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Tom Dawson, Courtney Nimura, Elías López-Romero and Marie-Yvane Daire

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Chapter 16

Archaeological heritage on the Atlantic coast of Uruguay: heritage policies and challenges for its management in coastal protected areas

Camila Gianotti, Andrés Gascue, Laura del Puerto, Hugo Inda and Eugenia Villarmarzo

Abstract

Archaeological coastal sites are an important source of information about human–environment relationships. The information they can provide is particularly significant given current predictions of global changes to coastal environments, mainly as a consequence of increasing sea levels attributed to global warming. In addition to climatic threats, there are strong pressures on coastal environments related to anthropic activities, such as urbanisation, tourism, agriculture and industrial production, which can further impact upon archaeological heritage. Although strategies to deal with the loss and destruction of archaeological sites have not always been included in public heritage policy, recent conservation policies associated with the management of protected areas in Uruguay have begun to integrate this heritage. This paper presents information about archaeological heritage on the Atlantic coast of Uruguay within three conservation areas, each providing a different category of protection. It will show how archaeological heritage has been integrated into conservation policies and will highlight future challenges for cultural heritage management and how they should be included in sustainable, participatory frameworks. The paper will also discuss the potential for prehistoric coastal occupation to shed light on past adaptations to environmental change.

Archaeological heritage management in national public policies for nature conservation

Over the last 15 years, public policies affecting Uruguay's heritage have developed and broadened, increasing links with biodiversity conservation and land planning. In 2001, the *National System of Protected Areas* (Sistema Nacional de Áreas Protegidas [SNAP]) created three national categories of protection: *Protected Landscapes, Sites of Protection* and *National Parks*. The new system replaced the old heritage law (No 14.040/1972) which had protected (but not effectively managed) heritage as *National Historic Monuments*. The former law had been criticised as being inadequate due to diverse socio-economic developments in the country over the last 15 years. This contrasted with certain national regulations that had progressively included cultural heritage protection and management, such as:

- Law 16.466/1994: Environmental protection through archaeological impact studies
- Law 18.308/2008: Land planning and tourism through departmental guidelines, master plans and local plans
- Law 17.234/2000: Biodiversity management and nature conservation through protected areas and their management plans
- The declaration of Ramsar sites protected by the Ramsar Convention on Wetlands Preservation (1971) and the

creation of Biosphere Reserves (through UNESCO's Programme on Man and Biosphere).

Integrating archaeology into biodiversity conservation policies has provided a favourable contextual and systemic framework in which to consider the management of heritage sites alongside the environmental units and ecosystems that contain them. It has also allowed for the development of participatory work as part of protected areas governance, where different forms of public archaeology can be adapted to the socio-economic characteristics of the protected territories (Caporale 2010; Brum *et al.* 2011; Lamas *et al.* 2013; Blasco *et al.* 2014; Gianotti *et al.* 2015a; Gascue *et al.* 2016). However, nature conservation policies have been criticised for their bias towards preserving living species and ecosystems, and for not paying enough attention to other elements of ecological systems (including archaeological, geological, and palaeontological heritage; Toledo 2005). They are also criticised because they have not incorporated the long-term responses of ecosystems to natural or anthropogenic changes (Waldhardt 2003). This was identified as a problem during the implementation of SNAP in Uruguay (Gianotti *et al.* 2016). The situation, however, is beginning to improve in some protected areas due to integration into management plans (Laporta and Sarroca 2014), especially when a landscape approach is incorporated (SNAP 2014-Project URU/13/G35; Gianotti *et al.* 2015a).

Some consideration is being given to large-scale processes and changes in national climate change adaptation policies (Bidegain *et al.* 2012). These also take into account the impacts of climate change on vulnerable socio-economic and environmental systems (cf. FAO 2013; 2014). Projected global climate models for the region forecast a rise in mean temperature of about 2–3°C and a rise of 10–20% of annual rainfall by the end of the 21st century (Bidegain *et al.* 2012). This could lead to the destruction of some of the archaeological heritage. However, the impacts of climate change on archaeological heritage – which can act as either a key indicator for conservation and management or as an example of past resilience – have not been explicitly included in national climate change adaptation policies. This situation is somewhat understandable given the historic vicissitudes of identity formation within Uruguay (Caetano and Rilla 2005; Criado-Boado *et al.* 2006). Heritage is not considered a key factor in the nation's economic and cultural development or as a priority for national policies.

Some recent initiatives have focussed on two main areas of archaeological heritage management in vulnerable coastal areas. Archaeology has made contributions to the integrated management of heritage, including projects which have a participatory or public dimension (Gianotti *et al.* 2007; 2015a; 2015b; López *et al.* 2007; Brum *et al.* 2011; Brum 2013; Gascue *et al.* 2016). In addition, interdisciplinary studies have enabled an understanding of the long-term, natural variability of coastal systems and the effects of human modification upon the environment. Combined, these help to show the effects of natural dynamics and the vulnerability of coastal sites from a time before more recent changes and anthropogenic pressures (Inda 2009; del Puerto 2011; del Puerto *et al.* 2011; Inda *et al.* 2011). Such studies have the potential to influence our thinking about the integration of archaeological investigation into policies orientated towards evaluating vulnerable socio-ecological systems. They can also inform our understanding of the impacts of, and the mechanisms of resilience against, climate change. This potential is evidenced by some European projects that have assessed the vulnerability and risk of archaeological sites prior to recent climatic changes, and have shown how these aspects are key when designing integrated heritage management measures (Daire 2008; Daire and López-Romero 2008; Ballesteros *et al.* 2013).

The Atlantic coast of Uruguay as a territory of change: archaeology's contributions to the study of human-environment relationships

On the Atlantic coast of Uruguay, climatic and environmental evolution has been approached with different multi-proxy analyses, as well as topographic and stratigraphic-sedimentological surveys (*e.g.* del Puerto *et al.* 2011; 2013). Archaeological surveys and excavations have been carried out as part of specific studies to understand prehistoric subsistence systems, changes in occupation patterns, and strategies for natural resource collection and use (*e.g.* Inda *et al.* 2006; 2011; López *et al.* 2009a).

Archaeological and palaeoenvironmental data have shown that settlement of the region took place *c.* 11,000–10,000 years ago, at a time when the coastline was significantly different and the sea was between 30 and 50 m below its present-day level (Inda *et al.* 2011). Subsequent sea level rise has inundated many of the archaeological remains of that period, leading to a lack of information on the early human occupation of the Atlantic coast (Inda *et al.* 2011). During the Holocene maximum transgression (4050–2550 BC), the sea was *c.* 4–6 m above present day levels, and evidence shows that human groups settled rocky promontories and the shores of gulfs and bays which would later develop into coastal lakes (Inda *et al.* 2006; López *et al.* 2009a).

A subsequent period of sea level regression led to humans following the retreating coastline. However, climatic oscillations between 2000 and 1000 years BC, including arid periods when there was significant aeolian movement of sand exposed by the retreating sea, created less favourable conditions for coastal occupation, thus

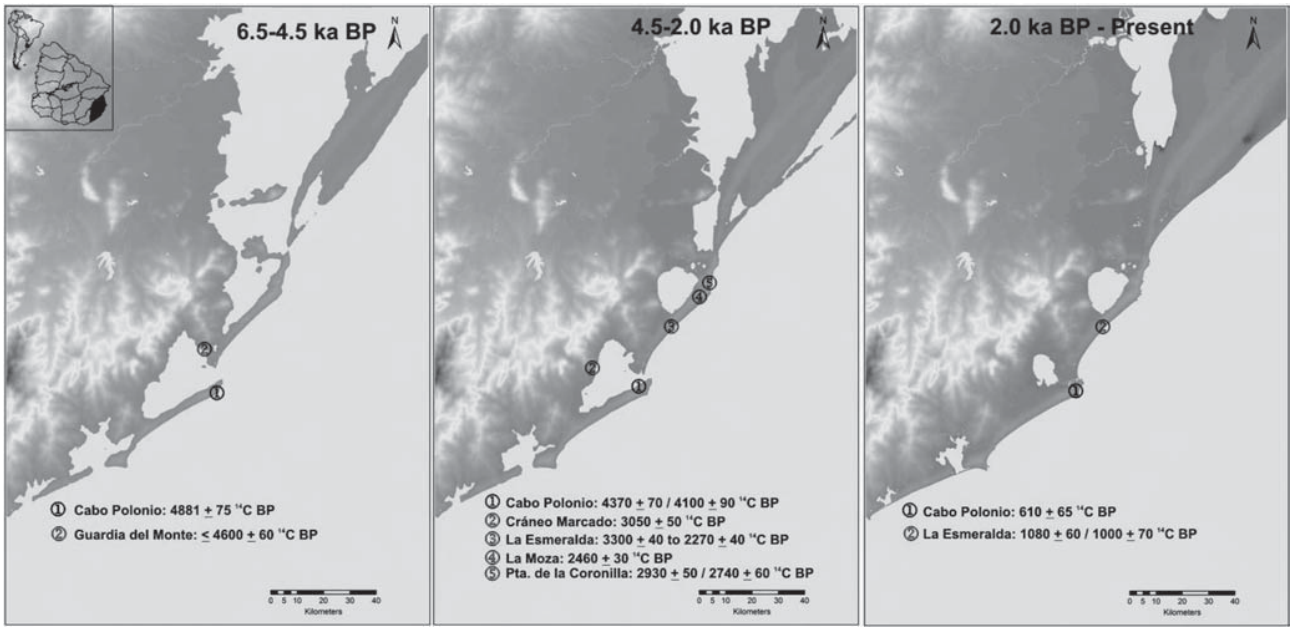

Figure 16.1. Evolution of the coastline of the study area (Department of Rocha) and location of archaeological sites divided by time period.

prompting new strategies for environment and resource management (Inda *et al.* 2006; Castiñeira *et al.* 2010; Villarmarzo 2010). Evidence of these changes has been recorded at archaeological sites such as La Esmeralda shell mound and Cráneo Marcado I (Fig. 16.1).

From 550 BC (dated by geomorphological location and relative chronologies), the environment was similar to today. Many sites were abandoned, although indigenous mound structures have been recorded in coastal areas from this period (López *et al.* 2009b).

From the 18th century, a new wave of human occupation occurred with the arrival of European settlers. Anthropic pressures emerged in coastal ecosystems – amplified by the start of production activities on newly settled fields and initiatives such as wetland drainage and afforestation – and modified both landscapes and the archaeological sites contained therein. The coastal urbanisation process and the development of towns and cities was exacerbated by the *Populated Centres Law* of 1939.

Promoting approaches that combine palaeoenvironmental, archaeological and historical information to understand coastal change processes is therefore an important challenge for heritage and conservation policymakers. The following three case studies highlight different actions that were taken to plan the management and conservation of coastal archaeological heritage. As the study area contains a large number of protected areas, an additional challenge was to develop strategies that promote integrated heritage management. These projects included the addition of a public archaeology approach to heritage management, and a participatory and multi-vocal dimension as an essential foundation of the management plans.

Archaeological heritage management in three protected areas on the Uruguayan Atlantic coast: planning for conservation and socialisation

In the last 20 years, socio-economic and land-use changes in the Uruguayan coastal territory have had a significant impact on the natural and cultural heritage of the region. These transformations took place at a time when National Parks were being supplemented by the creation of protected areas for the conservation of natural heritage and biodiversity.

The Department of Rocha contains two National Parks and five Protected Areas forming part of SNAP. The heritage management approaches employed have varied according to the legal status of the area, to the type of work being undertaken, and to the technical abilities of the teams.

Management plans have set out the processes for protected area planning, organising all relevant information so that it can be analysed to establish a set of sustainable management guidelines and actions based on conservation criteria. Criteria and methodologies published in SNAP project guidelines (SNAP 2012; Mejía 2012) have been used with other tools, including the Conservation Action Planning (CAP) methodology for the conservation of sites (TNC 2007), the Open Standards for Conservation Practice (CMP 2007), the IUCN Guide for Planning and Management of Protected Areas (IUCN 1994; Dudley

2008), and the Management Effectiveness Tracking Tool (METT; World Bank/World Wildlife Fund). Each of these established different mechanisms for promoting participatory governance strategies.

The creation of the management plans discussed below show a bias of the methodologies towards the biological and ecological aspects of conservation, and this has, at times, generated challenges for integrating, analysing, and assessing the cultural dimension of heritage (Gianotti *et al.* 2015a; 2016). Also, there are no pre-established planning guidelines used in the National Parks that are not managed by SNAP. The administration of each park has followed different processes as the technicians involved with each park have determined the methodologies used.

Cerro Verde and La Coronilla Islands Protected Area

The Cerro Verde and La Coronilla Islands Protected Area is a marine coastal area comprising 7000 ha of marine territory and 1700 ha of land located between Santa Teresa National Park and La Coronilla seaside resort (Fig. 16.2). The area is co-administered by the Ministry of Housing, Land Management and Environment (MVOTMA) and the Ministry of National Defence (MDN). This Protected Area entered SNAP in August 2011 as a *Habitat and Species Management Area*. Although its organisational structure was formed immediately, the management plan is still under development. From the outset, a key goal was collaboration, and the aim of the management plan is

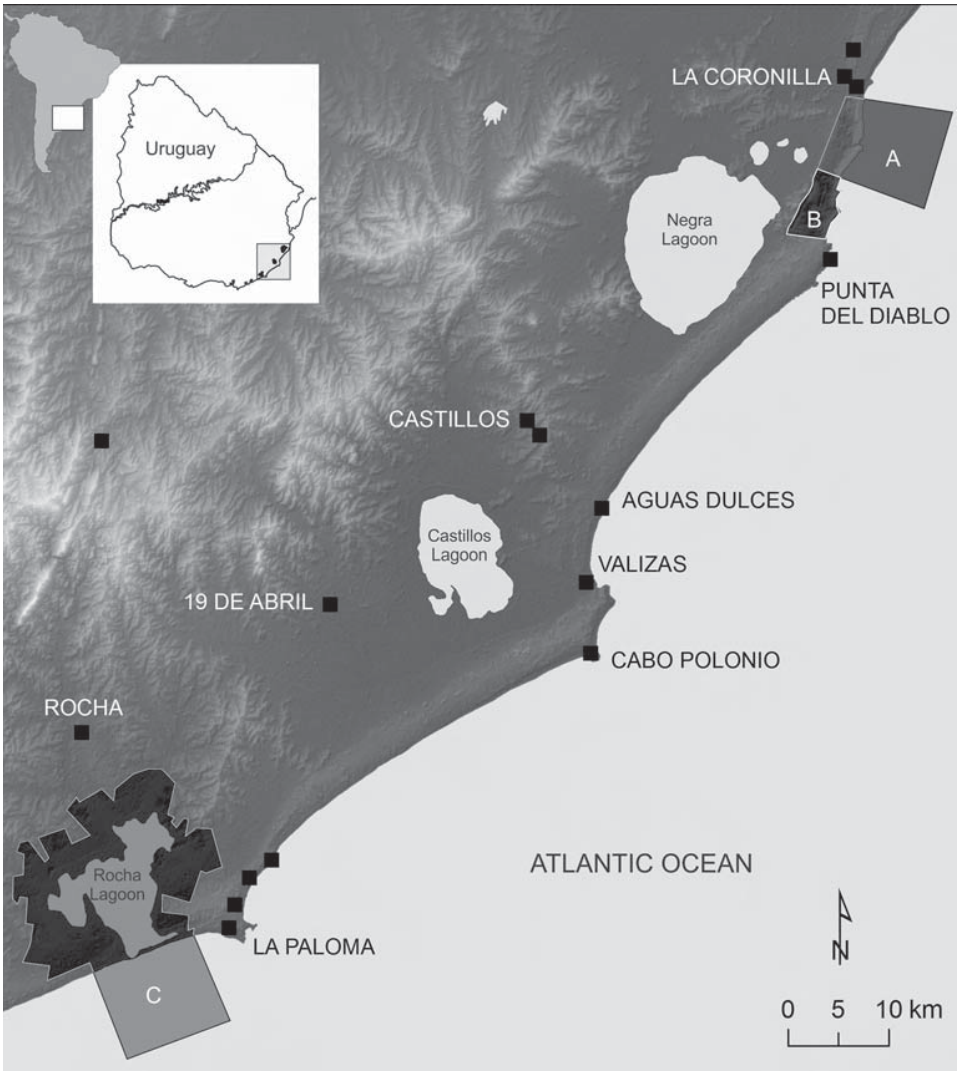

Figure 16.2. General location of the geographical area in Uruguay with the specific location of the three case studies: A) Cerro Verde and La Coronilla Islands Protected Area, B) Santa Teresa National Park, and C) Laguna de Rocha Protected Area.

to: 'research, restore and preserve biological and cultural diversity, respecting the high degree of naturalness of the marine-coastal landscape and providing opportunities for the population of La Coronilla within a framework of regional sustainable development' (Laporta and Sarroca 2014, 3).

Before the area was protected, archaeological sites dated *c.* 550 BC (López 1995) found on outcrops inspired the development of a conceptual and instrumental approach that promoted the integration of archaeological heritage and its management (Gianotti *et al.* 2007). The work involved cataloguing the archaeology of the area, thus increasing the number of known sites; analysing their conservation state; identifying the main threats and pressures; and defining a set of measures to promote better conservation of the heritage (Gianotti *et al.* 2007).

In 2014, during the development of the management plan, the opportunity arose to establish a specific strategy to integrate management of cultural heritage together with other assets in the area. Conservation *targets* – species, ecosystems, processes, or other important aspects of biodiversity and archaeological and cultural heritage – were defined as entities that needed to be preserved (Granizo *et al.* 2006). Of these, *archaeological zones, sites* and *movable property* with cultural or heritage value were identified separately from other resources relating to ecosystems, environmental processes and flora and fauna. Archaeological zones and sites comprise structures, groups of material and/or evidence of activities that indicate human use and occupation over time. Movable property refers to collections of palaeontological, archaeological and historical materials collected or otherwise sourced within the boundaries of a protected area (Laporta and Sarroca 2014). Two zones and five sites of cultural and heritage value (including prehistoric, historic and ethnographic sites) were recorded, together with some private archaeological collections (Laporta and Sarroca 2014; Table 16.1; Fig. 16.2).

An evaluation of the conservation state of the archaeological zones and sites allowed us to recognise that the majority of threats and pressures came from activities related to tourism (including motor or animal-drawn vehicles and tourist traffic), followed by looting, vandalism and a late 19th century forestry initiative that included the extensive introduction of exotic tree species. These pressures can directly alter or destroy heritage resources and can also generate the loss of vegetation cover and increase run-off, affecting the physiochemical action of natural agents. Other problems included aeolian weathering, intense rainfall, wave action and corrosion (Table 16.1).

Table 16.1. General characterisation of archaeological zones and sites of the protected area Cerro Verde and its main pressures and threats for conservation

Heritage entity & # on map	*Name*	*Site typology*	*Chronology*	*Pressures due to anthropic agents*	*Pressures due to natural agents*	*Present damage assessment*
Zone 1	La Coronilla I	Stratified with surface materials	Pre-Hispanic	Tourist development (pedestrian, motor or animal-drawn vehicle traffic), pillage, afforestation (sand dunes fixation)	Loss of vegetation cover, run-off, sediment erosion, insolation, aeolian dynamics	Moderate
Zone 2	Cerro Verde	Stratified with surface materials	Pre-Hispanic	Tourist development (pedestrian, motor or animal-drawn vehicle traffic), pillage, signage and wooden structures, afforestation (sand dunes fixation)	Loss of vegetation cover, run-off, sediment erosion, insolation, aeolian dynamics	Moderate
Site 3	La Coronilla II	Stratified with surface materials	Pre-Hispanic	Tourist development (pedestrian, motor or animal-drawn vehicle traffic), pillage, afforestation (sand dunes fixation)	Loss of vegetation cover, run-off, sediment erosion, insolation, aeolian dynamics	Moderate
Site 4	Olla-Isla Verde	Place of memory, historic site	Historic – ethnographic	Arrival of tourist boats, pillage	Weathering, corrosion	Moderate
Site 5	La Porteña	Underwater site	Historic – ethnographic	Pillage	Waves, corrosion	Very Severe
Zone 6	El Pesquero	Place of memory, historic site	Historic – ethnographic	Vandalism, abandonment	Waves, corrosion	Very Severe
Zone 7	Refugio Punta La Coronilla	Place of memory, historic site	Historic – ethnographic	Vandalism, abandonment	Weathering	Moderate

Following the evaluation, measures aimed at minimising harmful activities were integrated into the management plan. These included a ban on motor or animal-drawn vehicles in vulnerable areas and the use of rangers to control looting. In order to evaluate these measures, a monitoring plan was developed that included raising heritage awareness among the local population within a broader environmental and cultural education programme (Laporta and Sarroca 2014).

Santa Teresa National Park

The *c.* 3000 ha Santa Teresa National Park (PNST) lies adjacent to the Cerro Verde and La Coronilla Islands Protected Area, and receives *c.* 30,000 visitors annually. The Park has many cultural and natural assets, including: Santa Teresa Fortress (a National Historic Monument), dozens of archaeological sites (Gascue *et al.* 2016), and natural attractions including sandy beaches separated by rocky peninsulas, trails, and exotic and native flora and fauna.

The park is managed by the Army's Service of Parks (SEPAE) and the Museum of Santa Teresa Fortress is run by the Department of Historical Studies under the Army's management. Recently the Ministry of Tourism has shown an interest in participating in the Park's management by developing a *Master Plan for Santa Teresa National Park,* which includes aspects of heritage (Roche and Somaruga

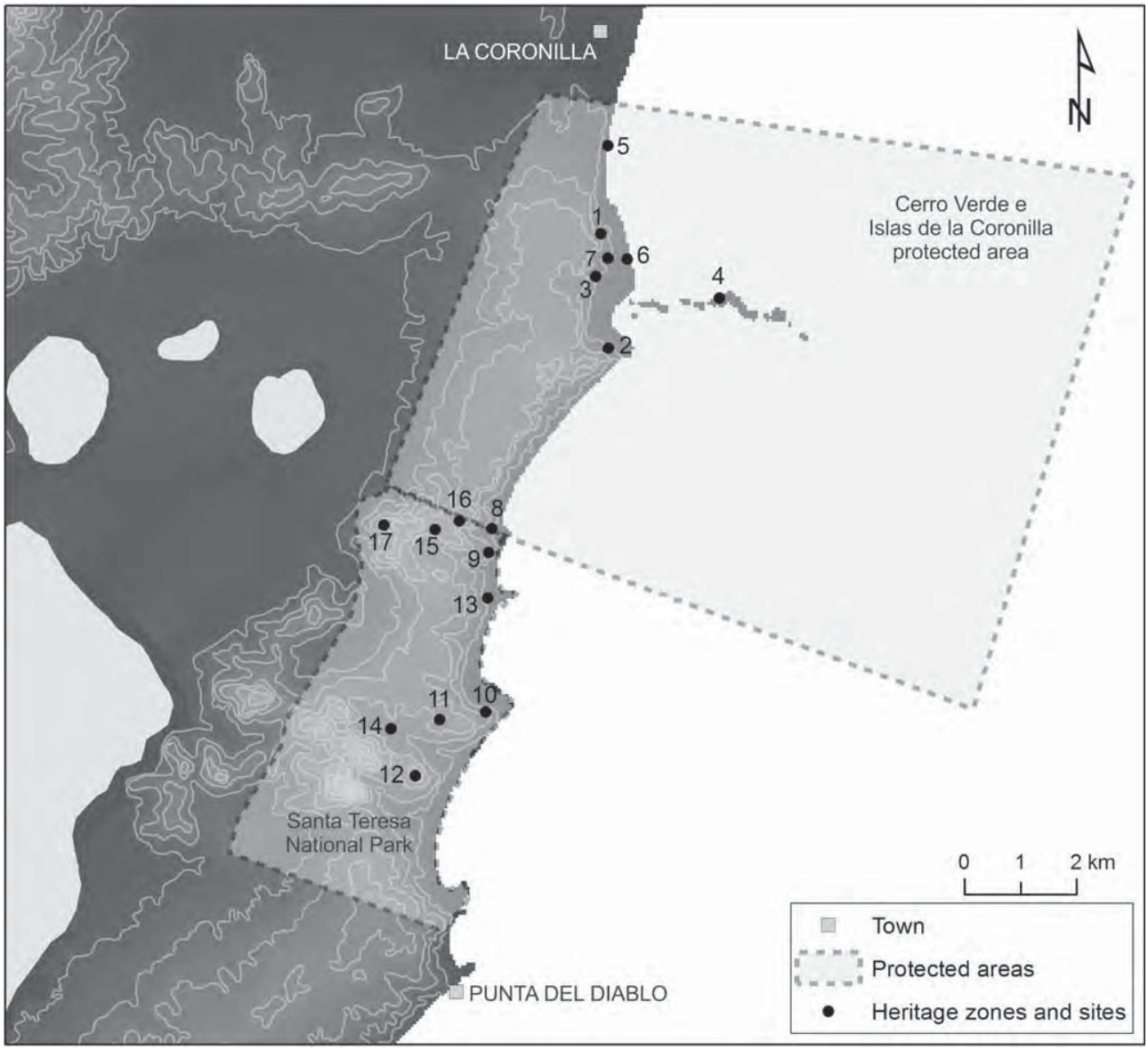

Figure 16.3. Delimitation of Cerro Verde and La Coronilla Islands Protected Area and Santa Teresa National Park with zones and sites of cultural and heritage value (site characterisation in Table 16.1 and Table 16.2).

2015). This is already being implemented in collaboration with the School of Architecture, University of the Republic.

An increase in socio-environmental transformations have created pressures and threats to heritage assets, and these can be traced back to the reconstruction of the Santa Teresa fortress and the reconversion of the area for tourism in the 1920s (Arredondo 1943). The main impacts include the afforestation of the mobile sand-dune system with exotic species, the damming of natural drains (Laguna de Peña), the introduction of exotic animal species, and an increase in tourism. The latter is exemplified by the expansion of infrastructure, equipment and services, including the construction of a network of roads and tourist buildings. Although tourism related improvements have had positive economic impacts, the changes have had a negative impact on the physical and biotic environment and on archaeological heritage.

These problems motivated the development of a management project, directed by Andres Gascue and funded by the Sectorial Commission for Scientific Research (CSIC), University of the Republic. The *Integrated Management of Prehistoric Cultural Heritage of Santa Teresa National Park* project aimed to identify and catalogue cultural assets, assessing and assigning significance to them and increasing public accessibility (Gascue *et al.* 2014). Twenty-four locations with concentrations of prehistoric material were identified through archaeological survey. Archaeological findings were grouped into seven zones and three isolated sites, which in turn related to different environmental units (Atlantic shore, Laguna de Peña and highlands) (Fig. 16.3 and Table 16.2). Recommendations were then made to integrate cultural assets into park management strategies (TNC 2003).

Each zone or site had been negatively impacted by tourism development and/or improvements to the park (Table 16.2). The evaluation identified the causes of degradation, providing the data needed to design management strategies that could safeguard unaltered areas that have a high scientific or heritage potential.

The first conservation strategy included the development of a public archaeology programme in an attempt to relay

Table 16.2. General characterisation of archaeological zones and sites of Santa Teresa National Park and its main pressures and threats for conservation

Heritage entity & # on map	*Name*	*Site typology*	*Chronology*	*Pressures due to anthropic agents*	*Pressures due to natural agents*	*Present damage assessment*
Zone 8	La Mocita-Cerro Bobo	Stratified with surface material	Pre-Hispanic	Buildings, motor vehicle and pedestrian traffic, pillage, absence of storm water management, afforestation with exotic species	Insolation, aeolian dynamics, run-off	Very severe
Site 9	La Moza	Stratified with surface material	Pre-Hispanic	Tourist development (roads, sports-recreational infrastructure construction, pedestrians), sediment removal (cell phone antenna, observation tower for whales)	Insolation, aeolian dynamics, run-off	Moderate
Zone 10	El Barco	Surface	Pre-Hispanic	Roads, pedestrians	Insolation, aeolian dynamics, run-off	Severe
Zone 11	Barco Alto	Stratified with surface material	Pre-Hispanic	Roads, heavy machinery traffic, afforestation with exotic species, pillage	Insolation, aeolian dynamics, run-off	Severe
Zone 12	Cerro Árido	Surface	Pre-Hispanic	Afforestation with exotic species, fires, pillage	Erosion, insolation, run-off	Severe
Site 13	Achiras	Stratified with surface material	Pre-Hispanic	Afforestation with exotic species	Erosion, insolation, run-off	Severe
Zone 14	Laguna de Peña	Surface	Pre-Hispanic	Afforestation with exotic species, sediment removal	Insolation, run-off	Severe
Zone 15	Cuartelillo	Stratified	Pre-Hispanic	Tourist development- road development, recreational use (camping zone), sediment removal for camping and drinkable water service, afforestation with exotic species	Run-off	Very severe
Site 16	Antena	Stratified with surface material	Pre-Hispanic	Roads, buildings (cell phone antenna base), afforestation with exotic species	Run-off	Moderate
Zone 17	Fortaleza and Pueblo de Santa Teresa	Architectural complex	Historic	Touristic reconstruction, afforestation with exotic species, roads	Weathering	Low

archaeological knowledge beyond the scientific community, and to help prevent the degradation of cultural assets due to negligence or ignorance (Saucedo 2006). The activities were focussed on local inhabitants and tourists with the intent to promote education and awareness of cultural heritage in terms of archaeological site preservation, together with a vast array of cultural resources that could foster local economic development. Three strategies were proposed/employed (Gascue *et al.* 2014):

- Archaeological trails, site signage and the design of display boards for the dissemination of research results and the promotion of community best practices for the preservation of cultural heritage.
- New exhibitions and designs for the archaeological exhibitions within the Santa Teresa museum, including the addition of new objects and scientific information based on recent research.
- A proposal developed for local school children and teachers with the aim of promoting a leisure-related experience and improving awareness of the importance of preserving cultural heritage. The proposal included a guided tour of ongoing excavations and experimental workshops for manufacturing and using prehistoric artefacts (Bortolotto *et al.* 2010).

These activities have helped turn Santa Teresa's pre-Hispanic heritage into assets that generate profitability by incorporating them as additional attractions offered to tourists by the Park.

Laguna de Rocha Protected Area

Laguna de Rocha Protected Area is located about 11 km from the city of Rocha and is very close to the seaside resort of La Paloma. Towards the west, it borders Laguna Garzón Protected Area. It has a total surface of 35,700 ha, which includes rural properties (18,425 ha), the lagoon water surface (7512 ha) and a portion of marine territory (9762 ha). Recently, the whole area was designated as a Protected Landscape by SNAP, the result of over 20 years of collaborative work involving different institutions, agencies and the local community (Vitancurt 2016). The development of the management plan began in 2011 and was finished two years later (Rodríguez-Gallego *et al.* 2012), although it is still awaiting approval by SNAP.

Initially there was a limited understanding of the Protected Area's cultural assets (Thompson 2006), which resulted in a project to identify, catalogue, and enhance the archaeological heritage of the area (Gianotti and Villarmarzo 2011; Rodríguez-Gallego *et al.* 2012). At the same time, new initiatives were started to create a general overview of the cultural heritage of the lagoon (Tiscart *et al.* 2014; Lagos 2016; Vitancurt 2016). Palaeoenvironmental and geomorphological studies contributed key information for understanding the relationship between human occupation and environmental changes in the course of the lagoon's evolution over the last 10,000 years (Inda 2009).

In 2012, interdisciplinary workshops began with the intention of reaching an agreement about the main aspects of a management plan (Rodríguez-Gallego *et al.* 2012). This resulted in a proposal to define Laguna de Rocha as a *cultural landscape* with a set of *focal targets*. The Laguna de Rocha Cultural Landscape is an area shaped by anthropogenic coastal practices – the population see themselves as part of the environment in which they live, and certain historical forms of territorial occupation continue today, reflecting strong links with marine-lacustrine biodiversity (see Gianotti *et al.* 2015a).

Six focal targets were identified for the conservation of biodiversity – five ecological and one cultural. Five main components were also identified: 1) visual, 2) aural, 3) historical-archaeological, 4) living heritage, and 5) physical. Each focal target and its components were defined by key attributes that could be monitored (Gianotti *et al.* 2015a; 2016). These data allowed a revision of the governance model, and six operational programmes (tourism, education, conservation, agricultural management, cultural heritage management, and monitoring) were presented to create the management plan (Rodríguez-Gallego *et al.* 2012).

The historical-archaeological component is formed of eight archaeological zones, seven sites and three private archaeological collections (see Fig. 16.4 & Table 16.3). The condition and conservation pressures on the sites were documented. In general, the degradation of archaeological heritage in the area is moderate. The main threats are the loss of vegetation cover from farming activities (crops, afforestation, cattle raising) and the action of natural agents on soils (weathering, insolation, aeolian dynamics *etc.*). To a lesser extent, looting and abandonment are also factors (Gianotti and Villarmarzo 2011; Rodríguez-Gallego *et al.* 2012; Gianotti *et al.* 2015a).

Archaeological work within the protected area has been carried out with a participatory approach. Projects have:

- activated, visualised and discussed the multi-vocal heritage narratives belonging to the community, institutions and technicians within the area;
- bridged the gap between traditional conceptions of 'heritage' at different institutional levels (university, local government, technicians, area administration), and what local actors consider 'their heritage'; and
- made visible the discussions of the ongoing process of heritage protection at Laguna de Rocha Protected Landscape, showing both conflicts, interests and asymmetries, but also confluences and agreements (Blasco *et al.* 2014; Gianotti *et al.* 2015a; 2016).

Some of the conservation measures implemented were based on the application of an inclusive approach, with the aim of raising awareness about the role of cultural heritage assets in

Table 16.3. General characterisation of archaeological zones and sites of the protected area Laguna de Rocha and its main pressures and threats for conservation

Heritage entity & # on map	*Name*	*Site typology*	*Chronology*	*Pressures due to anthropic agents*	*Pressures due to natural agents*	*Present damage assessment*
Zone 18	Loma Santa Carmen	Stratified with surface material	Pre-Hispanic	Farming activities (crops and cattle raising), pillage	Loss of vegetation cover, run-off	Moderate
Zone 19	Virazón-Barra Vieja	Stratified with surface material	Pre-Hispanic	Farming activities (crops and cattle raising), pillage	Loss of vegetation cover, run-off, weathering (insolation, aeolian dynamics)	Moderate
Zone 20	Zanjón de la Virazón	Stratified with surface material	Pre-Hispanic	Farming activities (crops and cattle raising), pillage	Loss of vegetation cover, run-off, weathering (insolation, aeolian dynamics)	Moderate
Zone 21	Lomada Zanja Honda	Stratified	Pre-Hispanic	Farming activities (crops and cattle raising), pillage	Loss of vegetation cover, run-off, weathering (insolation, aeolian dynamics)	Moderate
Site 22	Arroyo Zanja Honda	Stratified	Pre-Hispanic	Farming activities (crops and cattle raising), pillage	Run-off	Moderate
Site 23	Estancia Zunini	Architectural complex	Historic	Farming activities, buildings	Loss of vegetation cover, weathering	Moderate
Zone 24	Cañada Bellaca	Stratified with surface material	Pre-Hispanic	Farming activities (cattle raising), pillage	Loss of vegetation cover, erosion, weathering (insolation, aeolian dynamics)	Moderate
Zone 25	Arenal de La Garita	Stratified with surface material	Pre-Hispanic	Farming activities (crops and cattle raising), pillage	Loss of vegetation cover, run-off, weathering (insolation, aeolian dynamics)	Moderate
Site 26	La Garita	Architectural complex, place of memory	Historic-ethnographic	Absence of maintenance	Weathering (insolation, aeolian dynamics, rainfall)	Low
Site 27	Cerrito Tropicalia	Mound	Pre-Hispanic	Farming activities (crops and cattle raising)	Loss of vegetation cover, erosion	Moderate
Site 28	Tapera Laguna de las Nutrias	Architectural complex	Historic-ethnographic	Abandonment	Weathering (insolation, aeolian dynamics, rainfall)	Severe
Zone 29	Laguna de las Nutrias	Surface	Pre-Hispanic	Farming activities (crops and cattle raising), afforestation	Loss of vegetation cover, run-off, weathering (insolation, aeolian dynamics)	Moderate
Site 30	Carbonera Los Noques	Productive place	Historic-ethnographic	Farming activities (crops and cattle raising)	Loss of vegetation cover, erosion.	Low
Zone 31	Cañada de los Noques	Stratified with surface material	Pre-Hispanic	Farming activities (crops and cattle raising)	Loss of vegetation cover, erosion, weathering (insolation, aeolian dynamics)	Moderate
Site 32	Carbonera Sauce de Rocha	Productive place	Historic-ethnographic	Farming activities (crops and cattle raising)	Loss of vegetation cover, erosion	Low

the creation, promotion and conservation of biodiversity. The activities were carried out in collaboration with local people and examples included participatory archaeological surveys (Gianotti and Villarmarzo 2011); interviews to document oral history and local memory (Gianotti *et al.* 2016); social cartography workshops to record representations of the lagoon and its values (Blasco *et al.* 2014); activities in rural schools (Vienni *et al.* 2012); exhibitions and dissemination publications (Gianotti *et al.* 2015b); the presentation of the Laguna de Rocha Protected Landscape at the international photography exhibition *Diversa* organised by Incipit (Institute of Heritage Sciences, Spanish National Research Council; http://www.agenciasinc.es/Agenda/Exposicion-Diversa.-Arqueoloxia-dende-o-Incipit-alen-Europa); and scientific exchange through the incorporation of this protected area as a case study within the international study programme *Red TRAMA3* (Gianotti *et al.* 2016; Lagos 2016; Rodríguez-Gallego and Nin 2016; Vitancurt 2016; http://www.cyted.org/?q=es/detalle_proyectoandun=862).

Reflections and perspectives

The three case studies have shown how the management of cultural heritage in Uruguay's coastal Protected Areas have considered the relationship between climate change and human occupation of Uruguay's Atlantic coast together

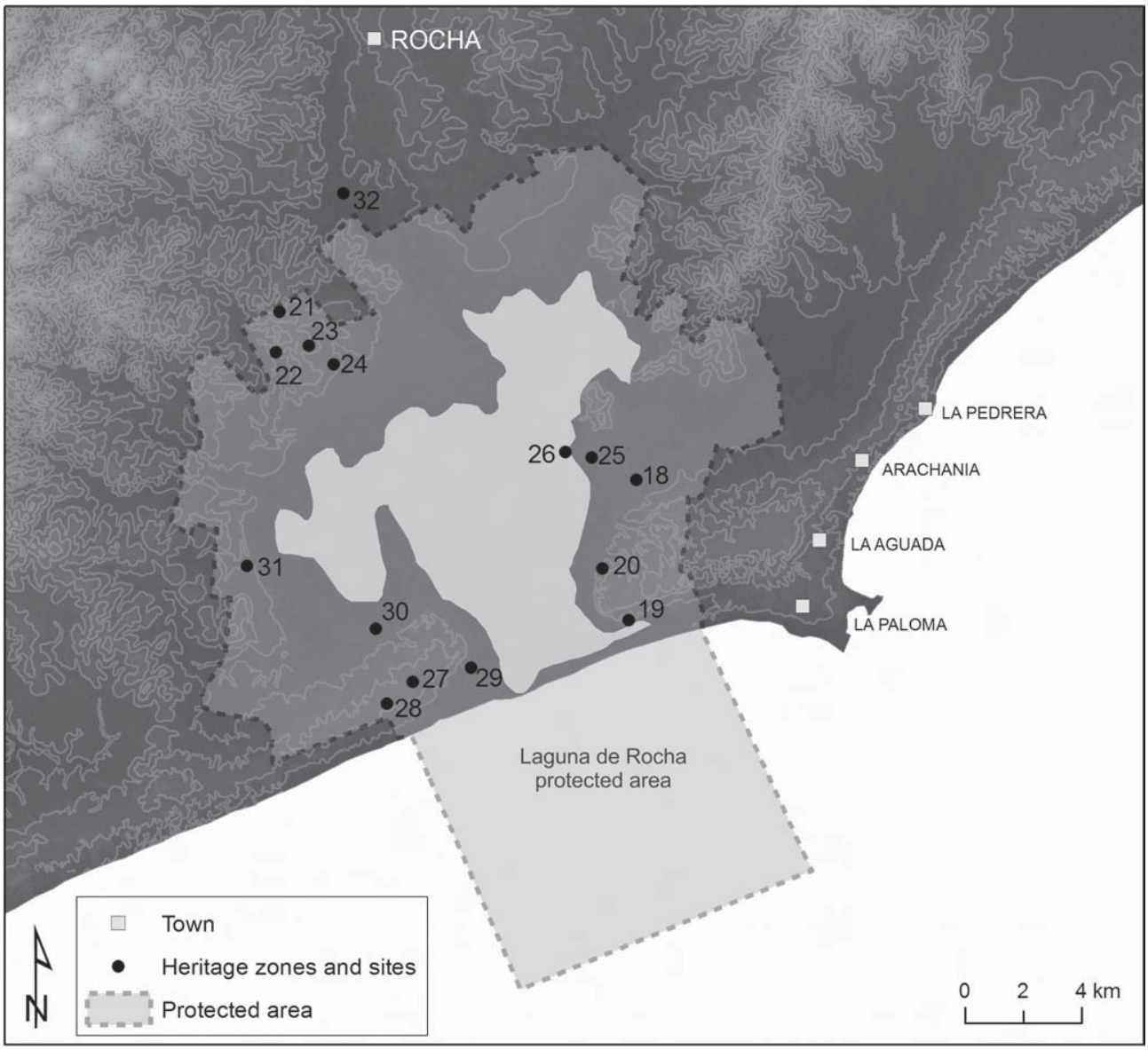

Figure 16.4. Delimitation of Laguna de Rocha Protected Area with zones and sites of cultural and heritage value (site characterisation in Table 16.3).

with the state and vulnerability of archaeological heritage in coastal Protected Areas. Consideration of these topics has been incorporated into national conservation and heritage policies within SNAP, and has directed thinking about future challenges, thereby strengthening heritage management practices.

Palaeoenvironmental and archaeological studies contribute evidence of successful prehistoric adaptations to environmental change, providing a long-term historical perspective. Modelling the formation of different coastal ecosystems indicates that some archaeological sites, especially the older ones, are now underwater (Inda *et al.* 2011). Those that are currently above mean sea level are located in different and varied landscapes, showing how human occupations adapted to these changes in terms of the spatial rearrangements of site allocation patterns (del Puerto *et al.* 2011; 2013).

We have also seen that much of the archaeological heritage in the three protected areas is extremely vulnerable, with different pressures affecting their integrity and conservation. Most pressures are exacerbated by an increase in human activity along the coastal strip (especially tourism, urbanisation, farming activities and afforestation). These can trigger erosive processes, enhanced by climatic factors

that further damage heritage. This can lead to the rapid destruction of some sites, while others are exposed and are, in turn, rapidly affected by erosion, leading to the movement or loss of archaeological materials. Some structures are damaged or collapsed, and there has been an increase in looting (Gianotti and Villarmarzo 2011; Laporta and Sarroca 2014; Gianotti *et al.* 2015a; Gascue *et al.* 2016).

It has become necessary to consider heritage vulnerability (and its causes) explicitly in order to implement conservation plans at different levels (analysis, scenario prediction, decision making). We believe that integrating threats into heritage and environmental public policies and planning processes for biodiversity conservation will help minimise damage in the future. It is also essential to initiate monitoring programmes that identify and assess the real impacts of climate change on heritage to help protect and safeguard assets. In this regard, some progress has been made. The three case studies show how, for the first time, heritage management is being incorporated into conservation planning at Uruguay's coastal Protected Areas.

There is still more to be done, including refining methodologies and work protocols to better integrate cultural asset management within Protected Areas. In addition, we must design cross-disciplinary strategies that consider the perceptions and representations of the different actors involved; and utilise the framework of public archaeology (Matsuda 2004; Silverman 2011). Implementing participatory and multi-vocal approaches should be goals for the future.

From the planning and management perspective, integrative approaches – including the landscape perspective – will need to be developed and implemented as main objectives of future management strategies. This will help overcome prevailing sector-based ideas that rely on the conservation of natural and cultural heritages in disparate ways. The challenge is to protect the human processes that shaped landscapes and cultural heritage by introducing best management practices to ensure the sustainable and long-term preservation of these resources. From this perspective, National Parks and Protected Areas and Landscapes are more than just units for management policies, they are spaces where we can think creatively and critically about heritage, territory and sustainability.

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