invaluable towards this end (see 3.5.6).

It is interesting to note that the SANP does have a list of rules and regulations for visitor behaviour and access to the site and these are only included in the booklet given with the ticket and are also available on the SANP’s website. The rules and regulations on behaviour are expressed in an instructive way and without actually communicating and explaining why certain actions may be damaging. For example: “Be extremely careful when moving about. Do not stand on the edge of the digs or climb on walls”; “Please show respectful behaviour; refraining from making unnecessary noise, writing on walls and littering. Please place garbage in the bins provided” (SANP guidebook in English). Furthermore, there are no signs on site or at the site entrance to communicate what behaviour is acceptable and what is not. Research on visitor behaviour in the field of natural resource management suggests that attempts to regulate human behaviour
through rules or laws are not effective (Marion and Reid 2009). They fail to win support and have negative connotations due to their emphasis on what may not be done. Observations of visitors and other stakeholders at the site reinforce this argument, as discussed below.

Visitors occasionally did not follow the restrictive access barriers placed in front of areas or rooms with mosaics in fragile condition. As the barriers were mobile and had no explanatory panels communicating why access is not allowed, visitors ignored them, particularly if these areas were included as highlights in their guidebook, site booklet or audio guide (Figure 8-23). Similar incidents were also observed with some guides. During the summer fieldwork in 2009, two guided groups in the House of the Beautiful Courtyard were observed to enter into room 4, to which access was prohibited with a mobile barrier at the entrance of the room (Figure 8-24). The guides ignored the sign and let visitors in, as the room had the skeleton casts on display. When I asked one of them why he let visitors into the room, he answered in a frustrated way that he could not understand why access to the room was prohibited. He then continued, saying that as he was not informed in advance that the entrance to the room was closed, he brought his group to this house for specifically showing them this particular room (Guide 5 2009, personal communication).
These incidents point to the need for a more effective communication between the SANP and the visitors and the guides. Placing a barrier without explaining why entrance is prohibited is not sufficient in controlling access.
Furthermore, these incidents further point to the lack of sufficient surveillance of visitors by the custodians. This is critical during the peak-visiting month of May, when schools coincide with adult groups. For example, there were instances when the Women’s section of the Central Baths was full of visitors, but there was no custodian to control access into the building. Such phenomena can be of significant concern in the future, particularly in the prospect of increase of visitor numbers (see 5.8.4). The effectiveness of custodians as a visitor management tool is discussed in more detail in section 8.6.1.

Furthermore, many guides and custodians have identified the behaviour of students in primary and secondary schools to be an issue in the protection of the archeological fabric. For example, in the House of the Beautiful Courtyard students do not adhere to the designated access itinerary but instead access or exit the upper part of the house by jumping onto mosaic 13 (Figure 7-41), which is a potential threat to its stability and this may place it at risk from further damage as a result of access (see 7.9.6). French schools are of particular concern as they have a distinct way of touring the site (Custodian 3 2010, personal communication). Students are left free to complete various exercises related to the history and archaeology of Herculaneum through exploration, but mainly unsupervised. As a result, primary school students run and play without being careful of their effect on the site. As two guides pointed out, teachers have to be trained in establishing the appropriate behaviour for their students (Guide 1 and
Another problem stemming from visitor behaviour is the fact that certain areas inside the buildings with mosaics are used as resting points, particularly during the hot summer months, when temperatures are on the rise (Figure 4-2) as they provide a shady refuge (Figure 8-25).

Figure 8-25 Participants in a guided group sitting on the floor in room 3, overlooking rooms 12 and 19 in the House of the Beautiful Courtyard
Figure 8-26 Visitors standing and resting on mosaic 5 in the House of the Beautiful Courtyard, where areas were recorded with lacunae in the survey.

Visitors may sit on the floors or on elevated areas above tessellated floors to have their lunch or to rest before continuing their visit. This may be a cause of damage when the mosaics are already damaged (ie. have losses or loose tesserae). For example, mosaic 5 in the House of the Beautiful Courtyard was recorded with lacunae and the same location was used as a resting area by visitors (Figure 8-26).

Besides the threats to the mosaics stemming from visitor behaviour, observations also suggest that visitors were very interested in finding out more about conservation activities, particularly when they encountered conservators working on site. From my participation in guided groups, at numerous occasions I noted that visitors made enquiries to their guide about what conservators did on site and wanted to find out more about conservation activities in general and the HCP in particular. Such interests have the potential for developing
interpretation and communication approaches that inform visitors about conservation. They can contribute to raising their awareness and modifying behaviour (see 9.3.5).

8.6 Other issues stemming from the assessment

8.6.1 Custodians

The observed visitor behaviour in combination with ethnographic observations highlighted the ineffectiveness of custodians in managing access (see 5.8.6). This is due to a number of reasons, as discussed below.

First of all, their shortage onsite, having 8 instead of 12 custodians in each shift (see 5.8.6), means that they fail to meet the needs of the areas open to access and the respective numbers of visitors coming to the site. Considering the unequal distribution visitors along each street and the resulting crowding in certain areas (see 8.3), it becomes impossible for the custodians to manage them effectively inside the buildings and on the streets, particularly during the peak-visiting season.

The age of the custodians (see 5.8.6) may be a factor that contributes to their ability to respond to the responsibilities of their job, as their physical abilities may
be limited for working outdoors, particularly under extreme weather conditions, for example in the summer period.

The situation is aggravated by the fact that not all custodians are actively working during their shift hours. Some position themselves in one location and rarely check the area for which they are responsible. As one custodian noted (Custodian 3 2010, personal communication), this is inevitable when one has to be onsite every day without any concrete and more specific hands-on responsibilities. This has been a justification by some (Custodian 1 and 2 2010, personal communication) for providing unauthorized guided tours to the visitors (see 5.8.6).

The shortage of custodians at the site is further impeded by additional governance-related factors, due to the way the Ministry manages its staff. For example, as one custodian pointed out (Custodian 1 2010, personal communication), there is no co-ordination of their annual leave. This allows most of them to go on vacation more or less in the summer period, when visitor numbers although not at peak, are still high, leaving the site understaffed.

As already discussed in Chapter Five (see 5.4.1) the SANP is powerless when it comes to managing its own human resources, as they are managed directly by the Ministry and the bureaucratic nature of the public sector prevents any
suggested changes from moving forward. The inability of SANP to have direct control over its own human resources, or at least through the Ministry, is further complicated by the strong unions of public employees in Italy (Guzzo 2003). This has allowed many custodians and site assistants to remain in their positions until their retirement, even if they do not meet the requirements of their professional role. As one SANP employee pointed out, even in cases where the site director and even the Soprintendente have evidence of inefficiency of existing staff, it has been impossible to achieve any substantial change (SANP personnel 3 2011, personal communication). He believes that this power, acts as a justification for not working effectively, as they feel that “nothing can touch them” (SANP personnel 3 2011, personal communication).

According to an archaeologist (2013, personal communication), this situation has left the SANP powerless in attempting to change this status quo. He believes that the process of hiring guarding staff has to be modified from the Ministry, by creating a professional profile of the custodians, and through that raise the standard and thus efficiency of the respective staff. Such an initiative was launched in 2010 by the Ministry, where recent graduates in Archaeology faced with unemployment, had to take an examination for the positions of custodianship (Bucci 2010). However, these graduates do not see such a post as a permanent solution to their unemployment, but only as a temporary measure.
Thus this solution had failed to solve the problem of staff shortage throughout the country in the long-term.

**8.6.2 The role of guides in controlling visitor behaviour**

Guides make no attempts to control visitor behaviour, such as instructing visitors to be careful with their backpacks, and be more aware of the fact that they are walking on ancient floor surfaces. This was evident from my participation in the guided tours on site, during which guides rarely made any requests to visitors to be careful or made any references to conservation issues, or to the fragility of the floors or other decorative surfaces. Only one guide referred to the vulnerability of the site by instructing visitors to be careful of where they walk and what they touch (Guide 5 2010, personal communication). This partly stems from the fact that some guides do not believe it is their responsibility to control visitor behaviour. As one guided pointed out, “it is not my responsibility to control how visitors behave on site” (Guide 3 2011, personal communication). As one guide argued, this aspect should be provided by the SANP, as they are not officially trained in conservation issues or awareness - raising as part of the preparation for their qualification exams (Guide 4 2010, personal communication). However, when asked whether they would be interested in being informed through training about conservation issues, which they could incorporate into their tours, eight guides responded positively. They also acknowledged that this is essential
as visitors are often interested in conservation issues, particularly when they come across conservators working at the site: “Visitors ask about conservation taking place on site, but many times I do not know what to tell them. I am not informed by the SANP about it, and I do not know because I am not trained in this”, one of them told me during his interview (Guide 12 2010, personal communication).

8.6.3 Lack of communication and collaboration between the SANP and access stakeholders

The absence of constructive communication of the SANP with the official guides is a major impediment to the effective management of visitor access. This was something that clearly surfaced from the interviews with eleven out of twelve guides, where most felt that “Each of us is doing their own thing” (Guide 1 2010, personal communication). Inevitably, this stirs a negative outlook towards the local heritage authority. Almost all guides expressed their concern that they are never informed about what is happening on site by the SANP, primarily in terms of on-going conservation work, and specifically of the closure of buildings. They felt that they were caught by surprise most of the time, as they would find buildings closed, without having been made aware of this in advance of their tour. This also applies to on-going conservation work at the site, of which guides are never officially informed. Three guides commented that they have never been informed officially about the Herculaneum Conservation Project, despite the fact
that it has been going on for the last ten years. “We have to chase information ourselves if we want to be able to respond to any questions visitors ask, which does not ensure that we get the most up-to-date information about the project”, one guide argued (Guide 4 2010, personal communication).

A step towards bridging this gap, however, has been made by the SANP in 2012, by uploading a document on its website listing all buildings open and closed to the public, although this is not updated on a regular basis. Although guides, and especially young ones, can be updated on this issue through the website, it is doubtful if this way of communication can reach old guides who may not have easy Internet access.

The lack of awareness in conservation issues is another factor contributing to the negative relationship between the guides and the SANP. Guides perceive access to the mosaics to be inherently negative for the protection of the floors, as surfaced from the interviews with three guides (Guide 1, Guide 3, Guide 12 2010, personal communication). The presence of walkways is perceived by guides as a sign of care and protection for the floors, whereas free access as neglect: “How can they let people walk on them?! They do not care about the mosaics. They could do what they did in Piazza Armerina, where they put walkways over them to protect them!” (Guide 12 2010, personal communication). As already discussed (see 8.5), this reality not only creates tensions between the guides and the SANP,
but has repercussions on the way the former carry out their tours, on the visitor experience and ultimately on the fabric of the site.

8.7 Conclusion

This chapter has analysed and assessed overall site use in terms of current visitor movement and behaviour at the site of Herculaneum. It claims to offer a better understanding of the way access is managed at the site and how such behaviour leads to current access patterns within those buildings possessing mosaics (as discussed in Chapter Seven). There is clearly uneven use of the site, caused mainly by the fact that the majority of visitors, consisting of guided groups and schools, is controlled by official guides. Guides tend to focus their visit in the main section of the archaeological zone, where the most impressive and rich (mainly domestic) buildings are located. Thus the greatest pressure is placed on this part of the site, and specifically along Cardo IV, while other less fragile parts are less visited.

As a consequence, the SANP has very little control over the majority of visitors, as there is no collaboration between these two parties. This also due to the fact that most schools choose the official guides over the Pierreci itineraries. This reality points to the weakness of Pierreci, and ultimately of SANP, to make full
use of its interpretive tools for managing access of independent visitors and schools more effectively.

The lack of communication and collaboration of the SANP and the guides surfaced as critical in the current management of access and particularly of visitor behaviour. The SANP must improve its interaction with the official guides in order to gain control of the management of access and its impacts on the site. Better communication is also necessary in terms of what behaviour is acceptable but also why certain actions are taken on site. As evident, lack of doing so, leads to potentially damaging behaviour and instigates a negative attitude from the visitors and the guides towards the SANP. There is a need for a more active and effective communication of the existing rules, in a mode that gets the message across in a constructive way.

The role of the custodians in regulating behaviour and access, particularly in the peak-visiting season surfaced as equally important. The situation of the custodians’ status quo must be addressed, as they are not efficient in responding to the responsibilities of their post.

The above assessment has brought to the surface some potential opportunities for managing access more effectively, and dispersing visitor volume to other parts of the site that are less vulnerable. For example, the role and future
modification of site interpretation choices is key to the sustainable management of access. This, opportunity and challenge, together with other issues, will be further discussed in Chapter Nine, as part of the suggested strategies for making current access to the site sustainable.
9 The quest for sustainability at Herculaneum

This chapter addresses one key research aim (see 1.2), which concerns the development of recommendations for achieving sustainable access at archaeological sites, and these are developed in relation to Herculaneum. To achieve this, the chapter first evaluates the extent to which access at Herculaneum is sustainable. This is achieved by identifying the current barriers and opportunities that exist at Herculaneum towards sustainable access. The assessment is based on the results of the visitor impact (Chapter Seven) and access (Chapter Eight) assessments and takes into consideration the context of the local management framework (Chapter Five) and visitor attitudes to sustainability (see 6.6). This is followed by a set of recommendations put forward as a response to achieving sustainability. They consider approaches for managing change stemming from use (see 2.7) and management practices that have the potential to contribute to sustainable outcomes, such as interpretation (see 2.5). The aim of these strategies is to minimize impacts stemming from direct access on the mosaics so that they are preserved for future generations. This will ensure that visitors will continue to benefit from direct access as explained in Chapter Six.
9.1 Overview of sustainability of access at Herculaneum

The assessment of the sustainability of access is based on the sustainable development framework that sees archaeological sites as resources to be passed on to future generations, while at the same time allowing current generations to benefit from them (see 2.6). In this case study, the resource to be passed on is the vulnerable mosaics in the buildings of Herculaneum. As demonstrated in Chapter Six, access to the buildings and the mosaics contributes greatly to the experience of the site in the present and in effect on the significance of the site itself.

The visitor impact assessment in Chapter Seven has demonstrated that current access leads to surface and structural damage to the mosaics and as such is not sustainable. This results mainly from a lack of effective management of access and conservation and a lack of an integrated site management framework. Both conservation practice and access management have to be modified in order to reduce impacts on the mosaics, but most importantly these two practices have to be placed in a holistic and integrated management framework for the site. This is vital as visitor numbers have been on the increase and they are expected to continue rising (see 5.8.4).

Despite the identified barriers, Herculaneum offers a number of opportunities, such as the conservation work planned by the HCP and the SANP (see Chapter
Five) that have the potential to contribute to sustainable access. Equally important is the prospective management plan for the site (see 5.6). As these are in the process of development, they can provide the context for adopting a more holistic approach to the management of access and conservation.

9.2 Barriers to sustainability

The barriers to sustainable access stem from the current site management context, mosaic conservation and interpretation and visitor management aspects.

9.2.1 Site management context

The existing site management context (see Chapter Five) is the biggest threat to sustainability for a number of reasons.

First of all, the complex bureaucratic structure of the SANP and the Ministry slows down the decision-making process about any matter related to Herculaneum, which is dependent upon approval by the SANP or the Ministry. More specifically, the institutional framework of the SANP regarding the control of its human resources (see 5.4.1) is a major factor that limits the effectiveness of the processes at work in controlling visitors and their impacts onsite. This is particularly relevant regarding the effectiveness of custodians (see 8.6.1) and the absence of in-house conservators to deal with conservation issues at the site (see
Equally important is the fact that SANP does not have full control of its financial resources since the Ministry has the power to make use of its financial resources when needed. This leaves the SANP unable to plan and implement activities related to conservation or enhancement of the visitor experience (see 5.4.1).

Relevant to the above issue is the limitation imposed by current standards and legislation to the practice of ordinary site maintenance by in-house workers (see 5.7.2). This limitation was temporarily solved by the HCP with the constant onsite presence of a conservation team especially during the years 2004 to 2007 (see 5.7.4). The significance of the constant presence of a team looking after the site and the mosaics has been evident through the slowing down of the rate of change on the mosaics as a result of visitor access (see 7.10.2). Now that the HCP has moved to the next phase of the project, this remains a critical barrier that the HCP and the SANP have to overcome to ensure the effective long-term sustainability of the archaeological resource.

The outsourcing strategy for commissioning conservation and maintenance is another major barrier to the effectiveness of conservation practice. As already discussed (see 5.7.2), the use of contractors means that responses to emergencies that arise cannot be as immediate as would be possible with in-house maintenance staff. Getting contractors for maintenance also raises the issue of the
quality of execution, which needs to be carefully monitored. The World Heritage Mission to the site in 2011 also acknowledged the weakness of the existing system in ensuring quality in the execution of conservation works. However, as the HCP has begun the process of developing and testing approaches that operate within this weakness of the Italian system (see 5.7.4), it is hoped that an effective approach to outsourcing will be developed that avoids the similar negative outcomes of the mosaics conservation project.

Lack of communication among the stakeholders surfaced as an important threat to the sustainability of the mosaics (see 8.6.3). Although the existing relationship between the SANP and access stakeholders at Herculaneum is a frequent phenomenon at heritage sites (Cochrane and Tapper 2008, 103), it is nevertheless an important issue when it comes to managing visitors effectively. Lack of communication was evident at various levels: between the SANP and the official guides (see 8.6.2), between the SANP and the visiting public (see 8.6.3). Not only was the significance of the site not communicated to the public and the stakeholders, but also conservation and management actions, or even inaction. The case study has showed how the failure to communicate and justify the policy of not taking any measures to prevent direct access to the mosaics, instigated a negative response from the visitors and the guides towards the SANP (see 6.6 and 8.6.2 respectively). It contributed to widening the gap between the guides and the SANP and failed to encourage collaboration and support in the efforts to
protect the site. For example, as a result of lack of communication of planned conservation work and of closure of buildings on site, guides were left feeling frustrated and angry as such events have a negative consequence on their tours (see 8.5). Guides react by ignoring the restrictions of access and take their groups into areas that are vulnerable to foot traffic.

Relevant to the issue of communication between the guides and the SANP is the overall negative attitude of the latter towards the former, reflecting what Conchrane and Tapper (2008, 103) described as a dichotomy between preservers and users. The SANP has failed to see the benefits for the site in the long-term that stem out of a strong relationship with the guides. Creating a stronger tie not only with the official guides but also with the tour operators that bring large groups to Herculaneum is a necessity in the current reality of tourism and its expected increase in the future.

9.2.2 Conservation

A number of conservation-related issues have surfaced as barriers to sustainability. The development of conservation activities at the site in the context of HCP since the early twenty-first century were defined based primarily on the idea of conservation as a technical intervention, and they did not approach the issues faced at the site from a holistic perspective. As such, critical aspects,
such as interpretation that, as demonstrated through this research, appears to contribute to damage to the mosaics (see 8.4), were not addressed in parallel with conservation. These aspects have begun to be considered after decay was put under control (see 5.7.4). Part of the reason for this has been the role of the sponsor of the project in defining priorities and how money should be spent onsite (see 5.7.3).

Despite this reality, however, it can be argued that the HCP did not consider all opportunities that surfaced in the process of planning for conservation towards sustainability (see 2.3). It did not grasp the full potential to contribute to sustainable benefits by taking advantage of its own onsite activities to raise awareness and thus change public behaviour (see 2.7.4). This is not to say that it has not developed a variety of outreach activities with the Herculaneum Centre (see 5.7.3). However, these have been addressed to specialist groups, such as academics, conservation professionals and schools who made special visits to the site. The great potential lay in integrating public outreach in its own activities addressed primarily to the visitors, who are the main users of the site. For example, onsite conservation offered and still does, an excellent opportunity in engaging the public. In my participation in the guided tours and while I was collecting my data, I became very aware of the interest of visitors in conservation, particularly when they observed conservators actively working onsite.
Considering the extended presence of the project at the site, there can be no doubt that these activities would have had very positive visitor responses.

Finally, lack of regular maintenance to the mosaics is another critical threat to sustainability (see 7.10.2 and 7.10.5). This is particularly the case for the mosaics exposed to foot traffic and affected by other decay mechanisms or by other factors that make them susceptible to visitor impacts. Relevant to maintenance is the role of materials used in conservation interventions that have low resilience to foot traffic effects, such as the use of soft and friable lime mortar that can be quickly consumed.

9.2.3 Site interpretation

Site interpretation shapes physical access to a great extent (see 8.4), and as a result contributes to impacts on the mosaics by not responding to the conservation needs of the floors. More specifically, the actual management of interpretation does not meet its potential in acting as a conservation tool and in redirecting visitor volume to less fragile areas. In particular, official guides are critical in directing visitor volume to the areas with mosaics but as they are not associated or collaborate in any way with the SANP, they do develop their tours in accordance to the conservation needs of the site.
9.2.4 Visitor management

In terms of visitor management, the SANP fails to enforce the existing measures for managing visitor flow into the site. This is especially the case for schools that have to book prior to visiting and whose groups have to respond a certain quota number per hour (see 5.8.6). Similarly, there is no effective communication between the SANP and the visitors particularly regarding the accepted forms of behaviour on site (see 8.5).

Furthermore, the ineffectiveness and shortage of the custodians to control visitor behaviour and movement is a major impediment to sustainability. The expected future shortage of staff will exacerbate current reality (see 5.8.6 and 8.6.1). In a similar light, as official guides are not trained in conservation issues they do not make any attempts to indirectly control impacts and behaviour by raising awareness on conservation issues (see 8.6.2.).

9.3 Recommendations for achieving sustainability

The aim of site management at Herculaneum would be to minimize damage stemming from direct access in order to consider the needs of future generations, while continuing to allow direct access and to provide a satisfactory experience, in order to respond to the needs of current generations. This approach takes into
consideration visitors’ outlook on the role of access to their experience of the site as demonstrated in chapter six.

Such an approach requires that measures are taken to ensure that visitor pressure to the mosaics through regulation of access is kept to a minimum, especially to the areas with mosaics made with volcanic stone (see 7.10.1) and those in a poor state of conservation (see 7.10.2). At the same time, regular mosaic maintenance can help to keep impacts from direct access under control. Towards this end, all processes involved in site management, namely site conservation, interpretation and visitor management, can be used in a holistic, integrated manner to ensure that visitor impacts are minimised (see 2.3).

In the local context of Herculaneum, the bureaucracy of the Italian system and the legislative and institutional framework are major barriers to sustainability, which cannot be overcome in the short, medium or even long-term. Nevertheless, various approaches can be developed within the existing management context to address the threats to the sustainability of the resource, and minimize pressure and damage on the mosaics. These are discussed in the following sections.
9.3.1 Competitive advantage as a framework for sustainable access

The competitive advantage strategy from the field of business administration offers a useful framework for managing access to the site in a sustainable way. Developed by Michael Porter, the competitive advantage strategy argues that every product, organisation or nation has to have or to develop one or more competitive advantages in its effort to compete or develop (Liwieratos 2009, 51). In the latter case, the competitive advantage becomes a drive to growth and development. This has to be sustainable in order to yield profit as part of a long-term development strategy. It can be maintained or changed in the process of achieving sustainability according to need. This approach to development is dynamic as it does not give a final solution by creating a development proposal, but the proposal itself needs constant monitoring, evaluation and flexibility.

Konstantina Liwieratos adapted this theory to the field of cultural heritage management as a strategy for development of the region of Mani in Greece, where heritage was perceived as its competitive advantage (Liwieratos 2004, 2009). She suggested that it is applicable not only for regions but for sites as well, and that management planning can be developed on the basis of the competitive advantage strategy focused on differentiation. Differentiation means to offer a product that is distinctive in some way and valuable to the buyer (Liwieratos 2009, 52). She argues that by basing the development of a region or a site on heritage-centred competitive advantage, a balance between conservation and
development can be achieved, which is the ultimate aim of heritage management: to balance in the best possible way the demands of conservation and human needs in development and visitation of places. As such, by identifying heritage as the competitive advantage its maintenance is secured. However, the competitive advantage has to be maintained and treated in the best possible way, through long-term strategies otherwise the project will fail due to lack of durability and sustainability. Finally, it is important that the buyers, in this case, the visitors, perceive the competitive advantage as such, as it may not be obvious to everyone.

This thesis suggests that the theory of competitive advantage is ideal for managing access at Herculaneum. As already discussed in chapter Six (see 6.5.4), the level of access and direct experience are perceived by visitors as one of the distinctive qualities of Herculaneum that makes it stand out from other archaeological sites. Thus, the experience achieved through this direct access can be perceived as the site’s competitive advantage, based on differentiation. It can be promoted as what is worth coming to experience at Herculaneum.

In this perspective, access to the site has to be managed in order to ensure the preservation of the mosaics as they contribute to the distinctiveness of the experience. If the site, and the mosaics, did not have this excellent level of
preservation, then access would not have been identified as a distinctive feature of the site.

The use of the competitive advantage theory as a framework for managing access requires that visitors are informed about the use of experience as the site’s competitive advantage. This can valorise their experience through gaining a sense of privilege of being able to experience Herculaneum. By raising awareness of the significance of the site through experience, public support and stewardship can be achieved in the long-term. This can be achieved through communication and interpretation strategies (see 9.3.4).

The adoption of this theory as a management framework of access requires the development of long-term strategies for managing the condition of the resource and the experience without diminishing the site’s competitive advantage. In this context, if the experience at the site is to be sustained as the site’s competitive advantage, then a more holistic approach to site management is necessary, one that encourages a better integration of all aspects of the management process, without focusing solely on the conservation aspect. For example, the need to consider interpretation together with conservation is paramount in managing visitors and their impacts on the mosaics (see 9.3.5). This requires the participation and collaboration of the relevant stakeholders in the management of access and conservation. If site interpretation is to be effectively integrated into
the management process at Herculaneum in a dynamic way, then the SANP has to establish stronger links with access stakeholders, namely the official guides and the broader tourist sector (see 8.6.3). The need for improving the current status quo is critical, particularly in the expected increase of visitors in the near future. This was also acknowledged in the UNESCO World Heritage First Expert Meeting report on the implementation of the management plan of the WHS in November 2012 (UNESCO 2012).

9.3.2 Direct measures

In order to sustain the experience at the site, measures have to be taken that minimize impacts on the mosaics (see 2.7). Strategies can be developed to release pressure from the buildings with mosaics and ensure regular monitoring and maintenance of the mosaics along with other preventive conservation measures.

Although the LAC approach has been suggested in this thesis as ideal for controlling visitors and their impacts as it is rooted in sustainability (see 2.6), the complex management context of Herculaneum and the bureaucratic structure of the SANP and the Ministry are major impediments in its successful implementation. The development and application of the LAC framework requires careful frequent monitoring of the condition of the mosaics in determining the difference between standards and observed conditions (Stankey
et al. 1985, 19). It further requires human and financial resources (see 2.7.1). In the case of Herculaneum, the number of mosaics that are open to access, juxtaposed with the limited number of in-house warding staff and conservators, make the application of the LAC a challenging task. The LAC approach could be developed and applied at the site in the framework of mosaic maintenance, for which the financial and human resources are available through the HCP plans for maintenance (see 5.7.4). However, unless in-house conservators are constantly on site, it will be very difficult to meet the requirements of the LAC approach in terms of monitoring condition of the resource and impacts on it.

There are clear benefits of the LAC methodology over the carrying capacity model (see 2.7.1), primarily as it considers both social and resource conditions. However, in the light of the issues described above, the limitations at Herculaneum require an approach that is primarily based on limiting public use.

**Imposing limits of use**

There are many options for imposing limits of use applicable to Herculaneum. However, as the site has high visitor numbers only in the spring season, when schools and guided groups coincide, efforts should first be directed at reducing numbers in this period. At present, the site does not suffer from over visiting with negative impacts on the experience, as Pompeii (Zan 2002). There is
potential for such impacts to occur in the near future, if numbers continue to be on the increase.

One way to regulate numbers to the site would be to modify the visits of schools, so that they do not coincide with the peak visiting times of guided groups. The visits of Italian schools can be shifted to a less congested period. For example, they can visit in the late February to March season when numbers to the site are the lowest (see 5.8.4). Moving the schools to a less visited season would allow better visitor control and a reduction of their impacts. As schools are a non-paying group, it would seem reasonable to shift their visits in order to accommodate and improve the experience of the paying visitors (see Figure 5-9 and Figure 5-10). This recommendation responds to the requirements of the competitive advantage framework in protecting the experience, but also in the context of the reality of the SANP, where site activities are funded mainly from ticket sales.

Another way would be to limit visitor numbers into the site during the daily peak hours in the medium and peak visiting seasons (see 5.8.4). For example, this was implemented at the Alhambra Palace in Granada in Spain, by limiting daily and annual capacity and redistributing visitor numbers throughout the day by setting maximum numbers for each period of the day (Luxen 2004, 89). Although this may be a complex measure to develop and implement, once it is achieved and
managed through a computerized system it can be very effective for controlling
flow into the site.

The development of an obligatory booking system for groups could facilitate the
control of flow into the site. Such a measure has been adopted at various
museums and heritage sites, such as the Schönbrunn Palace in Austria (Sattlecker
2004, 92) or the Sierra de San Francisco in Baja California, Mexico (De La Luz
Gutierrez et al. 1996, 220) or the Altamira Paintings in Spain (Lasheras
Corruchaga and Fatas Monforte 2006, 178). A more recent example is
Stonehenge, where advance booking is required for all visitors and access is
achieved through timed tickets (see 2.7.2). This may be ideal for Herculaneum
for controlling the flow of groups during the peak-visiting season. The obligatory
booking system has been implemented at other sites in Italy; for example, at the
Roman Houses of Palazzo Valentini in Rome.

Other ways can be developed by offering incentives to guided groups to visit
later in the day, or even better, in the low visiting seasons, such as winter and
early spring. Offering special prices for those periods could be another option.
This approach has been adopted at many sites faced with problems of over
visitation and negative impacts on the fabric (Timothy and Boyd 2003). However,

22 www.palazzovalentini.it/scavi.php?lang=eng
these options should be discussed with the tour agents, as they are the ones managing the packaged tours of the groups in the region.

Limits could also be established to the numbers of visitors per group to facilitate their management. For example, at the Paleolithic art site in the Côa river Valley in Portugal, a maximum number of eight people are allowed at the site per visit, and the visit has an average duration of 1.5-2.5 hours (Zilhao 1998, 202). This helps to control the effect of over-visiting on the micro-environment of the rock art caves. At the caves of Dordogne, in France, the number and size of guided tour groups is controlled, as at Westminster Abbey in London, UK, where guided tours are limited to twenty-six per guide (Shackley 2001, 49). Limits to groups are also imposed to heritage places in Italy, such as the Galleria degli Uffizi in Florence, where the same number is the maximum allowed for groups. At Herculaneum, where the average number of students in school groups is twenty-six, although sometimes it can go as high as fifty (see 5.8.3), appropriate limits could be imposed to better control entry of each group into the site. The number should be such to be easily managed onsite by the guide/teacher that heads the group.

9.3.3 Conservation

Various preventive conservation measures can be adopted for minimizing visitor impacts on the mosaics, with the most important one being that of maintenance.
Mosaic maintenance

The practice of regular mosaic maintenance at Herculaneum has been demonstrated to be of paramount importance in controlling visitor impacts as a result of direct access (see 7.10.2). The visitor impact assessment has brought to the forefront the need for establishing extraordinary maintenance activities, such as repairs, before, during and after the peak-visiting season.

This has been demonstrated by the constant on-site presence of the HCP team of conservator- restorers, supplemented by the input of custodians in notifying them about areas that need to be treated (HCP staff 2 2010, personal communication). Despite some of the shortcomings of the methodology adopted by the HCP in planning interventions for the mosaics (see 7.10.3), the overall results have been positive and successful in reducing the occurrence of visitor-induced damage to the floors.

Perhaps the biggest achievement of the HCP has been the inclusion of the maintenance of the site, including that of the mosaics, in the annual site budget, (see 5.7.4). The challenge remains, however, in the development of a programmed maintenance approach that will ensure the most effective results within the outsourcing approach of the SANP’s operating framework (see 5.7.2).
The maintenance guidelines currently being developed by the HCP (see 5.7.4) must include frequent assessment of condition. The standardization of the frequency of maintenance cycles should strive to establish frequent condition checks with higher frequency in the peak and medium-visiting season. To ensure that damage is kept under control it is crucial that this approach takes into consideration access patterns to the site and the mosaics.

Examples of in situ mosaic maintenance approaches at other sites provide additional input for deciding on the frequency of maintenance cycles. For example, at the site of Nora in Sardinia, condition checks are carried out once a month for the mosaics exposed to the environment and to public access (Zizola 2007, 172), even if they are not immediately followed by maintenance interventions. At the site of Volubilis, in Morocco, routine maintenance is carried out three to four times a year, which includes repairs ranging from infilling of lacunae and securing the borders using lime mortar (Limane and Palumbo 2008, 163).

It is hoped that the HCP suggested approach to maintenance will overcome the shortcomings of the outsourcing reality at the site that limits the presence of in-house conservators and technicians in checking condition against visitor impacts (see 5.7.2), also identified by the UNESCO Mission to the World Heritage Property in 2013 (UNESCO 2013).
**Loose aggregate deposits**

Loose aggregate deposits have been identified as one of the factors that contribute to the instigation of abrasion (see 7.10.2). The conservation of floors in *opus signinum* and *cocciopesto* adjacent to the mosaics is vital in ensuring that loose aggregate deposits do not get transferred on to the mosaics. Although this has not been dealt with by the HCP early on and led to surface loss of these vulnerable pavements and damage on the mosaics, it has been considered and included in the planning of the HCP future activities (see Chapter Five). This positive development should have a positive impact on reducing visitor-induced damage to the mosaics (HCP 2010). Another measure would be the use of material other than gravel for preventing soil erosion to areas adjacent to mosaics, such as in room 17 in the House of the Alcove (Appendix 9.3.1).

**Shoe covers**

Shoe covers can be used for mitigating damage, particularly where surface abrasion appears to be a concern, such as in the Women’s section of the Central Baths (see 7.9.9), as evidenced by the potential impact on the mosaics by certain shoes soles (see 7.10.4). Shoe covers are a measure adopted for controlling impacts on various religious places, such as the Taj Mahal in India various Mosques in the Muslim world. Inside the Taj Mahal, visitors have the option of
either taking their shoes off or using shoe covers, which are free of charge (Krusche 2011, 76).

Practical issues need to be considered, such as the costs and distribution. At Herculaneum, due to the nature of the site it is not possible to have visitors wear the covers during their entire visit, but instead it would be better to promote their use to place where abrasion is a major issue to the floors, such as in the case of the Women’s section of the Central Baths (see 9.3.4).

Research in materials and methods for repairs
Further testing of materials and methods for repairs is needed to ensure that extraordinary maintenance interventions are more resistant to the effects of foot traffic (see 7.10).

Implementation of other preventive conservation measures
The mitigation of visitor impacts on the mosaics requires more effective control of their exposure to water sources, as water is critical in instigating deterioration (see 7.3.1 and 7.10.2). For example, areas of the mosaics exposed due to openings of entrances could be covered while effective drainage of the existing roofing system is put in place. These interventions are included in the HCP future plans.
(HCP 2010) and it is hoped that they will have a positive impact on damage control from visitor access on the mosaics.

**Reburial**

Reburial of mosaics should be considered as a preventive conservation measure. Reburial retards deterioration processes and reduces maintenance costs and needs, as the actual number of mosaics that need to be maintained is reduced. At Herculaneum, mosaics that are currently accessible and in a fragmentary state, or found in ruined buildings where access does not play a significant role to the visitor experience could be reburied and reduce overall maintenance needs (see 9.3.4). Equally important in increasing the maintenance budget focused on mosaics presented to the public is the reburial of mosaics that are currently inaccessible.

**Documentation, monitoring and reviewing**

Documentation and monitoring are critical in the process of controlling visitor impacts. Both activities are also fundamental to the success of conservation and management plans (Matero 2003b, Demas 2002). As evident from this research, no proper documentation of the mosaics has been carried out (see 7.6.1). It is hoped that the HCP’s activities through the use of the GIS will establish a detailed record of the mosaics and their condition as a unique resource of the site. The
survey carried out as part of the visitor impact assessment for this project could be used as a basis for monitoring their condition.

**Monitoring studies of condition to better understand the role of visitor access in the instigation of damage.**

Further research and monitoring could be carried out to gain a better understanding of how impacts occur on the mosaics. The mapped distribution of impacts (surface and structural damage) to the mosaics in GIS (Appendix 9) could be used as a basis for identifying specific areas of concern (Stankey *et al.* 1985, 5). For example, the House of the Black Saloon (see 7.9.7) could be monitored more closely to understand better how damage occurs on exposed mosaics as a result of access. Similarly, the House of the Beautiful Courtyard (see 7.9.6) could be monitored for better understanding of how damage occurs in enclosed structures. A comparative monitoring study of condition of areas accessed versus areas not accessed can provide more robust data in better understanding the role of visitor access in the instigation of damage, and especially structural damage.

Surface damage could also be monitored, by defining indicators using measurements from abrasion resistance tests mentioned in Chapter Seven. Although it may be difficult to interpret the results in absolute terms, for example
millimeters per year per thousand people (Smith 1999, 448), the relative value of the rate of wear could still be useful in monitoring surface abrasion. This is particularly important for the rate of wear of the tesserae of the mosaics made of volcanic stone that have a low resistance rate (Figure 7-5).

### 9.3.4 Recommendations for action

Considering the limitations and challenges of the current management context at the site and the suggested direct measures discussed above, the following actions are recommended as an immediate or short-term response to making access sustainable, and mitigating its impacts to all buildings with mosaics included in the survey:

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23 This test is known as ASTM C241-90: Standard Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic
<table>
<thead>
<tr>
<th>Building</th>
<th>Recommended action</th>
</tr>
</thead>
</table>
| House of the Skeleton    | 1) Exclude daily large group visits and have special bookings for groups.  
                              2) Provide shoe covers for accessing the house to reduce abrasion over the mosaic at the entrance. A box with the shoe covers could be placed along the pavement outside the building. |
| House of the Wooden Partition | 1) Regulate visitor frequency and numbers into room 7, by setting maximum number per group allowed on the mosaic. This can be done by regulating access into the building, for example, allowing the entry of one group at at a time. |
| House of the Alcove      | 1) Remove gravel from the central area of mosaic 17 and rebury it.  
                              2) Address drainage issues in room 21 and remove cement mortar infills.                                                             |
| House of the Stags       | 1) Regulate visitor frequency and numbers into the building, by setting maximum numbers per group and allowing one group at a time inside the building.  
                              2) Remove walkways over mosaics 29 to 32 and conserve the mosaics, including removal of cement mortar infills. |
| House of Neptune and Amphitrite | 1) Control visitor numbers into the building by setting a maximum number of visitors per group to better manage flow and access to mosaic 3. |
| House of the Beautiful Courtyard | 1) Reduce visitor frequency and numbers for better control of visitor movement and behaviour.  
                              Control visitor flow inside the house, primarily by preventing visitors from sitting on the mosaics in rooms 3 and 5 and jumping from room 3 to room 13. This can be done by placing an interpretive fixed panel between the two rooms, which also explains conservation measures and recommended visitor behaviour. |
<table>
<thead>
<tr>
<th>Building</th>
<th>Recommended action</th>
</tr>
</thead>
<tbody>
<tr>
<td>House of the Black Saloon</td>
<td>1) Exclude daily large group visits and have special bookings for groups.</td>
</tr>
<tr>
<td></td>
<td>2) Conserve the floors in <em>cocciopesto</em> in room 11, and remove gravel deposits from room 12 and from the secondary entrance of the house.</td>
</tr>
<tr>
<td></td>
<td>3) Place, if possible, extended roofs along the peristyle and above the opening to room 6 to reduce rainfall exposure and avoid rain pooling.</td>
</tr>
<tr>
<td>Central Baths, Men’s Section</td>
<td>1) Set fixed numbers per group entering into the house for better visitor control and reduce daily frequency of visits.</td>
</tr>
<tr>
<td>Central Baths, Women’s section</td>
<td>1) Reduce visitor frequency and numbers per visit, by setting a fixed number per group to access the building, such as 10 per group.</td>
</tr>
<tr>
<td></td>
<td>2) Have shoe covers available at the entrance of the baths.</td>
</tr>
</tbody>
</table>

Figure 9-1 Recommended actions for controlling visitor impacts to the mosaics at Herculaneum
9.3.5 Indirect measures

Indirect measures aim at changing visitor behaviour through education, information and persuasion or through physical alterations of visitor movement (such as redirecting trails). The adoption of interpretation as a tool for conservation, visitor management and communication is a very effective indirect measure for controlling impacts on the mosaics and for contributing to their sustainability. Although measures like the ones suggested below may not have immediate outcomes and may take longer to succeed, they can have a significant impact on the long-term change of visitors’ behaviour and thus control of visitor impacts (see 2.7.3 and 2.7.4).

Update of site interpretation to respond to conservation objectives

The update of interpretation has been identified as a critical need for the sustainable management of access. The need to prepare and implement a management plan for the World Heritage Property (see 5.6), however, provides a good incentive for such a task. For interpretation to be effective as a conservation and visitor management tool it has to prioritise conservation objectives, including those for the mosaics. The suggested recommendations presented in the table in Figure 9.1 can be used as a basis for thinking about which aspects of the site need to be emphasized more, and which less, and to which type of visitor group.
Buildings or areas currently receiving few visitors could form the basis for developing thematic itineraries for guided groups, such as the suburban area, which was under-visited during this research (see 8.2). The opening of the arcades with the skeletons along the ancient coastline can contribute to increased movement in this area (see 4.2.4). The Sacred Area is another part of the site with potential to be promoted as one of the few excavated public spaces of the ancient town open to access (see 4.3.1), given that the Forum is currently under the modern town.

The development of thematic itineraries for adult visitors as part of the SANP interpretation could broaden current access to the site and contribute to the attempts to release pressure from the areas with mosaic floors. This could also be developed for guided visits in collaboration with the official guides to ensure that large groups are better distributed throughout the site.

These itineraries can communicate the broader significance of Herculaneum, instead of focusing only on the architectural and artistic values manifested through the well-preserved buildings that currently form the focus of their visit (see 8.4.1). For example, the following themes could be used as a basis for the development of itineraries:
• The volcanic eruption and its destructive effects (see 4.2.2), which offer the potential to include buildings that manifest the destruction, such as the House of Galba, currently receiving low visitor numbers;

• The history of conservation of the site (see 4.2.4 and 5.7). This theme offers a great potential in informing visitors about the role of conservation in the preservation of the site, but also about the uniqueness of Herculaneum as a place where conservation was integrated with excavation as early as the 1920s. There are areas at the site that receive very few visitors but constitute good examples of past approaches to conservation, such as the use of bamboo screens in front of wall paintings as a form of protection during Maiuri’s time (Figure 4-15);

• The history of excavations (see 4.2.4), including buildings showing the Bourbon tunnels, or techniques of excavating and removing objects from the site, such as the House of the Stags;

• The prospect of a new site museum (see 5.8.5) offers an additional solution for reducing visitor volume in fragile areas;

• The plans of the HCP and SANP to create an itinerary connecting the existing archaeological area with the Villa of the Papyri is another option that can disperse visitor volume and release pressure from the buildings with mosaics (HCP website).
Similar updates of interpretation should be communicated to the publishers of tourist guidebooks that include Herculaneum in their itineraries, such as the Lonely Planet, the Blue Guide and the Michelin Guide.

Adjustments and updates to interpretation have to be made frequently if it is to be effective as a visitor management and conservation tool. This includes updating the interpretive tools, such as the audio guide, site map and booklet and the website of the SANP. As regular update of site interpretation is not a frequent phenomenon at archaeological sites, Herculaneum is no exception in this. The SANP perceives interpretation to be a one-off process, evidenced by its last update in 2000 (see 5.8.5). It is important that interpretation is acknowledged as equally significant as conservation if direct access is to be sustainable. Thus, the SANP has to regard its regular update as being of equal importance as the need for maintenance, which has been identified as critical for the overall sustainability of the archaeological site. This will allow for its inclusion in the annual site budget, in the same way that financial support for maintenance has been secured (see 5.7.4).

**Site interpretation as awareness-raising tool**

The sustainable benefits of interpretation stem from its potential to contribute to conservation from an educational perspective (see 2.7.4). Conservation activities
can be integrated in site interpretation and be used as an opportunity to communicate the mosaics’ vulnerability and the role of conservation in their protection.

There is potential at the site for developing such approaches to interpretation. Overall visitors are very keen to find out more about conservation and this should be taken advantage of for raising public awareness (see 8.5). During my participation in guided tours, it became very clear that visitors would always observe conservators actively working onsite and would almost always ask the guides questions about their activities. However, the guides were almost never in a position to respond in an informed way (see 8.6.1). How much more effective and satisfactory would it have been, if visitors had an opportunity to find out more about conservation, including mosaic conservation from the conservators themselves?

The activities of HCP offer an opportunity to inform visitors about conservation and the significance of the site. In the case of mosaics, the implementation of the conservation plan in 2012 (see 5.7.4) was an excellent opportunity for communicating the mosaics’ significance, the HCP’s efforts in their protection, but most importantly the importance of direct access in the experience of visitors and their own responsibility in the protection of the floors. Unfortunately, such initiatives have not been taken up by the HCP in their ten years’ presence onsite,
despite the project’s guiding philosophy in shifting away from the idea of heritage management as guardianship and protection to the idea of shared responsibility for cultural heritage (Thompson et al. 2010, 4). The HCP has been involved in promoting conservation and its activities only to specialists in the field of archaeological heritage conservation, excluding the broader public.24 Despite the missed opportunities, the continuing onsite presence of HCP still provides future opportunities for integrating conservation in site interpretation. The development of thematic itineraries on conservation issues, and specifically on mosaics with a qualified conservator from the HCP or the SANP, could be an effective way of raising awareness.

**Communication**

The use of interpretation as a “communication mechanism” (van der Linde and Williams 2006, 120) can help develop public awareness and support (see 2.7.4). Interpretation can be effectively used as a method for communicating to visitors the need to adopt low-impact practices and as an indirect management response to reduce resource impacts or improve visitor experiences (Manning, 1999; Roggenbuck, 1992). The aim of communication is not to control behaviour, but instead to provide a cognitive basis to encourage appropriate low impact visitor behaviour in recreation settings (Peterson and Lime, 1979). In this way long-term

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24 [http://www.herculaneum.org/hcp-home/eng/comunicazione.html](http://www.herculaneum.org/hcp-home/eng/comunicazione.html)
There is potential for this to be developed at the site through various means, such as highlighting conservation issues through guided interpretation, through messages on tickets, printed materials, posters and the website of the SANP as well as other websites where Herculaneum is promoted as a tourist destination (namely the website of the Regional Council of Campania). Similar messages can be communicated on site and through other interpretive aids used by visitors prior to or during their visit, such as tourist guidebooks. The following aspects can be addressed for raising public awareness and changing behaviour:

- Communication of the benefits and impacts from direct access to the visitors. Visitors can be made explicitly aware of the significance of direct access to their experience and, at the same time of their own responsibility in the preservation of the mosaics;

- Communication of the role of visitors in protecting the mosaics. Explaining clearly why a specific type of visitor behaviour can be negative can contribute to change (see 2.6.2), otherwise it can lead to the opposite result. For example, at the site of Luxor in Egypt, authorities reported that by explaining management problems to visitors they managed to distribute visitor movements more evenly (Pedersen 2002, 68);

- Communication of management decisions. Equally significant is the need to communicate conservation and overall management decisions and
especially decisions that relate to the way visitors are managed. Some visitors (see 6.6) and official guides (see 8.6.1) perceive current management of access as lack of care for the floors. These attitudes are counter-effective to the efforts of SANP to control visitor impacts.

Education

The educational value of Herculaneum is reflected by the high number of school groups that visit the site (see 5.8.3). Educational activities can be very effective in engaging the new generation in regards to sustainability and conservation, particularly of the mosaics at the site. Students can be involved in site interpretation by developing their own image of the site and integrating this as an additional theme of the significance of Herculaneum. Additionally, conservation issues can be introduced in-class prior to the visit to the site in order to raise awareness of the deterioration of archaeological heritage and a basic awareness of conservation, as well as their own responsibility in terms of behaviour when visiting the site and when entering into the buildings with fragile surfaces and mosaics. They could also “adopt” a monument and engage in its care (Stone 1997). Suggestions on how to achieve are provided by ICCROM as part of its Public Advocacy programme (Grattan 2004). They necessitate the collaboration of schools with the conservators of the SANP and the HCP, who
can decide how schools can contribute in the care of the site and in raising public awareness about it.

Although such measures would have to be thought through and would need to be developed for different age groups, they can have long-term sustainable benefits. They can contribute to a sense of stewardship of cultural resources, especially with the participation of schools from the community of Ercolano or the Vesuvian region. The public outreach role of the Study Center of Herculaneum has the potential for developing such initiatives in collaboration with the town municipality and the schools nearby.

**Capacity building**

Capacity building is a critical component of sustainable development (see 2.6) Herculaneum offers opportunities for training access stakeholders, such as the custodians, the official and Pierreci guides, and teachers in raising awareness about the fragility of the mosaics and thus using them as an indirect conservation tool.

- Guides

Particularly significant to the control of access through interpretation is the training of guides in conservation issues. As evident from the assessment of
access (see 8.6.2), visitors are particularly interested in conservation. Guides should thus be able to respond to the needs of visitors, by adjusting the content of their presentation to their audience. In this way, they indirectly have the power to influence visitor behaviour (Aplin 2002, 44).

The initiative of ICCROM, as part of its Public Advocacy Programme (Grattan 2004) entitled “Let’s save our heritage together”, illustrates well the importance of training guides in conservation issues. The project involved the development of a self-guided tour for Ostia Antica, and a training course for tour guides followed by guided visits to the site on issues of conservation, such as conservation problems, and how they manifest onsite. Following ten weeks of the project, 79% of the 4,500 visitors who participated in the tours mentioned that they wanted to receive conservation related information regularly when visiting an archaeological site, while 32% understood the fragility of heritage for the first time after taking the tour (Bedello 2000, 50). Most importantly, 86% of the visitors acknowledged that they have a role to play in the conservation of sites.

Such initiatives could be developed as part of Continuing Professional Development (CPD) for existing guides at Herculaneum, in collaboration with the Regional Council of Campania. At the moment, however, CPD is not an obligatory requirement for guides (see 5.8.5). In contrast, for example, the South East England Tourist Guides Association in the UK is piloting a requirement for
qualified tourist guides to undertake continuing professional development by accumulating forty CPD points each year.²⁵

The success of capacity building initiatives in conservation depends on how well they are integrated in the training for the qualification of future tourist guides. At the moment this is not explicitly assessed in the examinations (Head of Guides’ Association 2011, personal communication). For example, the Centre of Lifelong Learning at the Università degli studi di Napoli L’ Orientale was in the process of integrating such issues in the guides’ training programme in collaboration with the Study Centre of Herculaneum (HCP staff 3 2011, personal communication), despite the fact that such issues are not included in the qualifying examination. The Study Centre for Herculaneum could play a critical role in disseminating knowledge on conservation issues, through its collaboration with various regional public and educational bodies.

Incentives could also be given to guides (both existing and new) in training in conservation issues and in raising public awareness. For example, the Study Center of Herculaneum and the HCP could promote them to the interested public, as specialised guides in conservation issues.

• Custodians

Custodians are critical for the protection of Herculaneum, as they control visitor movement and behaviour. However, their shortage and ineffectiveness at the site contributes to the lack of effective management of access (see 8.6.1). Finding a way to improve this component of visitor management is necessary, especially for dispersing visitors to less fragile areas and for minimizing visitor impacts through control of behaviour. This is even more vital due to the future opening of other buildings currently being conserved, as part of the HCP and SANP conservation works (Guidobaldi 2013).

This problem has also been identified by the UNESCO Mission to the site in 2011 as critical in the control of visitors both at Herculaneum and at Pompeii (UNESCO 2011). Part of the recommendations in the Mission report was to increase the numbers of custodians in order to spread visitor load and allow more access to the site (UNESCO 2011, recommendation 5). It should therefore be a matter of concern that as a SANP senior employee pointed out (SANP staff 3, personal communication) that the situation with the custodians at the site is unlikely to improve in the near future; staff will retire but there are no plans by the Ministry to replace them.
To counteract this constraint, alternative solutions can be sought within the existing limitations of the site institutional and legal framework, that increase the number of staff working in this capacity. Outsourcing of services, which is the approach adopted by the SANP for all services provided at the site, such as the bookshop, the audio guide and the ticket sales (see 5.5), could also be used for increasing the number of custodians, especially during the peak-visiting season. Alternatively, additional private staff could be hired for fulfilling night shifts, while permanent staff could implement day shifts in the spring and summer months. This approach has been adopted at the Galleria degli Uffizi in Florence (UNESCO 2013).

Another option would be to consider and integrate the technical staff (workers) currently not being used in the maintenance of the site due to the legal restrictions in having in-house workers (see 5.7.2) in the custodianship of the site (SANP staff 3 2011, personal communication). It is critical, however, that personnel hired through outsourcing or as permanent staff in the SANP for custodianship, undergo training in how to manage visitors effectively, by being informed about the ways that visitor behaviour may cause damage and about conservation issues in general. In this way custodians can also act indirectly as a tool for changing behaviour and for raising awareness.
9.4 Conclusion

This chapter has evaluated the extent to which access at Herculaneum is sustainable, by discussing the barriers to sustainability as identified through the various assessments at the site, presented in the previous chapters. It then presented a set of recommendations that could make access at Herculaneum sustainable, by allowing direct experience as it is currently allowed, while considering the long term protection of the resource and also long-term benefits both to the experience and the preservation of the mosaics. These require a better integration of management processes in mitigating visitor impacts. This involves primarily the integration of interpretation, conservation and visitor management objectives and the development of strategies that respond to these objectives. Using the approaches suggested in this chapter, Herculaneum can effectively respond to the needs of current and future generations, and thus respond to the goal of sustainable development.
10 Sustainable access at archaeological sites: lessons from Herculaneum

This chapter revisits the research aims established in Chapter One (see 1.2). The first part of the chapter addresses the first research aim, which is to develop an understanding of the significance of experience when visiting archaeological sites, by considering the role of physical access to the experience. This extrapolates and generalizes from the results of the exploration of the role of access to the experience at Herculaneum as discussed in chapter Six.

The second part of the chapter addresses the second research aim, which is to develop an understanding of the ways in which experience through access contributes to impacts on the resource and the ways that site management processes contribute to these impacts. This draws upon the results of the visitors impact assessment as presented in chapter Seven and upon ideas stemming from Chapters Five and Eight.

This is followed by addressing the third research aim, which is to develop an understanding of the extent to which the experience is worth the impacts on the resource and as such whether it can be considered as an interpretive approach, while managing the impacts stemming from access and keeping them within
acceptable limits. This is based on the evaluation of the results stemming from the first two aims.

Finally, the last part of the chapter addresses the fourth aim, which is to suggest a set of approaches for managing access in the framework of sustainable development that control impacts and allow visitors to have meaningful and engaging experiences.

10.1 Access and experience of archaeological sites

As discussed in Chapter One (see 1.1), the role of physical access in interpretive planning for archaeological sites has not been given the consideration it deserves. Although cognitive access has been acknowledged as vital for communicating significance (ICOMOS 2008), it cannot provide for the intangible elements stemming from physically experiencing a place, such as a sense of place and affective responses. Increasing evidence from other fields, such as human geography and architecture, point to the significance of direct experience in grasping the meaning of places of the built and natural environment (see Goodwin and Ursprung 2014, Relph 1976, Lynch 1960, Tuan 1977) (see 2.9). Similarly, work in museums suggests that physical access and interaction with objects and exhibits has positive effects on the experience of visitors, such as
enhancing learning and creating engaging experiences (Falk and Dierking 2000, Romanek and Lynch 2008).

In this context this research has been concerned with developing an understanding of the significance of physical access from the perspective of experience of archaeological sites. To investigate this I examined the significance of accessing the buildings, including walking on the mosaics, to the overall visitor experience at Herculaneum. This was achieved through a visitor survey, interviews and observations (see Chapter Three for the methodology and Chapter Six for more details on the methodology and the results). The results from the case study in Chapter Six suggest that physical access contributes to the visitor experience in various ways, primarily by helping establish a sense of place, instigating an affective and engaging experience and contributing to mindfulness, which ultimately encourages learning.

Physical access achieves a form of insideness, what Relph (1976) suggests as an essential pre-requisite to experiencing the sense of a place. The deeper the insideness the more authentic is the experience of the sense of place. Herculaneum illustrates the significance of insideness in the visitor experience. By entering inside the buildings and even walking on the mosaics, visitors could gain a sense of what Herculaneum was about in the past. They could see the particular characteristics of the buildings’ interiors and understand their function.
and use better; walking directly on the mosaics reinforced this aspect of the experience (see 6.5.1). This helped them to get a better understanding of the historic and archaeological values of the site; not only what made Herculaneum a Roman resort town, its destruction and its revival, but also its similarities to their own houses and cities in the present.

Relevant to insideness is the level of closeness achieved with archaeological remains. Physical closeness and direct contact with the material past helps the past achieve a concrete reality. It is no longer something distant to be observed. Being inside the buildings, without any barriers between them and the archaeological remains, visitors felt that they were themselves part of the past (see 6.5.1). This concrete reality is enhanced by the fact that visitors could walk on the mosaic floors. Not only could they be in the past, but they could also be in touch with it. Walking in the “footsteps of the Romans” made the experience feel more authentic, by reinforcing the actuality of the past in the present.

Being inside the buildings and so close and intimate with the archeological remains stirs affective reactions in visitors. Visitors at Herculaneum described their experience of being inside the buildings and walking on the mosaics with expressions denoting emotional responses: “felt good”, “felt amazing”, “emotional” (see 2.9.2). The affective reactions to the experience at Herculaneum echo parallels in ongoing museum research, regarding the role of touch in the
experience of objects, where it has been acknowledged that people experience objects emotionally, and that touch is of prime importance to the visceral experience of objects (Romanek and Lynch 2008, 276). This affective component of the experience is what interpreters in museums try to achieve, since this is regarded as a pre-requisite to provoking thought (Black 2005, 203). As Tuan (1977, 8) argued, “emotion tints all human experience, including the high flights of thought”.

The provocation of thought is another aspect that stems from having a direct experience, and this is very important in the learning process (see 2.9.3). At Herculaneum, the freedom to walk into the buildings and see the remains of Roman life, enabled visitors to make sense of the past by comparing it with their own built environment and present lives. They constructed their own meaning about the past and its significance (see 6.5.2), realizing that the past was not so different from their own present: “[…] in two and a half millenia things have not changed that much” (Male, British, Health and Safety Consultant, 65+ years old, I.34). Through access and experience visitors became mindful: interested, engaged, curious and active, and more open to learning (Langer 1993, Moscardo 1996). Ultimately, if direct experience can provoke feelings, the visit becomes a more powerful and memorable one. The affective responses of visitors at Herculaneum were positive and powerful most of the time, and overall
expressed with enthusiasm. Many had a stimulating engagement with the site during their visit.

The level of insideness achieved at Herculaneum, allowing direct contact with the mosaics and an overall intimacy with the archaeological remains, also had negative responses to a sector of the visiting population regarding the fact that they were able to walk on the mosaics (see 6.6). Feelings like worry, concern and even fear of damaging the floors appear to be powerful for some, and in some cases dominate the positive feelings stemming from directly experiencing the buildings. This negative effect, stemming primarily from the awareness of visitors of the potential damage to the mosaics as a result of direct access, further points to the multiple facets of the conflict of preservation versus access. It further implies the powerful discourse of the ‘conservation ethic’ that influences visitors’ own perception of the need to protect archaeological sites for the future and particularly for future generations (see 6.5). It also points to the effect of traditional approaches on the presentation of archaeological sites that distance the past with the present through the use of ropes and viewing platforms, on the way visitors perceive the past: it is perceived as something distant from their present, something they are not allowed to be close to. This is why this level of access at Herculaneum acquires the distinctiveness it has in the visitor experience. At the same time it suggests that interpretive planning has to consider the need to communicate and justify to the public, any actions or no
actions that are taken regarding site presentation. These issues are further discussed in section 10.4 in this chapter.

Herculaneum has demonstrated the diversity of ways in which direct access can contribute to the visitor experience. However, one can ask whether the level of access at Herculaneum with such a powerful impact on the experience can find parallels to other sites, not so well preserved. For example, can physical access at a site, such as the Roman Forum in Rome or Hadrian’s Wall in the UK achieve the same effect on the visitor experience? I suggest that it does have the same effect; it is the physical presence in the locality of the place that is important, and the deeper one can be inside, the better it is for the experience. One useful way of thinking of this issue is whether the use of merely the visual and cognitive access as the main form of interpretation at these places would be as powerful as physical access. Viewing the Roman Forum from the outside, without being allowed to enter into the site would not be as powerful as the being on the inside. Similarly, viewing the stone circle at Stonehenge from afar, without getting close to it does not have the same effect as by being close to the stones, or even being inside the circle and having an experience from the inside. Nor would virtual access provide the same impact as a real, lived experience of a place. Insideness, as Relph (1976) argued, is fundamental for understanding places. It enables experiencing the place in its landscape and its surroundings, which helps appreciate them as places – distinctive elements in space. Thus, when considering
physical access as an interpretive approach, the question should be on what level of insideness should be provided as a form of interpretive experience. This is further discussed in section 10.3.

10.2 Access and visitor impacts

The second aim of the research was to develop an understanding of the ways access impacts on the archaeological resource, and the role of site management in the instigation of impacts. This was addressed through the visitor impact assessment on the mosaics at Herculaneum, supplemented by the results of the access assessment. Although the results from the assessment are site specific, certain outcomes have applicability to archaeological sites in general.

The findings from the visitor impact assessment at Herculaneum suggest that damage to the mosaics as a result of physical access can be surface and/or structural, whose extent and severity depend on a number of factors (see 7.10). The extent and severity of surface damage depends on visitor numbers and on the abrasion resistance level of the material of the tesserae (see 7.10.1). As the assessment has demonstrated, mosaics made with tuff stone that has a low abrasion resistance level, are more susceptible to abrasion stemming from foot traffic. In contrast, limestone has a higher abrasion resistance level and thus does not abrade so easily with foot traffic. The level of abrasion further depends on
the type of shoe sole surface that comes in contact with the *tessellatum* (see 7.10.1).

In the case of structural damage, the relationship between visitor numbers and damage is not directly proportional, as even only a few visitors can cause damage if mosaics are in a poor state of conservation (see 7.10.2). Additional factors have been identified as contributing to mosaic susceptibility to structural damage as a result of access.

Mosaic maintenance has surfaced as a paramount factor in determining the extent and severity of structural damage (see 7.10.2 and 7.10.5). The capacity of the mosaics to withstand damage is another factor that is determined by the presence of ongoing deterioration processes. Current and past conservation practice, such as the use of methods and materials for maintenance not responding to the needs of the mosaics against access, or the use of cement in conservation interventions exacerbate the susceptibility of mosaics to visitor access (see 7.10.2). Finally, the presence of loose aggregates found on the mosaics’ surface or on adjacent surfaces is another factor that contributes to the instigation of surface abrasion and loss.

The assessment has also brought to the surface the role of visitor behaviour in the instigation of damage (see 7.10.3). At Herculaneum, visitors were observed to sit on damaged areas, or to act in ways that can potentially damage the mosaics, such as using baby strollers on the floors.
Other issues stemming from site management have been identified as critical in determining visitor access and thus numbers and impacts on the mosaics. For example, the development of interpretation without considering site conservation needs can have a negative impact by leading to increased access to areas with vulnerable surfaces (see 8.4). Relevant to this is the role of the custodians and guides in failing to control visitor behaviour and numbers into the buildings with mosaics (see 8.6.1 and 8.6.2). Finally, weak relationships between access and conservation stakeholders and lack of effective communication of these groups with the public also have the potential to indirectly impact on the resource (see 8.6.3).

Reflecting on the above findings from the visitor impact assessment at Herculaneum, the following factors can be extrapolated with broader relevance to the instigation of impacts on archaeological sites in general:

1. Uncontrolled visitation;

2. Uncontrolled and inappropriate visitor behaviour, including unsuitable shoe wear (where relevant);

3. Low abrasion resistance levels of the material of the resource, especially of floors with frequent access;

4. Stability and overall state of conservation of the resource;

5. Inadequate conservation and care, including maintenance;
6. Lack of integration of site management processes, such as interpretation and conservation;

7. Weak collaboration between access and conservation stakeholders;

8. Lack of communication between access and conservation stakeholders and the public.

The extent and severity of impacts can be mitigated or at least managed in the context of a holistic and integrated management approach that considers conservation, interpretation and visitor management, and strives for sustainability (see 9.3).

10.3 Experience versus resource preservation or both?

The third aim of the research was to develop an understanding of the extent to which the benefits from access are worth the impacts on the archaeological resource. As this study has shown, finding a definitive answer to the value conflict of experience versus preservation is not an easy task, and perhaps it is an impossible task. Although access does yield important benefits to the experience, as it allows visitors to get a sense of place of the site they are visiting, it also has negative effects on their experience primarily as a result of the damage it inflicts on the resource. As has been clearly demonstrated by the case study, access does cause damage, even if its extent and severity are dependent on other factors that
are conservation and management-related, and even if it is not the root cause of the problem, but an added layer to it (see 1.1 and Chapter Seven). Ultimately, even in the best cases of effective management, including visitor management and conservation, direct access will lead to some form of material change and degradation.

To shed some light on this perplexing relationship between access and conservation and specifically between the value of experience and resource sustainability, it is worth addressing the question what the ultimate purpose of managing archaeological sites is, and particularly those approaches that are driven by the need to preserve their significance and values. The dilemma would seem to be about sustaining resources only for the future, or making resources relevant to the present while sustaining them for the future.

The purpose of values-based management is to understand the values and benefits of heritage, the latter being inextricably linked to values, in order to understand how each of these values come into conflict and will be affected by various decisions taken regarding the use and protection of the site in question (see 2.1.4). This is where the difference between sustainability and sustainable development discussed in Chapter Two (see 2.6) become significant in decision-making. If decision-making is framed solely by the resource sustainability framework, then its ultimate purpose would be the preservation of the resource
for future generations. If it is guided by sustainable development, then decisions should strive for achieving resource sustainability and ensure that present generations derive substantial benefits from the site. Thus use in the present should be carried out wisely, to ensure that the resource is sustained in the future.

Acknowledging the ethical responsibility of professionals in the field towards current and future generations, makes it possible to look at the debate of access versus conservation afresh, from a less absolute perspective. Returning to the issue of whether the benefits of access are worth the impacts on the resource as examined through the case study of Herculaneum, the answer would be that yes, the benefits are important and should be considered, as long as use is carried out wisely and damage is kept to a minimum. After all, material change is inevitable (see 2.3), and as Lowenthal (2000, 20) argued, “[…] no human creation endures forever, that the decay of site and city, artifact and work of art can only be retarded, never prevented.” When change occurs as a result of abandonment or neglect, and this is what often happens in non-visited archaeological sites, clearly illustrated by the non-visited areas at Herculaneum (see 5.7.4) then this loss is worse, because it has no intangible benefits as a return.

With this outlook, current generations can benefit from their site experience, by having engaging and enjoyable visits, which have the potential to be powerful and memorable. Visitors can gain a sense of place and appreciate sites and their
significance. Such an approach to access builds support for archaeological heritage. After all, surely this must be the ultimate aim of allowing visits to archaeological sites, to provide joyful experiences, engage visitors, contribute to learning and promote and encourage support.

In the long-term, by providing meaningful and memorable experiences, visitors, not only appreciate and understand the significance of archaeological sites, as demonstrated at Herculaneum (see Chapter Six), but have the potential to generate more support, including financial. Herculaneum exemplifies this, where the HCP and its activities have been funded by a private sponsor, the Packard Humanities Institute, whose Director has been a passionate supporter of the preservation of the site.

The case study of Herculaneum, points to another issue relevant to the management of access. The negative feelings experienced by a group of visitors as a result of walking on the mosaics (see 6.5) point to the need to ensure that access provides positive experiences; only positive experiences can lead to sustainable benefits. Furthermore, visitors’ negative perception of being allowed to walk on the mosaics as an indication of neglect and lack of care by the SANP, as already discussed in Chapter Nine (see 9.3.5), could have been avoided if effective communication and interpretation of the actual management actions or inactions had taken place. A positive and productive approach to the issue of
access derives from museums, where the touch of objects is perceived by some museum professionals as one way of establishing sustainable relationships between visitors and museums, and as a way of entrusting or sharing responsibility for the protection of objects (Romanek and Lynch 2008, 278). The same can apply to the field of site management, as a way to communicate explicitly to visitors that they are being entrusted with the protection of sites when they have this direct access and contact. This can also contribute to changing attitudes towards the material remains of the past and support their protection.

In this thesis, I have acknowledged the significance of access to the experience of visitors, and discussed the ethical responsibility of the field to consider how it can respond to the needs of current and future generations, and I have concluded that some degradation should be allowed if these aspects are to be considered, as long as it is kept within acceptable limits. A realistic outlook, however, to the complexity of site management with all its elements interconnected (see 1.1 and 2.3), as clearly demonstrated throughout the analysis of the way access is managed and shaped by site management processes at Herculaneum, adds a degree of skepticism as to whether it is possible to keep degradation under control. This reluctance is pertinent to sites faced with uncontrolled and excessive visitor numbers. The comparison between Pompeii and Herculaneum points to the difficulty in employing this approach to both sites, despite the fact that they
are both under the same management authority. It is more difficult to control impacts from access at Pompeii, considering its scale. Guided by this reluctance, the thesis thus argues that the extent of the applicability of this approach depends on the particularities of each site and its context. Nevertheless, as site management is a dynamic process, striving for an ethical management approach should be the priority and the basis on which to modify and adapt according to the needs of each site.

10.4 Towards sustainable access

The final aim of this research was to suggest an approach for the sustainable management of access (see 1.2), stemming from the concerns discussed in the previous sections. This is based on the approach developed for the management of access at Herculaneum (Chapter Nine).

This approach is based on the idea of access as insideness, where access should be thought of in terms of the levels of insideness allowed in the interpretive experience. This approach is further guided by the concept of sustainable development (see 2.4): it aims to deliver sustainable outcomes in the present and to minimize impacts on the archaeological resource, to allow it to be passed on to the future. It is based on the contemporary values-based management approach (see 2.1.4) and to the idea of conservation as the management of change.
(see 2.7), while it uses approaches for managing impacts based on the idea of sustainability, such as the Limits of Acceptable Change (see 2.7.1) and approaches that have the potential to yield sustainable outcomes in the long-term, such as interpretation (see 2.5).

The suggested approach shifts the negative outlook on the experience (and access) stemming from its impacts on the resource to one that sees it as a positive contributor to social and economic development. It suggests seeing access as an advantage, and where possible, a competitive advantage, as it has been adopted and developed for Herculaneum (see 9.3.5). Although it may not be possible to adopt access as a competitive advantage for all sites, this research suggests that it may be fruitful if it is perceived in a positive light when making decisions on how to manage it.

For the benefits of the experience to materialize, however, the preservation of the resource becomes a necessity. If experience is to contribute to social and economic development, by promoting support and engagement with the past, then both the experience and the resource have to be sustained in order to respond to this need for sustainable development. For example, in the case of Herculaneum, the nature of the experience provided through direct access, becomes a distinctive quality of the site in the eyes of the visitors, as it makes it stand out from other archaeological sites. Nevertheless, if the mosaics or other elements of the site are
lost, then the experience would no longer be the same. Hence, the benefits of direct access are inextricably tied to the preservation of the resource. To sustain these benefits while sustaining the resource, the impacts from direct access have to be kept to a minimum, in other words, be within acceptable limits. At the same time the suggested approach considers not only the intergenerational but also the intragenerational responsibility of site management. This means it considers the obligation to provide access to all visitors who come to the site and managing access within the site in accordance to conservation needs and management capabilities.

It is important, however, to note that the extent to which these approaches can be successful depends on the local context, in terms of the institutional and administrative framework, and the resources, both human and financial, of each site for materializing these approaches. However, it is worth noting that certain aspects may not be costly, but may take longer to materialize. For example, changing visitor behaviour through interpretation will not yield immediate outcomes, as it is an indirect measure (see 2.7.4). Nevertheless, it is more sustainable in the long-term, and may not be limited only to a particular site, but to heritage in general. Therefore, it may be necessary to allow access to certain areas as guided by the condition of the resource, while indirect measures begin to come into effect. The research suggests the consideration of the following aspects in managing sites.
10.4.1 Management planning process

Sustainable management of access requires that all processes linked to the management of access be considered in parallel during the planning process. This is especially important for the development of values-based interpretive and conservation planning. Beyond interpretation and conservation, other aspects such as communication, capacity building and education have to be given equal consideration in a dynamic approach to site management planning.

10.4.2 Site interpretation

The practice of interpretation is fundamental in the management of sustainable access, as it lies at the interface between conservation and experience. Interpretation has to be developed from a holistic perspective, and consider both physical and cognitive access in the process of interpretive planning, as also recommended in the Ename Charter (ICOMOS 2008a) (see 2.6). As this thesis suggested, physical access as insideness, should be explicitly thought of and planned along with cognitive access as essential elements of the interpretive experience.

Interpretation has the potential to contribute to sustainable benefits for the processes of conservation, decision-making, and overall management processes.
if seen as a dynamic part of the management process (see 2.5). It can be used as a visitor management tool by limiting visitor numbers to areas at risk from access and thus contribute to conservation objectives and to the sustainability of the resource. This can be achieved by developing different interpretive itineraries for each visitor type, to spread visitor load across the site and thus release pressure from vulnerable areas.

Furthermore, interpretation can be used as a tool for communicating significance, the potential benefits of current use and access to the experience and the need to preserve the resource for the future. This can lead to increased awareness and support, and contribute to behaviour change. All these outcomes can yield sustainable benefits for the conservation of the resource. More specifically, interpretation in this context can:

- Communicate and raise awareness of the significance of the site;
- Raise awareness of management issues and specifically those related to access, such as justifying decisions related to access;
- Raise awareness of the vulnerability of the resource;
- Influence visitor behaviour;
- Inform and raise awareness of the benefits and potential impacts of direct access and experience;
- Communicate conservation activities and their significance in protecting the values of a site. For example, onsite conservation work should always
have an interpretive component. Conservators should be communicating their work to the public and enhance public awareness.

For these reasons interpretation should be considered from the beginning of the management process and not as an end product.

10.4.3 Communication

Communication has surfaced as a prominent component in the sustainable management of access. Communication is essential during the planning of all practices linked to the management of access, among the stakeholders, but also between the heritage authority and the visitors. Although interpretation can be used as a communication tool (see 9.3.5), communication extends beyond the scope of interpretation, particularly in terms of establishing fruitful relationships between access stakeholders (see 2.5). Ensuring that management processes are in synergy and not in conflict, will contribute to an effective management of access and experience.

10.4.4 Managing visitor impacts

Limits of acceptable change

The Limits of Acceptable Change framework together with other similar frameworks discussed in section 2.7.1, offer many advantages for managing
change stemming from access to archaeological sites. This framework can be a starting point for managing the effects from access. Monitoring the interaction between visitors and the site can help identify where action should be taken to control exceeding limits of use, and where there is potential for further use. This is a dynamic approach for managing impacts, as it requires constant monitoring and modifying. It may be difficult in the beginning, but in the long-term it does protect the actual contemporary values while it contributes to the sustainability of the resource. Furthermore, as it explicitly considers the experience of visitors, it manages impacts from a holistic perspective, not solely impacts on the resource.

**Other methods for managing impacts**

Although the LAC and other related methodologies are considered as the most appropriate for controlling the management of visitors and their impacts in a holistic way, their complexity and need for constant monitoring do not make it suitable for sites lacking human or financial resources for their implementation, such as Herculaneum (see Chapter Nine). In such a case other methods can be used for controlling capacity, for example, by setting a limit to the numbers of people allowed into the site, and using methods for not exceeding this limit, such as the use of a booking system that responds to the capacity of the site.
Other methods include the collaboration with access stakeholders from the tourist and educational sectors to ensure a better control over access, especially during the peak visiting seasons. For example, in Italy, most schools visit heritage sites in the spring, which is the beginning of the tourist season. Instead their visits could be spread throughout the year, or less known sites other than popular tourist sites could be included in their curriculum. This way visitor load could be reduced to sites like Herculaneum that are popular to schools and guided groups.

10.4.5 Site maintenance

Maintenance assists in safeguarding the sustainability of the resource (see 2.7.5). It is significant in controlling impacts on the archaeological resource, by ensuring that it is well maintained. As demonstrated in this research, maintenance surfaced as the most important factor in the control of visitor impacts on the site (see 7.10.5). In the case of floors, ensuring that there are no lacunae or cracks in the areas open to access will reduce the possibility of visitor-induced damage from occurring.

The success of maintenance as a sustainable conservation tool is greatly dependent on the use of in-house conservators. The history of conservation at Herculaneum has demonstrated the significance of a permanent group of workers looking after the site during Maiuri’s time (see 4.2.4). This approach was
taken up again by the HCP in the twenty-first century (see 4.2.4 and 0). The importance of in-house conservators cannot be overstressed; they are significant not only for carrying out conservation work per se, but also for ensuring continuity through daily interaction with the material remains and an intimate knowledge of them. As Andrew Oddy (1996, 4) stated in his argument for the valuable role of in-house conservators in museums, there is no substitute for a conservator who knows the collection intimately and who passes his or her experience on to younger colleagues. In-house conservators further have the potential to develop strong relationships and collaborations between other professionals involved in the protection of the site, such as the site manager, or the archaeologist. This sort of collaboration has the potential to yield more effective and sustainable results in the protection of the site in the long-term.

10.4.6 Capacity building

Capacity building has also been identified as a vital consideration in the sustainable management of access. This component is integral to the sustainable development framework (see 2.5). Strengthening the capacities of human resources involved in the management of access, through skills and knowledge, may take time in the short-term, but yield sustainable benefits in the long-term. In terms of managing access, this would necessitate the training of professional guides not only in conservation issues, but also in the adoption of effective
interpretation strategies for communicating the significance of sites. The approach adopted by Parks Canada in ensuring that guides employed at the Grosse Ile and the Irish Memorial National Historic Site is exemplary of how such training could be effectively carried out, and how it can contribute to active collaboration and communication between the guides and heritage authority (MacLean and Myers 2005, 47). Guides are provided in-house training on an annual basis to update their knowledge, and they also actively participate in defining the interpretation of the site.

The need for capacity training is also relevant to site custodians, another critical group of stakeholders involved in the management of access, but often overlooked in the process. Herculaneum illustrates the importance in ensuring that custodians are trained on how to manage visitors (see 8.6.1).

10.4.7 Documentation

Documentation of the resource is fundamental for controlling and minimizing impacts on the resource, as it can provide a basis for monitoring and thus understanding change more effectively. It is an aspect of conservation that has been acknowledged as critical in the implementation of conservation activities and is included in guidelines of practice (see 2.1.2), such as ICOMOS and UNESCO guidelines (see ICOMOS 1964, ICOMOS 1990, Australia ICOMOS 2013,
UNESCO 2013c, UNESCO 2013d). It is also critical for popular sites, as their documentation and recording of all its values and where they reside can ensure that they are recorded for the future.

10.4.8 Monitoring

Monitoring is extremely important in the sustainable management of access. Although this is integral in management planning (see 2.3) and in the Limits of Acceptable Change framework (see 2.7.1), it is discussed separately to highlight its significance in achieving sustainable access. Usually monitoring is considered at the end of the planning process (Demas 2002), but instead it should be an active mechanism from the beginning of the process.

10.5 Conclusion

This chapter has addressed the four overall aims of this research based on the results from the in-depth analysis of the case study, the site of Herculaneum. The research has demonstrated that physical access does contribute to the experience of archaeological sites in a number of ways, such as contributing to a sense of place, to affective experiences and to mindfulness. Together with these positive impacts, access may have negative effects if not placed in an informed framework of management planning, where its significance as an interpretive experience is made explicit to the visiting public.
Furthermore, this thesis has contributed to a better understanding of the role of access in the instigation of impacts on the archaeological resource, where it depends on a number of factors, which can be controlled and thus assist in mitigating visitor-induced impacts.

On the basis of these findings, the research claimed that physical access should be explicitly considered as an interpretive approach, as long as damage is kept within acceptable limits. This is imperative primarily from an ethical point of view, for the field of site management to respond to its intergenerational and intragenerational responsibilities. To achieve this, the research brought forward a set of guidelines for achieving sustainable access in the framework of sustainable development. These approaches suggest a holistic approach to management planning, aiming at reducing impacts on the resource while maximising the benefits. These are developed while acknowledging the importance of context and the multi-faceted complex reality of site management. Ultimately, what this research hopes to achieve is a shift in thinking of access at archaeological sites, and to approach it as an advantage and as an ethical requirement towards sustainable development.

The next chapter provides the final conclusions on the research.
11 Conclusion

This thesis has sought to explore and achieve a better understanding of the ever-present conservation and access dilemma with which archaeological sites open to access are faced. In doing so, the aim has been to consider the ways in which physical access affects the visitor experience, and to juxtapose the significance of these effects against the impacts that access inflicts on the archaeological resource. Through this juxtaposition, the research aimed to reach an informed conclusion on whether access can be considered as an interpretive approach in the visitor experience, and to suggest ways in which this can be achieved. These aims have been explored in detail through the case study of Herculaneum in chapters Four to Nine, while a synthesis has been provided of the broader generalisations of the results of the case to the field of site management in Chapter Ten.

This final chapter presents the conclusions stemming from the research and comments on their wider significance. The chapter comes to a close with suggestions for further research and concluding thoughts on the thesis.
11.1 Lessons for archaeological site management

The case study of Herculaneum clearly demonstrates the complexity of contemporary site management approaches, and particularly those that are values-based (see 2.1.3 and 2.1.4). More specifically, it has emphasised how site management processes are influenced by the local institutional and legislative context and by the dynamics among stakeholders. It has brought to the forefront the reality of the interconnectedness of all components of management and the complexity and difficulty in achieving effective and sustainable management. This complexity of site management stems from the fact that decision-making is no longer solely based on the opinions of the experts, but has to consider the values of other stakeholders with an interest in archeological heritage. The process of identifying and prioritising values is particularly challenging and, as discussed in Chapter Two (see 2.4), ultimately a political choice. Indeed, this research has clearly demonstrated the complexity of decision-making in site management, and how decisions are guided by the values of the decision-makers, who are not necessarily preservation-led actors. For example, at Herculaneum, preservation values have been prioritised over interpretation and contemporary values as the sponsor of the HCP project placed emphasis primarily on physically conserving the resource and seeing fast results from the funds given to the project (see 5.7.3). Although this is a unique approach in the context of the Mediterranean sites, it nevertheless illustrates the political nature of conservation and the power dynamics of stakeholders. As such, the research
contests discourses that overlook this complexity and the power dynamics among the stakeholders involved in site management, where conservation professionals are usually not the ones that decide (see 2.4; Poulis 2010, Smith 2006).

This research further emphasises the importance of the dynamic aspect of management planning, which is often overlooked in practice, and which does not allow for opportunities to be identified and taken advantage of. The sequential character of planning was clearly reflected in the management of conservation at Herculaneum, especially in terms of prioritizing conservation over interpretation activities. Relevant to this, the research has further highlighted the need to place all management processes on an equal footing with conservation. Herculaneum demonstrates that in practice, physical conservation is often the dominant priority of site management, and interpretation is only an additional layer over conservation decisions at the end of the planning process (see 5.8.5 and 9.2). As a result, interpretation fails to acquire its full potential as a conservation and visitor management tool (see 2.5, 5.8.1, 9.3.5). The reality at Herculaneum challenges the field for thinking how interpretation could be better integrated with conservation in the context of site management planning. Further dissemination of the results of successful site management planning case studies using interpretation in a dynamic way could contribute towards this aim.
Communication is another aspect that surfaced from my research as a critical component in the successful management of access (see 8.6.3). Although communication has been advocated as critical among stakeholders, particularly in the phase of eliciting values (see 2.2), Herculaneum suggests that it is a key ingredient in establishing successful relationships among stakeholders within a site, but also with the visitors, throughout the management planning process. This is an aspect that has to be made more prominent and an essential ingredient in the process of successfully managing archaeological sites.

My research further advocates the need for the field of archaeological site management to consider its ethical responsibility to current and future generations, especially when making decisions about access. Although the decision-making process of the values-based approach is guided by the sustainability concept, it has not made explicit the ethical obligation to respond to current and future generations. The intergenerational and intragenerational responsibilities of the professionals in the field to the broader public have to be brought to the forefront of site management, especially as it strives to be made relevant to the twenty-first century social sphere.

Finally, the most significant contribution of my research has been the need of values-based site management to reconsider the use of physical access as an interpretive approach, due to the array of intangible benefits associated with it,
as illustrated through the case study of Herculaneum. Ideas such as sense of place and affect, currently advocated as critical pre-requisites in understanding and getting to the heart of places but also essential in developing successful interpretive experiences, are greatly facilitated through physical access. As such, the field of site management can benefit significantly in the long-term, if these aspects are placed on an equal footing with the need to communicate significance as essential aims and prerequisites of interpretive planning.

In response to this need, I have introduced the concept of insideness, borrowed from human geographer Edward Relph, and his study of sense of place (see 2.9), in thinking about ways of managing physical access at archaeological sites. Thinking about levels of insideness, rather than access, implies from the outset physical presence at the place in question. It responds to the character of archaeological sites as places, distinct locales in the landscape. It thus facilitates a more positive outlook to the management of access and helps develop effective visitor experiences.

Relevant to this more positive outlook to access, I have suggested the concept of competitive advantage as one approach for managing access in the framework of sustainable development. Although this is well applicable to the site of Herculaneum, I acknowledge that it may not always be applicable to other sites.
However, it is a very useful starting point for thinking about access: as an advantage and not as a threat.

11.2 Comments on data and methods

As this research comes to a close, some comments on the data and the methods used for their collection and analysis, as well as whether these have served the purpose of responding to the research questions that framed this thesis, are inevitable.

First of all, the methodological approach developed for examining the role of access to the visitor experience and to the archaeological resource has been very effective in meeting the research aims, despite the unexpected shortcomings, such as the approach used by my assistant in 2010 to interview visitors and the consequent limitations in analysing the data afterwards. Such shortcomings are inevitable in most if not all research. This methodological approach is suggested as an approach for examining visitor usage at other archaeological sites (see 11.3).

The combination of qualitative, quantitative and documentary research methods, such as the visitor questionnaire survey, interviews, observations, mosaic condition documentation and archival data (Chapters Four to Eight) created large amounts of data, which have been challenging to manage and process, but
have, nonetheless, presented a stimulating challenge. The different data sets collected have corroborated the validity of arguments put forth in response to the research aims. They have enabled the examination of the issue of access holistically, and from different perspectives.

In addition, the combination of different methods of data analysis has enhanced the validity of the research, and the reliability of the findings. For example, the combination of quantitative and qualitative data in examining the role of access to the experience of Herculaneum enhanced the research findings and the arguments put forth in responding to the research aims. Similarly, the combination of observations with interviews of various stakeholders, helped in obtaining a more complete view of the site dynamics and interactions between stakeholders. Finally, the time spent onsite during fieldwork proved critical in facilitating the interpretation of data on the visitor experience and in understanding the dynamics between the various access stakeholders and the local heritage authority. This was evident from the way my interaction with the various stakeholders changed, and how this granted me acceptance in the on-site community and facilitated unstructured interviews and informal conversations with the custodians.

The use of GIS as a tool for documenting and analysing different types of data has been very beneficial in allowing spatial and statistical analysis that would
otherwise not have been carried out. Thus, it strengthened the validity of the research findings. Furthermore, the potential for using these data in the future as a monitoring tool of visitor access and mosaic condition adds to the potency of the methods used for data collection and analysis.

As with all research, these strengths have inevitably been accompanied by some weaknesses, in terms of data and the respective methods of collection. For example, the collation of past photographic documentation of mosaic condition was particularly challenging. The limited material available in terms of past mosaic photographic evidence and especially post-excavation documentation was not foreseen at the beginning of the research, especially as Herculaneum is such a famous Roman site (see 3.5.3 and 7.6.1 and Appendix 5). Nevertheless, despite this limitation, it was possible to get an overall understanding of the rate of change, particularly through recent documentation.

In retrospectively reflecting on the methods used for collecting data on the visitor experience at Herculaneum, there are some changes I would make in terms of the data collection methods. For example, I would have added more exploratory questions in the interviews, in addition to probing questions to minimise visitors’ limited responses. However, this can be seen as a response to the changes in my own ideas and perspective over the course of undertaking this research.
Nevertheless, a respectable amount of data was gathered from which satisfactory interpretations could be made.

In terms of the methods used for the visitor impact assessment, a comparative evaluation of condition of mosaics found in open versus closed areas and in similar environments could perhaps have provided a more straightforward understanding of visitor impacts. However, methods are ultimately decided based on the practical limitations of the research context, and in this case, the requirements of the initial internship with the HCP was just such a limitation, together with the difficulty in finding similar environments for mosaics in closed and open access areas. Thus, the method adopted included a large number of mosaics in diverse conditions and thus have provided sufficient data from which to derive firm conclusions regarding the way visitors instigate impacts.

11.3 Potential for future research

The research project has highlighted various areas with potential for future research. First of all, seeing the dearth of material available in understanding visitor use and impacts at archaeological sites, the methodological approach developed for this research could be adapted and applied to other sites. This can form the basis for comparative work in understanding in more depth the conflict between conservation and access and how this manifests at different types of
archaeological sites. Such work could provide further testing of the methods used in this thesis for exploring visitor use of sites, and thus lead to an improved methodology based on a richer and robust data set.

Furthermore, as discussed in Chapter Two (see 2.7.1), the LAC framework has not been widely applied in the field of managing visitors in cultural heritage settings. Thus, the application of this approach at an archaeological site, including its long-term monitoring for evaluating its effectiveness, and the dissemination of the results would be invaluable for the field. This would contribute to a better understanding of the benefits and limitations of using this method as a way to manage visitors using a sustainability-driven approach.

Finally, in the field of mosaic conservation, further work on the instigation of visitor impacts, examining areas accessed and not accessed as discussed in section 11.2, could corroborate the results of the visitor impact assessment and provide a more informed understanding of the role of access in the instigation of mosaic damage.

11.4 Concluding thoughts
The work presented here was driven by the belief that experience is fundamental in the understanding of archaeological sites, which are places, and as such the
interpretive experience is rooted in their locality. I have sought to understand to what extent direct experience could be adopted as an explicit interpretive approach in the management of archaeological sites.

Through the in-depth examination of Herculaneum, a site where direct experience is perhaps unique in the world of archaeological heritage attractions, this study has demonstrated the challenge of managing access sustainably, shaped by the complex reality of the site’s particular local context in administrative, legislative and ultimately political terms.

Despite these challenges, I argue that finding a solution to the conflict between access and preservation lies at the core of decision-making that is the framework of sustainable development, a framework for the ethical management of archaeological resources. Such a framework ensures that both the needs of current and future generations are considered, along with the need to protect the resource, whose sustainability is inextricably linked to achieving sustainable access. The wise use of resources for engaging visitors in the present through a sustainable development framework can enhance public awareness and appreciation of the resource. In the long-term, this can change public attitudes and overall behaviour towards archaeological resources and define the way future generations engage with their own past.
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Glossary

*Ala* (-e). Side passages or rooms on the left and right sides of the *tablinum* in a Roman *atrium*.

*Andron*. The passage between two peristyles.

*Apoxyterium*. The changing room of a Roman bath building.

*Atrium*. Main hall of the traditional Roman house.

*Biclinium*. A dining room with two couches.

*Caldarium*. The hottest room of a Roman bath.

*Cardo*. A primary north-south street of a Roman town.

*Cocciopesto*. Pavement made of lime mortar mixed with ceramic or stone fragments.

*Cryptoporticus*. Covered or subterranean passageway.

*Cubiculum*. A room, often small and windowless, that serves as a bedroom in a Roman *domus*. It often opens off of the atrium of a Roman house.

*Compluvium*. A rectangular opening in the central part of the roof of a Roman house that admits light and water; the latter falls into a corresponding shallow basin in the floor, called the *impluvium*.

*Decumanus Maximus*. The main street running east-west in a Roman town.

*Diaeta* (-ae). A daytime resting room.

*Fauces*. The narrow passageway to an *atrium* of a Roman house.

*Frigidarium*. The “cold” room of a Roman bath.

*Impluvium*. A shallow basin in the floor of a room, commonly the atrium of a Roman house, to catch rainwater from an opening in the roof overhead, the *compluvium*. 
Insula. A city block defined by four streets as used in this thesis. In antiquity it meant an apartment house, occupied by a number of families.

Nucleus. One of the foundation layers of a mosaic floor composed of lime mortar with aggregates.

Nymphium. A natural or artificial grotto dedicated to water nymphs, but generally a reference to a monumental fountain.

Oecus. The main living room, used for dining and entertaining.

Opus sectile. Type of pavement or wall revetment consisting of pieces of marble or other materials cut to the specific shapes of a design, and fitted together to form a smooth surface (Dunbabin 1999, 343).

Opus scutulatum. Pavement combining an opus tessellatum background, frequently monochrome, and small stone slabs, often in fragments, generally aligned in rows. The slabs are of different forms, colors, and dimensions.

Opus signinum. Pavement made of lime mortar mixed with ceramic fragments into which quadrangular tesserae or small stone fragments are inserted, either randomly or to form geometric designs.

Opus sectile. A floor or wall covered with pieces of stone slabs, most commonly of different colored marble, cut in regular, shapes and placed side by side to create a geometric pattern or figurative motif.

Opus tessellatum. Floor pavement made of quadrangular pieces of cut materials, tesserae.

Palestra. Porticoed enclosure for sport and exercise.

Peristyle. A colonnade that surrounds a structure or encloses an inner courtyard.

Pozzolana. Volcanic powder with hydraulic properties, added to the mortar used in the construction of mosaics. Its name derives from Pozzuoli in central Italy due to its abundance, although pozzolana is sourced from many areas.

Praefurnium. The stokehole of a bath – building.

Rudus. One of the foundation layers of mosaic floors composed of crushed stone or gravel mixed with calcium hydroxide, with the addition of pozzolana and crushed bricks.
Statumen. Foundation layer of a mosaic floor composed of coarse stones or coarse crushed stone-rich mortar.

Taberna. A Roman shop, often with a single room and a mezzanine level for living and storage space.

Tablinum. The traditional reception room, usually on axis with the main doorway of a Roman domus.

Tepidarium. The warm room of a Roman bath.

Tessera (-e). A small cube of cut stone used to create a floor or wall mosaic.

Thermopolium (-a). A type of taberna, a place that serves heated wine and food.

Triclinium. The dining room in a Roman house, named after the three dining couches traditionally placed around the side and back walls of the room.

Tuff. A volcanic stone derived from hardened volcanic ash and mud.

Vestibulum. The transition point or space between the street and the entrance hall of a Roman house.

Viridarium. An interior garden.
**Acronyms**

BSR  The British School at Rome

EH  English Heritage

GCI  The Getty Conservation Institute

HCP  The Herculaneum Conservation Project

INP  Istitut National du Patrimoine

PHI  Packard Humanities Institute

SANP  *Soprintendenza Archeologica di Napoli e Pompei*

UANZ  University of Auckland New Zealand
Appendices