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Military training areas as semi commons: the territorial valorization of Quirra (Sardinia) from easements to ecosystem services

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Abstract: The military areas in Sardinia are around 234 km², which constitutes 59.97% of the national surface affected by military easements. This situation is due to its geographic centrality in the Mediterranean. This contribution evaluates the performance of the Local Coastline Plan (LCP) and the Site Management Plan of Community Interest (SCI) in conditions of military constraint. The case study is the Municipality of Villaputzu where an important coastal military easement and the use of the coast for recreational tourism purposes coexist together through specific planning, a consequence of institutional agreements between the Municipal Administration of Villaputzu and the Ministry of Defense. The evaluation of the congruence of the specific objectives of the LCP and the SCI shows how their combined action favors the environmental enhancement of Sardinia, contributing to the formation of ecosystem services, even in particular conditions arising from military easements. These are sites that pass from the status of 'anti-commons' to 'semi-commons'. In fact, the military release process in Sardinia, together with the promiscuous military and civil use, activates unique governance policies of their kind that find a significant field of application in Sardinia to guarantee a sustainable renewal of economic development of the 'semi-commons' awaiting to become 'commons'¹.

Keywords: landscape connectivity; Natura 2000 Network; strategic environmental assessment; Protected areas and spatial planning, semi commons

1. Introduction

The notion of state property² indicates a complex of publicly owned assets that are very different from each other. Public use is exercised on state property [1], i.e. the community can enjoy its benefits

¹This article is part of the work of drafting the Municipal Urban Plan of Villaputzu (MUPV) and in the related Coastal Use Plan (LCP) and Strategic Environmental Assessment (SEA): scientific coordinator Ginevra Balletto. Participated in: MUPV, LCP and SEA Alessandra Milesi and LCP Nicolò Fenu .

²In Italy the state property 'Demanio' (Civil Code art. 822 et seq.) consists of the necessary state property, which includes the maritime state property (sea shore, beach, ports, roads, lagoons, river mouths that flow into the sea, water basins saline or brackish, canals usable for maritime public use and appliances belonging to the maritime domain), the water state property (rivers, lakes and streams, excluding the sources that flow into the sea, public waters defined by the legislation on the subject, all groundwater and surface waters also collected in reservoirs and cisterns, excluding rainfalls not conveyed, in a watercourse or not collected in reservoirs or cisterns) and

directly (as in the case of beaches or museums [2]) or indirectly (in the case of ports or airports). The main characteristic of the goods that are part of the public domain is their inalienability, that is they cannot be sold (except by virtue of a specific new law) and cannot be subject to rights in favor of third parties, except in the ways and in the limits established by the laws concerning them (Nav. Code 30 et seq.). They cannot then be prescribed, that is they always remain state-owned even if abandoned for a long time (they cannot be used). Among the assets owned by the public those relating to military uses also take on particular importance in relation to the fact that military defense is configured, in strictly economic terms, as a pure public good (non-rival and non-excludable), and therefore as an asset the benefits of which fall indistinctly on the totality of the population, a fact that partly explains the huge amount of financial resources that the various states allocate [3]. After a descending phase in the nineties, starting from 2000 military spending has in fact been continuously growing (Figure 1).

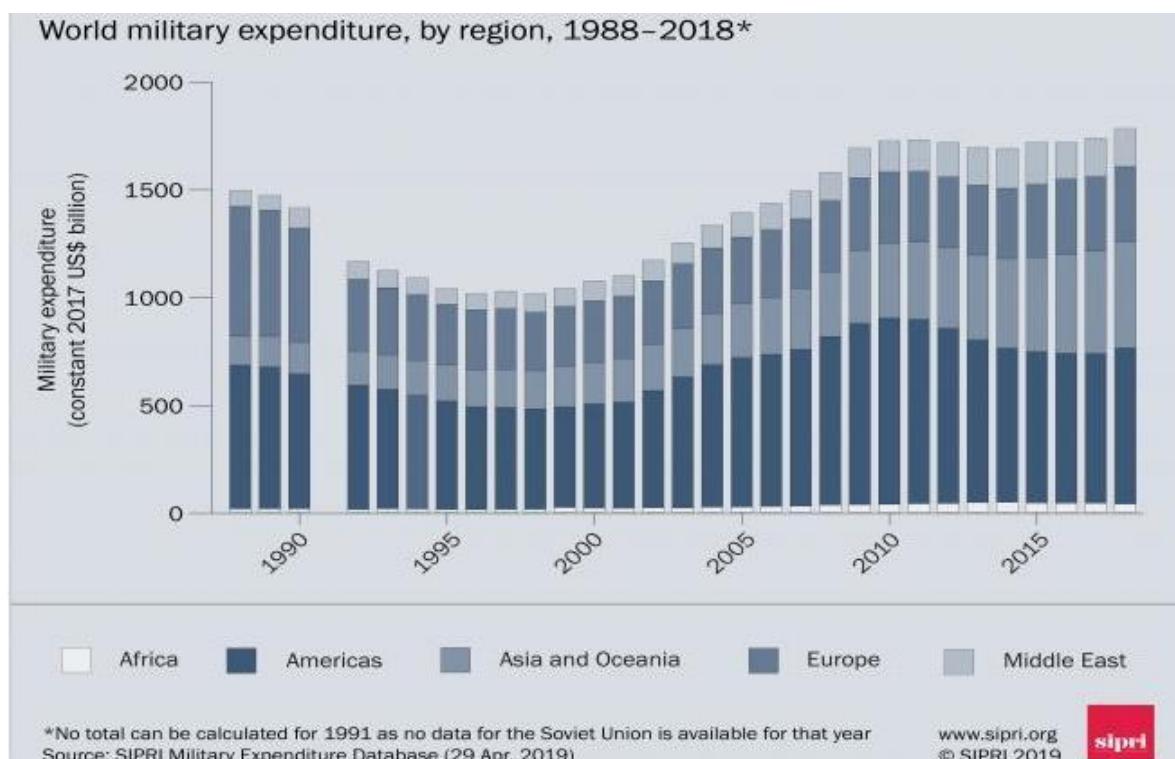


Figure 1. World military expenditure, by region, 1988–2018³

military property (permanent works destined for national defense: fortresses, missile installations, fortified and entrenched facilities, military ports and airports, railways, military cable cars, air raid shelters); and from the so-called accidental state property -which is divided into state-owned roads (roads, motorways and railways), railways, aeronautics, aerodromes-, aqueducts owned by territorial public bodies and cultural property (the buildings recognized by artistic, historical, archaeological or ethno-anthropological interest in accordance with the relevant laws, collections of museums, art galleries, archives, libraries); and finally the other assets that are by law subject to the regime proper to the public domain. Such assets can also belong to the regions, metropolitan cities, provinces or municipalities, thus constituting the regional, metropolitan, provincial or municipal property, but are equally subject to the state property regime.

³Source: Sipri, 2019, Available on line: <https://www.sipri.org/research/armament-and-disarmament/arms-transfers-and-military-spending/military-expenditure>

Looking deeper (Figure 2), we see how in 2018 the United States of America is the main financiers of the sector with 649 billion dollars (equal to 36% of world spending and 3.2% of its GDP), followed by China with 250 billion dollars (14% of world spending and 1.9% of its GDP).

TOP 15 MILITARY SPENDERS IN 2018

Countries with highest military expenditure

In current 2018 US\$ billion



Figure 2. World military expenditure, by region, 1988–2018⁴

In this ranking Italy occupies the eleventh place with 27.8 billion dollars (equal to 1.5% of world spending and 1.3% of its GDP). The state properties, if on the one hand can be traced back to the so-called 'enclaves', that is closed areas defined by administrative or cultural characteristics different from the surrounding territory (think of the emblematic case of the British sovereign bases of Akrotiri and Dhekelia on the island of Cyprus)⁵, on the other hand they have characteristics attributable to the so-called 'anticommons', the concept of which was first introduced by Michelman in 1982 (in contrast to that well known of common[4-5]). This concept was then taken up and widely developed by Heller [6] and Eisenberg⁶ through the theory concerning the under-use of a resource caused by the right of ownership (and therefore of exclusion) legitimately attributed to a multitude of subjects. In fact, since it is sufficient for only one of the subjects to exercise their right, it is clear that it is very probable, due to the high transaction times and costs necessary to reach a satisfactory agreement for all, that the fruition of that well, incurring a blocking situation in which 'no one has the actual privilege of use'[6]. This is what happens in a by now recurrent form, on the occasion of the dismissal of the state property, both in the urban areas and in the extra-urban ones [8]. This brief summary also includes Military Proving Ground (MPG), which have the following European location as shown in Figure 2, with a total of 284 MPG, mainly concentrated in the United Kingdom (55), the Netherlands (27), France and Germany (26 in each country), Switzerland (22), Spain (21), Italy and Poland (13 in each country).

⁴Source: Sipri, 2019. Available on line: <https://www.sipri.org/research/armament-and-disarmament/arms-transfers-and-military-spending/military-expenditure>.

⁵The case is particularly interesting because, despite the desire to occupy areas devoid of population, some Cypriot dwellings found themselves 'enclave' in the British base of Dhekelia. Even today, the villages of Xylotymbou and Ormídia, dependent on the Republic of Cyprus, are like islands in the center of the British territory.

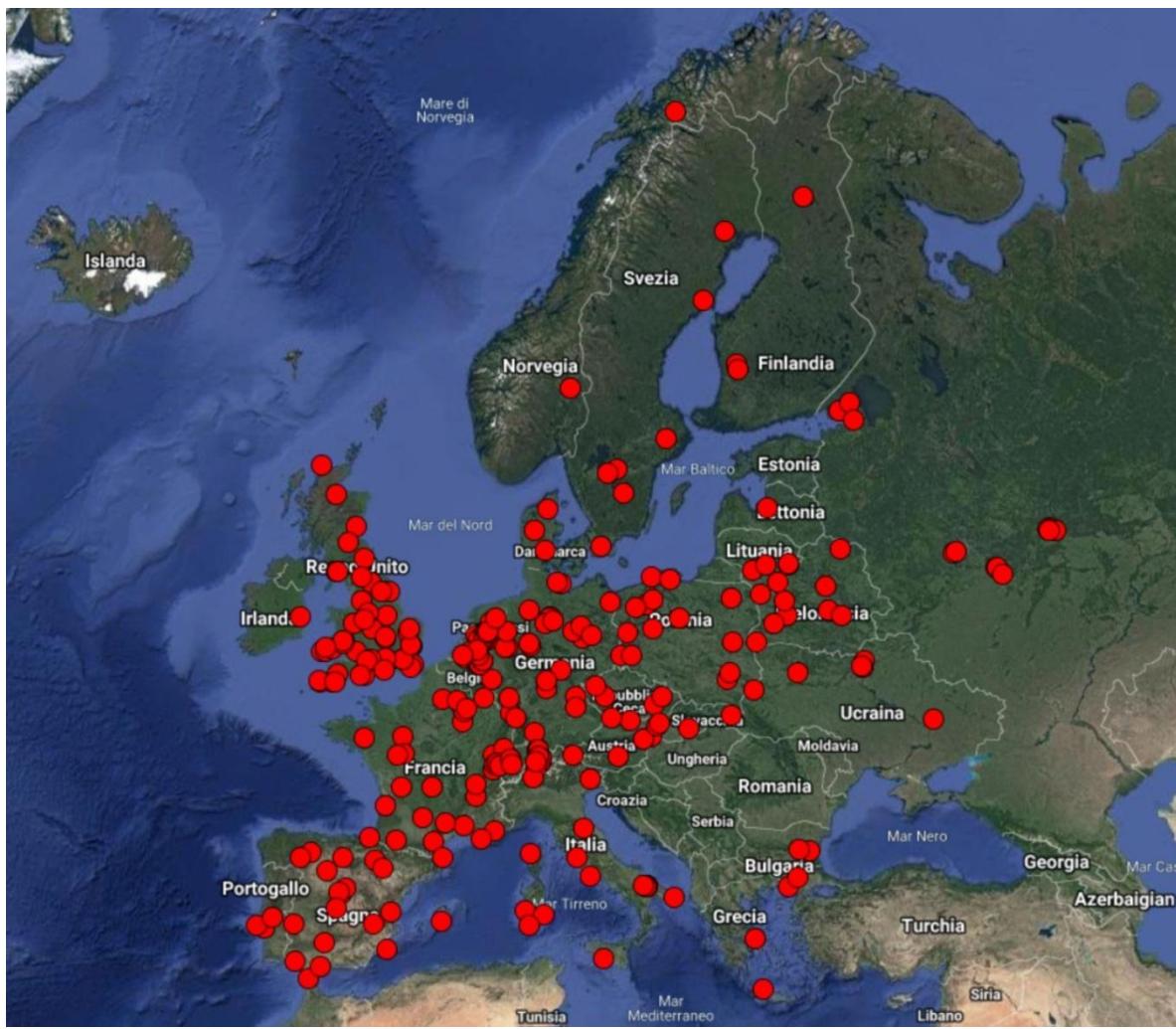


Figure 3. Maps of European military training areas⁷

The multitude of activities that are carried out there⁸ have a significant negative impact [9-10] not only for the territory directly concerned, but also for the local communities, also given by a series of constraints (interdiction of flight, navigation, bathing, etc.) that they express themselves through easements⁹, which vary according to the security that is required.

⁷Source:

<https://www.google.com/maps/d/viewer?mid=1OemqgnRVJt1hU3APrcjpm1rxXk8&ll=53.03753891849571%2C10.553295128936952&z=5> and <https://www.libreriamilitare.com/links.php#sitet>

⁸Activities range from the training of national and foreign units to testing missile prototypes and targets, from quality tests in cooperation with industries and organizations in the aerospace electronics sector and activities related to scientific research, testing and experimenting of naval ammunition and medium- and long-range terrestrial, including the testing of missile systems, shooting practices, even interforce and for out-of-area operations.

⁹According to the Italian Civil Code (art. 1027) an easement (or predial or land easement in the case of land), in the legal lexicon, indicates a minor real right of enjoyment over something else, consisting in the weight or limitation imposed on a fund (called servant) for the usefulness of another fund (called dominant) belonging to another person.

In particular, military easement¹⁰ means the set of limitations or prohibitions that can be imposed both on private assets and on public assets located near military installations. The state of servitude can for example impose the prohibition of building buildings higher than a given height, the evacuation of land and housing in conjunction with operations of exercises.

If on the one hand it is true, as evidenced by several studies [11-16], that military goods and servitudes perform a substantial function of indirect landscape protection that, in many cases, has prevented or severely limited speculative appetites on territories of great naturalistic value; on the other hand, the intensity and concentration of fire drills, as well as the testing of armaments with the use of fuels and propellants, have a significant impact on environment and biodiversity [17], whose possible redevelopment may require expensive and difficult land reclamation works. The alleged correlation between military activities and the anomalous appearance of damage to health is still not completely defined. With regard to the economic aspects related to the presence of military bases and MPG, it should be noted that the territories concerned see potential forms of economic development linked to the exploitation of land for agricultural uses and of many sea areas suitable for fishing damaged. to this must be added the failure to take off the tourist industry, both due to the unavailability of the sites, and to the interference that military activities have with a normal process of tourist settlement. It is also true, however, that this 'cumbersome' presence is in any case connected to an induced, also industrial, which relies mostly on local labor, as well as the local civilian staff serving in the MPG is often local [18].

The problems arising from the presence of military easements are therefore manifold and this feeds the debate on the search for possible solutions. The current orientation of several European countries is to aim at the rebalancing of military easements and the closing down of buildings [19]. In Italy, these procedures have often turned out to be cumbersome and slow, also due to the frequent regulatory interventions that have repeatedly changed the discipline. Also in terms of environmental protection, similar considerations apply, in the sense that overcoming the exclusively military destination of certain areas may require guarantees of naturalistic protection [20], especially if such sites are included in the trade-in and exchange agreements program with local authorities. In this framework the concept of semi-common [21] is well suited to be used for a new interpretation of those areas that present a mixture of civil and military uses in time and space. This concept, in fact, interposed between that of commons and anticommons, establishes an interaction between public and private property [1], and 'allows the right holders to benefit from the joint use of the resource' [22]. The semi-commons, in fact, incorporate all private collective rights, but at the same time attribute a series of public rights to other subjects, such as those arising from military servitude. In the presence of this regime, the following two effects arise, deriving from the combined use [22]:

1. Economies of scale - are achieved because public and private interests are combined;
2. Environmental protection - the interaction of private and common use reduces the phenomenon of over-use.

In other words, there is a balance between the right of use and exclusion (Vanneste, Van Hiel, Parisi and Depoorter, 2006; Brede and Boschetti, 2008), typical of semi-commons with the following characteristics:

1. a multitude of subjects (public and private) are involved;
2. there is the co-presence of public and private rights;
3. there is the simultaneous presence of divergent public and private interests.

To this end, the second section of the contribution, after a brief classification of military easements in Sardinia and the main memoranda of understanding signed over the years between the Ministry of Defense and the Autonomous Region of Sardinia (paragraph 2.1), is as follows:

- classification of the case study 'MPG' of Villaputzu (paragraph 2.3)
- evaluation of coastal planning and management tools (paragraph 2.4, 2.4.1 and 2.4.2)

¹⁰In Italy, military servitude is an institution governed by law n. 898, promulgated December 24, 1976 and subsequent amendments.<https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:1976;898>, access 15 September 2019.

-assessment of the consistency of the objectives and actions of the coastal planning and management tools (paragraph 2.4.3)

In the third section the results are shown and discussed in the fourth section the conclusion and future activities.

2. Materials and Methods. The case study of Villaputzu 'Militar Enclave'

The present contribution analyzes the case study of the coast of the Municipality of Villaputzu in Sardinia, with particular reference to the beach of Murtas, which constitutes the main case of Sardinia in the management and use of the areas subjected to military easements.

In particular, the area under study is set up as an 'enclave' within the Military Proving Ground Salto di Quirra (MPGSQ), which has effectively prevented its use by transforming the area into an anti-common. Furthermore, the beach of Murtas is included within a Site of Community Interest (SCI) identified with code ITB040017 'Ponds of Murtas and S'Acqua Durci'. In other words, it is a site where divergent strategic objectives (environmental and military) converge, but which for a long time has been totally prevented from entering. The possibility of making the coastline accessible, was reached with the recent State-Region agreements (2014-2017) which allowed the use of the coast for tourism purposes in a limited period of the year (June 1 - September 30), thus to allow the municipal administration of Villaputzu to equip itself with the appropriate Littoral Use Plan (LCP). The authors, after framing the main State-Region and Municipality Agreements and Protocols (paragraph 2.1), the military easements in Sardinia (paragraph 2.2) and the analysis of the Villaputzu case study (paragraph 2.2), proposed the following methodology organized according to the following phases:

- description of the case study (paragraph 2.3)
- evaluation of the LCP and SCI (paragraphs 2.4.1 and 2.4.2)
- evaluation of the congruence of the specific objectives (qualitative and quantitative) and of the (qualitative) actions of the LCP and SCI (paragraph 2.4.3)

2.1 Agreements and memorandum for the reorganization of military areas in Sardinia

In Italy, military easements date back to the 1950s and derive from international agreements signed by Italy as a defeated country, at the end of World War II, in particular by the bilateral 'Mutua Sicurezza' agreement (1952) under which the United States has imposed military bases in Italian territory. These agreements provide for the limitation of the right of ownership in the areas adjacent to installations of military interest. In 1976 the first law governing all matters of Military Servitude is issued (L. December 24, 1976, No. 898 'New Regulation of military easements') which provides for the establishment, for each Region, of a Joint Commission with the task of assessing the compatibility of military programs with territorial development plans. With the National Law 104/1990 a list of the regions most affected by military easements was introduced to then provide for the provision of compensation with the protocol of understanding between the Ministry of Defense and ARS of 09.08.1999. Below is the list of the main agreements and memorandum of Ministry of Defense and ARS (Table 1).

Table 1. Main agreements and memorandum for the reorganization of military areas in Sardinia

Date	document type	object
09.08.1999	Memorandum of Understanding between the Ministry of Defense and the Autonomous Region of Sardinia	Regulation of compensation to economic operators for the removal of water bodies affected by military exercises
08.09.2005	Memorandum of Understanding between the Ministry of Defense and the Autonomous Region of Sardinia	Integration of the 1999 Memorandum of Understanding with the calculation of additional compensation due to the economic operators of the Teulada and Sant' Anna Arresi marinas
10.11.2006	Agreement between the Ministry of Defense and the Autonomous Region of Sardinia	Reorganization of the military presence on the island
28.03.2007	Memorandum of Understanding between the Ministry of Defense and the Autonomous Region of Sardinia	Disposal by the ministry of the buildings listed in the attached tables and the contextual commitment of the Region to the relocation of the functions performed in the buildings for which the disposal will take place
07.03.2008	Program Agreement between the Ministry of Defense, the Autonomous Region of Sardinia, the State Property Agency	Definition of procedures, methods and timing of disposal of the properties listed in the annexes
21.12.2011	Resolution n. 45/5 Autonomous Region of Sardinia	Integration to the 2008 Program Agreement
18.12.2017	Memorandum of Understanding between the Ministry of Defense and the Autonomous Region of Sardinia	Coordination of military activities present in the territory of Sardinia with which in particular the suspension of fire activities at the Sardinian Military Proving Ground (MPG) is formalized from June 1 to September 30 of each year

Finally, with the memorandum between the Ministry of Defense and the ARS dated 18.12.2017, the suspension of the exercises within the MPG from 1 June to 30 September was formalized in order to guarantee the exploitation and use of the coast, also consistent with the environmental defense policies deriving from the 'Natura 2000' Network and the Regional Landscape Plan (PPR).

2.2. Military Proving Ground (MPG) in Sardinia

In Sardinia the military bases were installed in 1956 with the construction of the three coastal military proving ground: Capo Frasca, Teulada and Salto di Quirra (Military Proving Ground Salto di Quirra, MPG SQ, case study, paragraph 2.3), with a total area of approximately 234 km².

These MPG together with the remaining military easements [23] account for about 1.5% of the total surface area of Sardinia, which in addition to blocking the air spaces during the exercises, determine that in some periods of the year almost the whole island is concerned (Fig. 4).

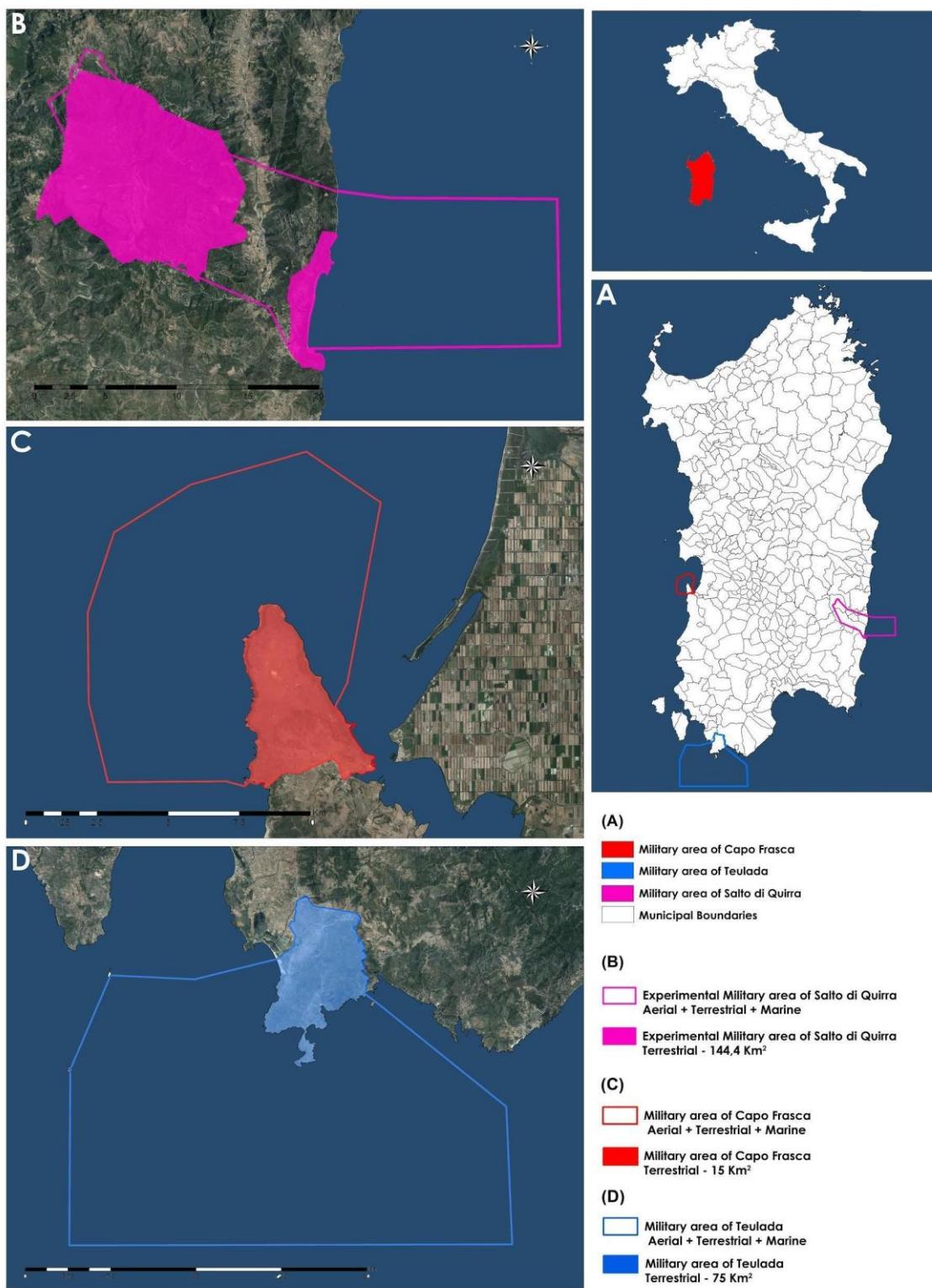


Figure 4. Maps of European military training areas

In particular, the MPG are intended for military services, such as: training, experimentation with new weapon systems, simulated wars, deposits, etc.

These services have always confirmed the strategic role of Sardinia in the context of the North-Atlantic alliance of the political-military system related to control in the Mediterranean. These

military services required a complex system of easement, with variable limitations, both in the inland and coastal areas and in the airspace. In particular, the limitations consist in the prohibition of the internal areas, in the permanent and / or temporary limitations in the coastal areas and in the prohibition of flight in the air spaces. In this framework the system of military services, which is expressed through the relative state property, land, sea and air servitude, determines the complex and articulated system of military constraints that exist in Sardinia. Only in the last decade the military state property is the object of a specific state federalism, particularly in the coastal area, partly reducing military constraints. In fact, with the state-owned federalism process started with Legislative Decree 85/2010, the transfer of part of the State's assets to the Municipal Administrations was envisaged. However, this process has not yet had the desired effects. In fact, in this situation, on the one hand, the ARS pushes for the non-onerous transfer of state property based on statutory regulations (while the decree provides for costs); on the other hand, the municipal administrations and local authorities are pushing for ownership to activate the development [24].

2.3 The case of Military Proving Ground of Villaputzu (MPGSQ)

In this regional framework fits the case study of Murtas beach, in the Quirra coast - Municipality of Villaputzu - an 'enclave' within the MPGSQ [25]. It represents the first case in Sardinia of planning for tourist uses in the summer months and uses military in the remaining months of the year, the result of the complex process of state federalism (paragraph 2.1 and paragraph 2.2). The MPGSQ is located in the south-eastern part of Sardinia and develops mainly on two distinct areas: an area characterized by a plateau called 'Salto di Quirra' [25]. The MPGSQ involves the municipalities of Villaputzu, Perdasdefogu, Tertenia, Ballao, Osini, Ulassai, Jerzu and Arzana (Figure 5).

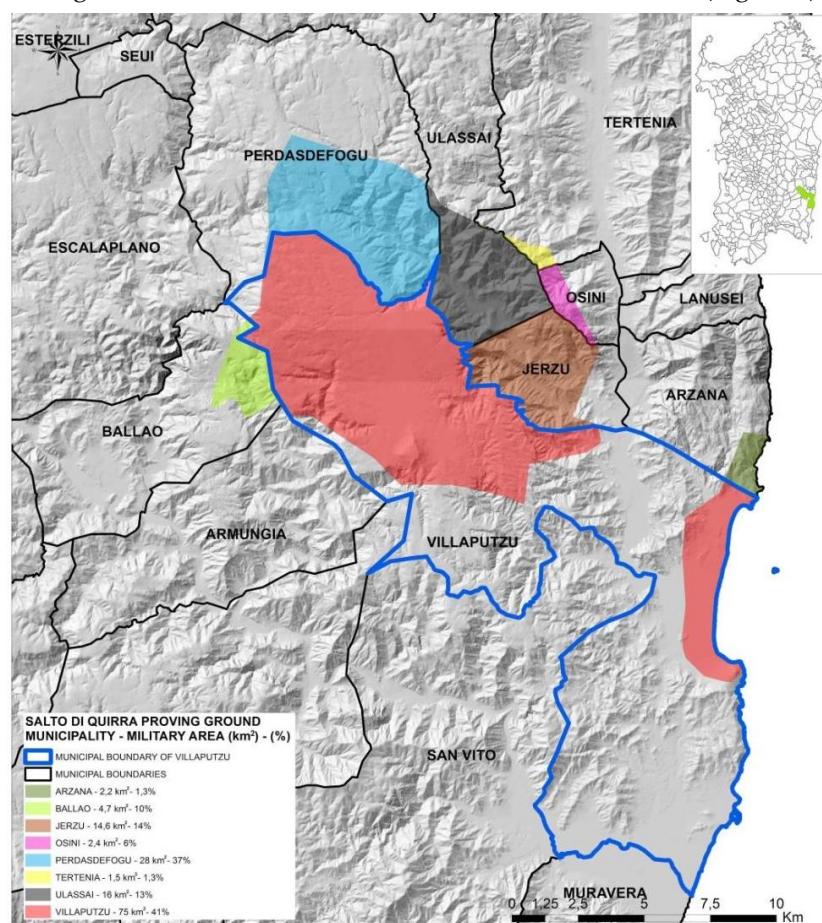
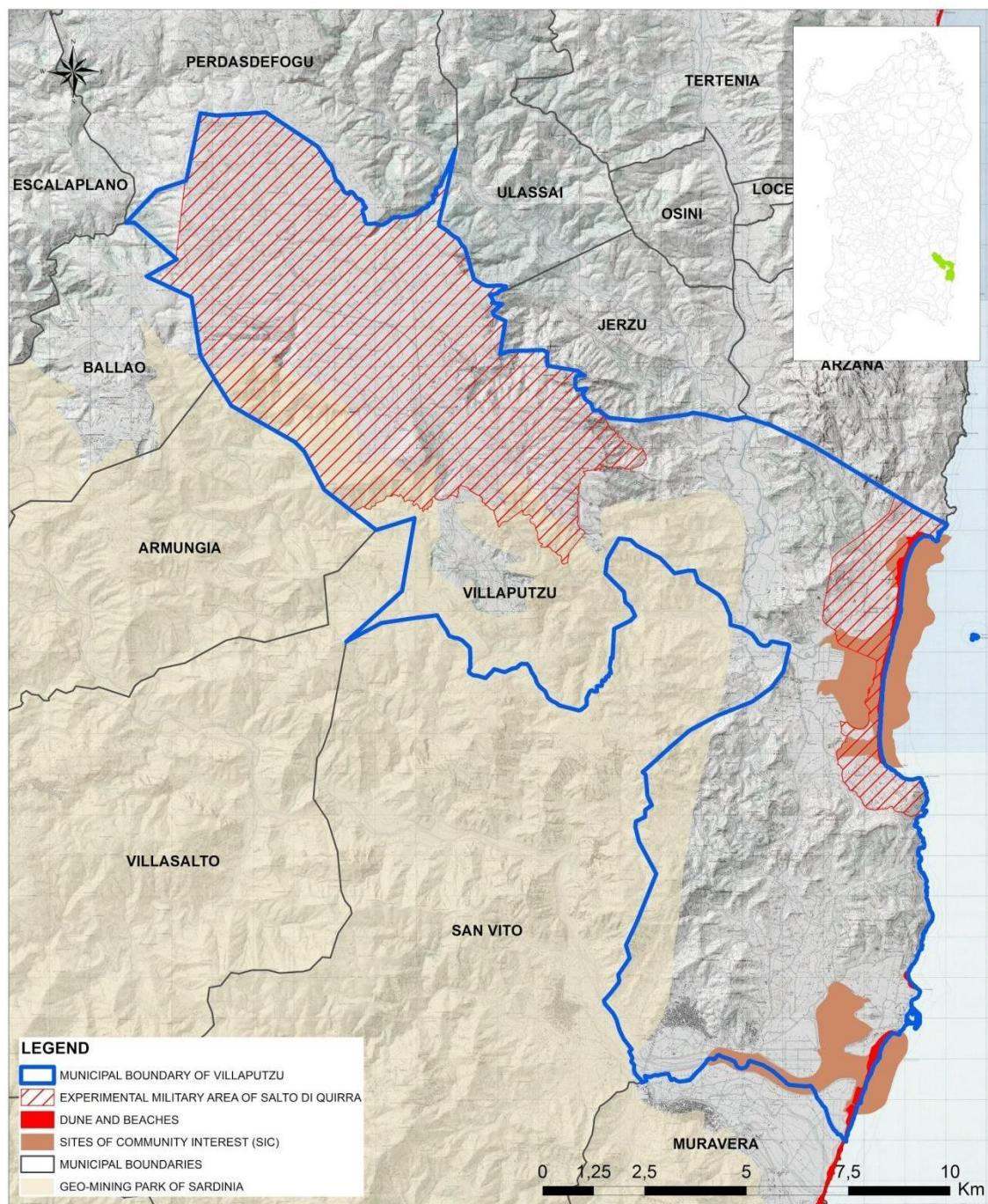


Figure 5. Municipalities affected by MPGSQ. Percentage compared to the total municipal area

The Municipality of Villaputzu covers about 181.25 Km² and is the most affected by the MPGSQ with about 41% of the land area occupied by military easements. Furthermore, the MPGSQ at sea

falls within a site of Community interest (SCI) classified with code ITB040017 'Ponds of Murtas and S'Acqua Durci' [26] (Figure 6).

Figure 5. MPGSQ and SCI of Villaputzu



This situation deriving from military constraints has stimulated an impressive action from the bottom coming from the local community that has offered a sensitization of political opinion so that through the agreement of the Ministry of Defense and the Municipality of Villaputzu of 06.27.2013 it is allowed- from June to September - tourist use on the beach of Murtas.

In 2017 the beach of Murtas was then included in the Regional List of Bathing Beaches, thus allowing the Municipality of Villaputzu to include this beach within its Local Coastline Plan (LCP).

2.4. Planning and management tools for coastal uses.

The planning and management of the coastal environment requires a careful assessment of both coastal evolutionary trends, such as marine and hydrodynamic weather phenomena and the phenomena of increasing anthropic pressure connected to tourist use. This in order to integrate the planning and management of the coastal environment between risk mitigation and conscious use [27-28]. In this sense the authors have identified as main instruments for the planning and coastal management of Villaputzu: the Coastal Use Plan (LCP) and the SCI Management Plan (SCIMP) [29]. In particular, the need to equip coastal municipalities with the LCP stems from the need to regulate the use of maritime state-owned areas, such as beaches, for recreational tourism purposes in order to protect and enhance the coastal environmental heritage.

With the Law of 4 December 1993 n. 494 (article 6 paragraph 3) gives the faculty to allow the Regions to have plans for the use of state-owned maritime areas. Subsequently with the Legislative Decree 112/98 the delegation from the State to the Regions was transferred for the functions related to 'the release of property concessions of the state of the inland navigation, of the maritime land and of areas of the territorial sea for purposes other than supplying of energy sources. This transfer of powers does not operate in ports and areas of national interest - SIN - identified by the decree of the President of the Council of Ministers of December 21, 1995'. Sardinia Region (Regional Law of 12 June 2006, n. 9, the 'Assignment of functions to Local Authorities') holds the task of adopting the general guidelines for the preparation of LCPs and of adopting the general guidelines for the preparation of LCPs. Municipalities are assigned different the functions on the subject of: processing and approval of LCPs; concessions, on the assets of the maritime domain or inland navigation, for tourist-recreational purposes, on uncovered areas or which involve easy removal facilities and other administrative functions concerning maritime land ownership and the territorial sea not reserved for the Region or the State..

The regulatory system within which the LCP is inserted is however wider and concerns the reorganization of maritime state property concessions: with the Regional Landscape Plan (DGR 36/7 of 2006) the Municipalities are obliged, within the process of adaptation of the Municipal Urban Plans (MUP) to the Regional Landscape Plan (RLP) [30], to draw up the LCP as an integral and substantial part of the municipal urban plan, then the LR 8/2015 recognizes the LCP as an implementation plan. The general guidelines for the preparation of the LCP are currently represented by the 'Guidelines' (Regional Council Resolution No. 10/5 dated 21 February 2017). In particular, the LCP regulates the use of the coasts and immediately contiguous territories for recreational tourism functions, dividing the coast in relation to the specific environmental characteristics, establishing the use, and the related support services.

The LCPs in Sardinia often act within the territories of the Natura 2000 Network, the main instrument of the European Union policy regarding the conservation of biodiversity (established pursuant to Directive 92/43 / CEE 'Habitat' and subsequent national transpositions) to guarantee the long-term maintenance of natural habitats and of threatened flora and fauna species, divided into Sites of community interest (SCI), Special Protection Areas (SPA) and Special areas of conservation (SAC), understood according to recent literature as ecosystem services [31-32]. The LCP planning proposals must therefore take into account the SCI on which they act, so that the respective specific objectives are congruent.

2.4.1 The Coastal Use Plan (LCP) -Murtas beach - Villaputzu

In this framework, the Villaputzu LCP was developed which, in addition to the state-owned maritime areas, also governs the contiguous areas, regulating road and pedestrian access to the areas in order to create an integration between the coast and the areas not immediately close to the coasts, thus directing tourist flows also towards less privileged areas (Figure. 6).

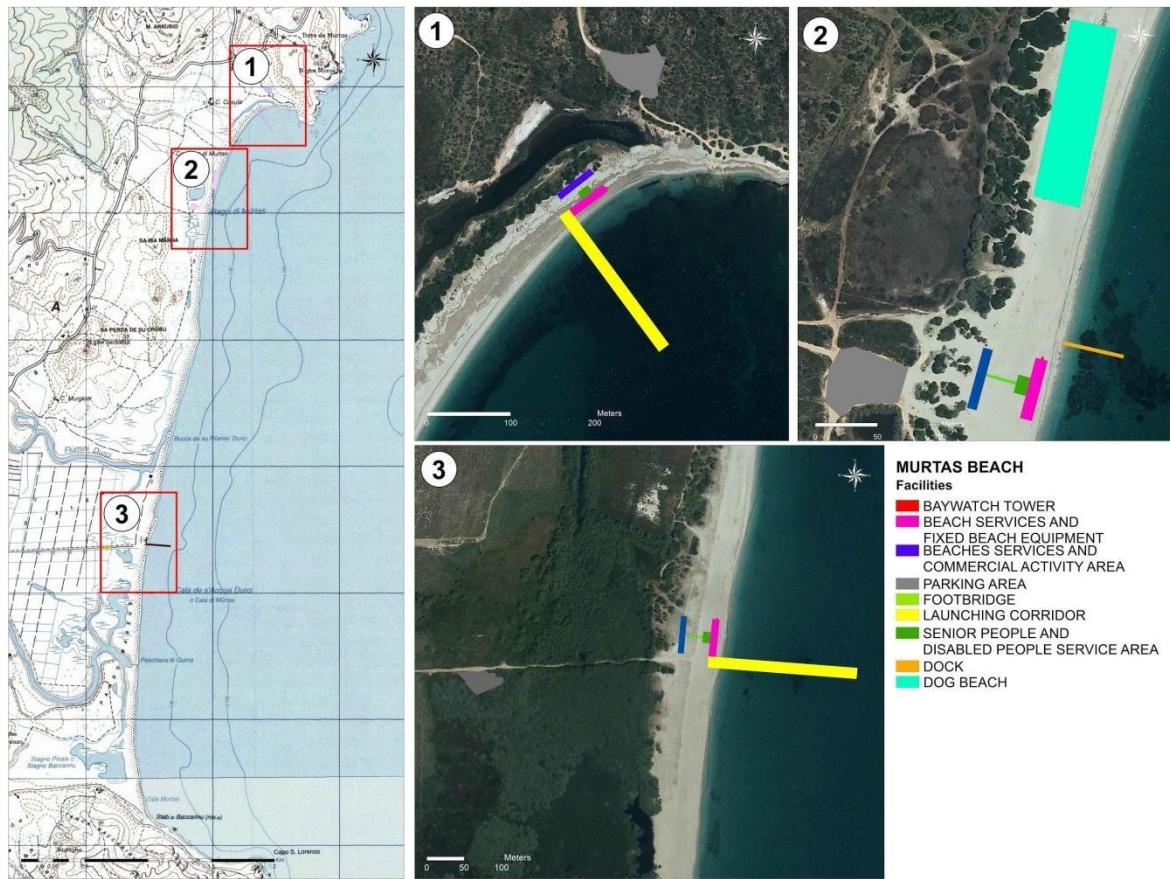


Figure 6. LCP - Concept Murtas beach - Municipality of Villaputzu (2019)

In particular, the LCP proposes the following strategic objectives:

- Guarantee the conservation and protection of local coastal ecosystems, with particular reference to habitats - Directive 21 May 1992, 92/43 / CEE and subsequent amendments;
- Harmonizing actions on the territory for sustainable development, in particular by promoting measures for the reduction of degradation and land consumption processes;
- Promote and encourage environmental redevelopment through re-naturalization projects;
- Guarantee the continuity between the sand dunes and the ecological plant corridor, as well as improving the accessibility of the state-owned maritime areas;
- Promoting innovation and diversification of the tourist offer;
- Regulate the various activities for the purposes of integration and complementarity between them.

The Villaputzu LCP also affects the enclave of the MPG for the 'Salto di Quirra' section (MPGSQ), constituting the first case in Sardinia of coastal planning that intends to reconcile the military activities of the winter period and the tourist ones recreating the summer period, in compliance with current legislation in terms of health and safety and in the context of environmental monitoring [33].

2.4.2 The Management Plan of the SCI Municipality of Villaputzu

The SCI called ITB040017 'Ponds of Murtas and S'AcquaDurci' located in the coastal sector of the mouth of the Rio Quirra, in central-eastern Sardinia, includes the portion of territory that from the promontory of Torre Murtas reaches Capo San Lorenzo, extending for a area of 7.4 km² (Figure 5).

Regione: Sardegna

Codice sito: ITB040017

Superficie (ha): 744

Denominazione: Stagni di Murtas e S'Acqua Durci

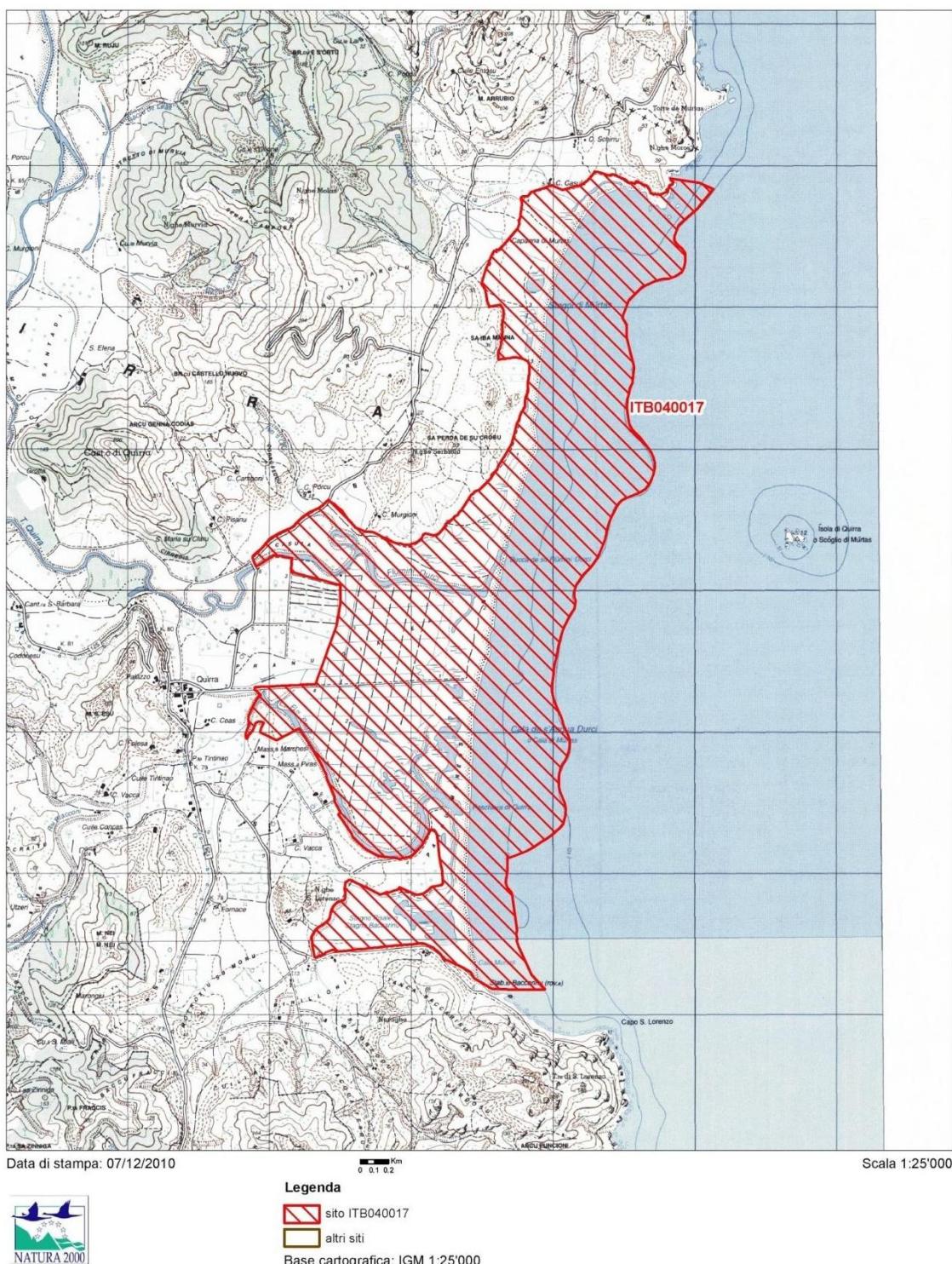


Figure 7. SCI, ITB040017 'Stagni di Murtas e S'Acqua Durci' - SCI, ITB040017 'Stagni di Murtas e S'Acqua Durci'¹¹

¹¹Source: <https://www.minambiente.it/pagina/sic-zsc-e-zps-italia>

The SCI is regulated by the Management Plan (SCIMP) which is consistent with the provisions of the art. 6 of the 'Habitat' Directive and of the art. 4 of Presidential Decree 120/2003, has the objective of guaranteeing the conservation and protection of habitats and species of fauna and flora, implementing protection and management strategies capable of allowing the maintenance of areas in optimal conditions, even in the presence of human activities, favoring the maintenance of ecosystem services.

2.4.3 Evaluation of congruence of specific objectives - LCP and SCIMP

The authors then proceeded with the Evaluation of the congruence of the specific LCP and SCIMP objectives, building the following logical framework (table 2).

Table 2. Logical framework. Specific Objectives of LCP and SCIMP

Specific Objectives [SO] of Local Coastal Planning [LCP]	Specific Objectives [SO] of Sites of Community Importance - Management Plan [SCIMP]
LCP_SO_01 - Promoting innovation and diversification of the tourism offer, also through an integrated advertising-offer circuit	SCIMP_SO_01 - Improve the quality and effectiveness of the organization responsible for the implementation, verification and updating of the Management Plan.
LCP_SO_02 - Establish a framework for the harmonization of the actions of public and private subjects on the coastal strip.	SCIMP_SO_02 - Improve the quality and effectiveness of communication and territorial control activities.
LCP_SO_03 - Promote and encourage environmental redevelopment of the areas identified in the PUL	SCIMP_OS3 - Improve the quality and effectiveness of monitoring activities
LCP_SO_04 - Adopt recognition and monitoring systems of the coastlines in order to activate actions aimed at reducing the degradation and consumption processes of the territory.	SCIMP_SO_04 - Restore and promote the expansion of all the surfaces that can be potentially occupied by habitats and habitats of species thanks to the involvement of stakeholders.
LCP_SO_05 - Promote the decongestion of some stretches of coastline where the greatest load of bathing users is usually concentrated.	SCIMP_SO_05 - Removal of landfills, exotic and invasive species and stray dogs.
LCP_SO_06 - To guarantee the conservation and protection of local coastal ecosystems in harmony with the development of tourist activities and the free use of stretches of coast.	SCIMP_SO_06 - Implementation of internal nature trails, adaptation of parking areas, and ecological connection of the SCI with the other neighboring SCIs and SPAs.
LCP_SO_07 -To guarantee the continuity between the sandy shore and the dune system, improving the accessibility of the state-owned maritime areas	

This congruence was evaluated both in qualitative terms (Figure 8) and in quantitative terms (Figure 9), also going to examine the actions of the two instruments (Figure 10).

	SCIMP_SO_01	SCIMP_SO_02	SCIMP_SO_03	SCIMP_SO_04	SCIMP_SO_05	SCIMP_SO_06
LCP_SO_01	✓	✓	✓	✓	✗	✓
LCP_SO_02	✓	✓	✓	✗	✓	✓
LCP_SO_03	✓	✓	✓	✓	✓	✓
LCP_SO_04	✗	✓	✓	✓	✓	✓
LCP_SO_05	✗	✓	✓	✓	✓	✓
LCP_SO_06	✓	✓	✓	✓	✓	✓
LCP_SO_07	✗	✓	✓	✓	✓	✓

✓ relationship of congruence between objectives
✗ no relationship

Figure 8. Qualitative assessment of specific objectives LCP and SCIMP

From the qualitative analysis (Figure 8) we can extrapolate an overall coherence between LCP and SCIMP, given by the prevalence of congruence relations, in line with the assumptions Integrated management of the coasts in Sardinia [34].

The authors subsequently built a matrix with attribution of weights (quantitative evaluation) to congruence relations to obtain the degree of convergence between the specific objectives of the LCP and SCIMP (Figure 9).

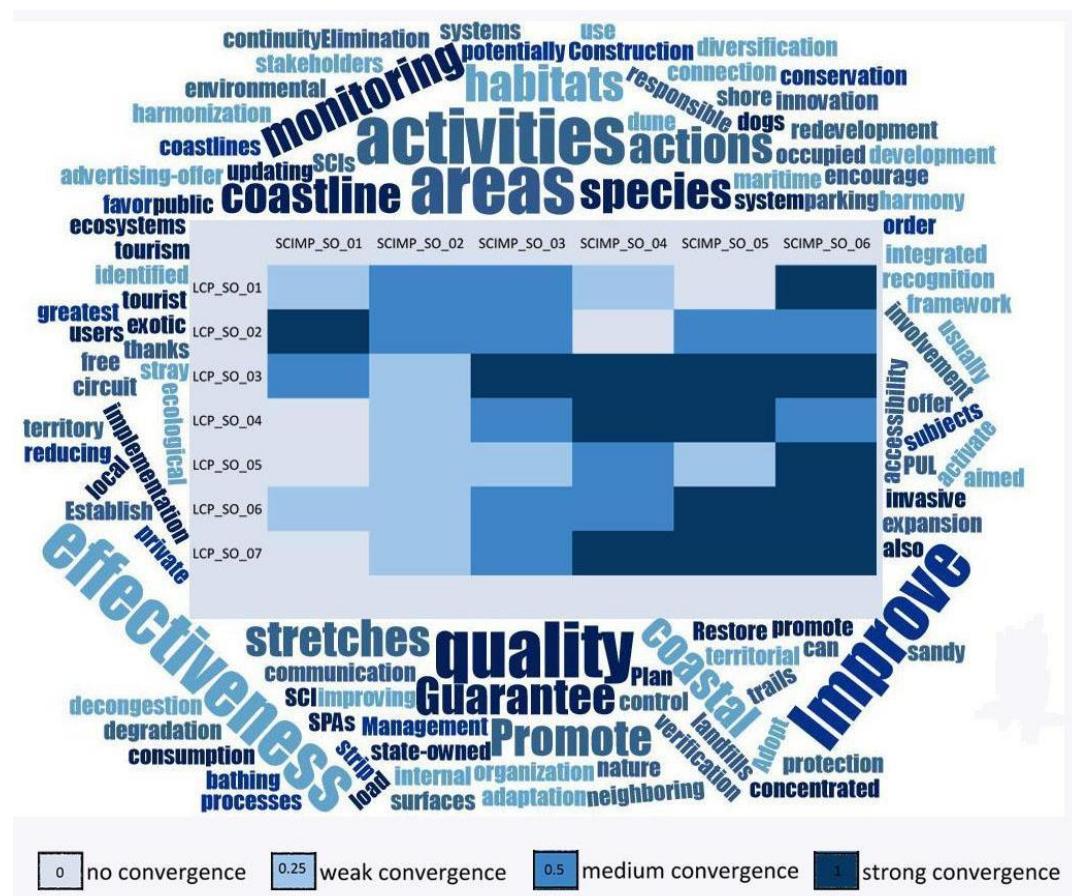


Figure 9. Convergence matrix (qualitative evaluation) of the objectives of the PUL and the SCIMP

From figure 9 it can be extrapolated that there is a maximum convergence for about 88% of cases, a weak convergence in 23.8% of cases and no convergence in 11.9% of cases.

The authors also proceeded to assess the adequacy of the individual actions envisaged by the LCP and the ICS Management Plan, to achieve their specific objectives.

The results of the consistency assessment of the actions (LCP and SCI) are shown in Figure 8. The white squares indicate that there are no interferences between the actions of the two instruments; the + symbol indicates a positive congruence between the actions; the ++ symbol indicates a highly positive congruence between actions.

LCP ACTIONS	SCIMP ACTIONS																											
	AI1	AI2	AI3	AI4	AI5	AI6	AI7	AI8	AI9	AI10	AI11	AI12	AI13	AI14	AI15	RE1	IN1	IN2	MR1	MR2	MR3	MR4	MR5	MR6	MR7	EP1	EP2	EP3
LCP_Act_01	+			+																								
LCP_Act_02		++																										
LCP_Act_03													++															
LCP_Act_04			+							+								+										
LCP_Act_05																												
LCP_Act_06				+					+	+	+		++			++		+										
LCP_Act_07																												
LCP_Act_08												+							+	+	+	+				+		
LCP_Act_09												+					+	+	+									
LCP_Act_10																	+											
LCP_Act_11												+	++													+	++	

AI1-15 = Active interventions RE1 = Regulation IN1-2 = Incentives MR1-7 = Monitoring programs EP1-3 = Educational Programs
+ positive congruence ++ highly positive congruence

Figure 10. Evaluation of congruence between actions of LCP and SCIMP

Figure 10 shows that there are no negative interferences between the actions of the respective Plans, therefore the pursuit of objectives that have a low degree of convergence or no convergence does not derive from an interference between actions, but from actions that act on levels and different themes without conflict.

3. Results and discussion

The coexistence of multiple military, public and private interests found a synthesis in the LCP. In fact, with the overall convergence of the specific objectives of the Villaputzu LCP with the Agreements and Protocols of Understanding between the Ministry of Defense and the Sardinia Region (table 1) and with the specific objectives of the SCIMP, an attempt was made to respond to the debate of the local communities that they oppose military servitude, especially in the coastal area. Furthermore, this methodological application referred to the military enclave of Villaputzu can be replicated in the remaining contexts of Sardinia subjected to military servitude (Figure 1) and more generally on the occasion of semi-common. In this paper we tackled a little covered issue, as that of allowing the co-existence of military zones with civil uses, and particularly those related to leisure, and tourism in particular. The example cited and analyzed is not a trivial one and implied profound reflection on the concept, on the planning aspects and on the opportunities deriving from a concurrent use of areas presenting military bonds and opening to tourism.

With reference to the concept, it is worth noting that considerations have been made on the nature of the goods as semi-commons, as those particular goods holding all the private collective goods, but at the same time attributing a set of public rights to other subjects, as those deriving from being territories subject to easements for military purposes. Such a concept seems nearly straightforward and obvious, nonetheless not explicitly cited when considering this kind of use.

When moving to planning, central is a consideration of the delimitation of the areas and, from a visual, graphical (and cartographical) point of view, the precise localization of the areas, what are the bonds in terms of both military and environmental uses, as well as the possible destinations to a civil use. That point alone required a deep and articulated survey on the planning instruments as well as on the official documents and materials to identify correctly areas and the different aims, bonds and opportunities on a given territory.

A last, innovative and interesting point deals with the evaluation process aimed at developing new techniques for resolving issues in terms of bonds, and proposing common and concurrent planning capable of complying with most of the different aims and orientations of the planning issues of origin: in the case study tackled here, the authors, as scholars and professionals involved in

studying spatial planning issues, as well as working with local authorities on spatial planning issues, propose an instrument as an evaluation matrix for putting together the different pieces of evaluation elements belonging to the different levels of planning, as military purposes, local spatial and urban plan, environmental constraints.

Among the benefits expected by such a novel approach presented here, there is that of allowing a wider awareness and acceptance of bond and easements over environmentally sensitive and protected areas, as well as a fair exploitation of resources.

4. Conclusions

The methodology proposed by the authors consisting in the evaluation of congruence and convergence between the specific objectives of LCP and SCIMP and in the evaluation of congruence of the respective actions has allowed us to demonstrate how the military enclave of Villaputzu can be configured as semi-common [35], able to configure services ecosystems [36-37] and use.

The research carried on appears to be at an initial stage, and with little evidence of other cases in sensible areas around the world. To the authors' knowledge, no other cases have been widely tackled in literature and in spatial planning actions. Authors in particular highlighted, in theory and practice, how a concurrent approach on planning can be adopted, *de facto* allowing multiple targets to be addressed: allowing military operations; environmental protection and management; tourist recreational use. The basic idea, extended for the consideration of the goods and services considered as 'semicommons' is that their use, observed by means of a fitted for purpose matrix, can be in some sense concurrent. If rights of use can be present on a theory, it is extremely unlikely that a same territory is subjected to different uses at the same time, or at least, this can be regulated and planned. A right of use should not be translated into a perpetual use of a given portion of territory, as that can be in some particular moments of the year and/or of the day. This is valid for proving grounds – generally used in certain circumstances and moments – as well as tourism – generally subject to strong levels of seasonality in the presence of tourists and in the use of areas. An appropriate and calibrated planning can act also in terms of urgency or special cases in which a dominant use can overcome the other ones, but adopting adequate announcements and communication.

The issue tackled here represents a tested for other, further analyses on other sites where a need for a concurrent planning is needed in order to face the pulls towards a sustainable use of land resources as well as those related to defense and military purposes. In changing times in which military needs change the ways in which operations and training are performed, a convergence, at least in periods of time and for certain amount of space is actually needed. Some Italian regions - and Sardinia in particular - present a vast heritage of military grounds and easements, the offspring of the Cold War period, now still persisting. If military presence, in terms of personnel and assets, reduced its dimension and operational ways, that did not happen in terms of the spaces occupied for such activities, thus maintaining bonds of areas, which use and military importance has changed in time. So a need for changes in the approach, in the interests of both military and civilian uses, is coming out. In such sense, little research seems to have tackled such issue. Further research will be carried on in the same region and in other ones, where the heritage of military forces is still strong and pushes for a reuse are ongoing and with little, delayed responses. The authors therefore intend to continue the research evaluating the performance of ecosystem services on the occasion of semi-commons connected to MPG.

Glossary

LCP - Local Coastline Plan: Municipal Plan that defines the structure of the coastlines through an integrated and systemic management that allows to guarantee the preservation and enhancement of the integrity of the state property for tourist uses.

SCI - Site Management Plan of Community Interest: It's the management tool for specific measures, required by the 'Habitat' directive 92/43 / EEC, for the conservation of natural habitats and

species of wild flora and fauna of Community interest, taking into account the particularities of the specific site.

MPG - Military Proving Ground: Training area is a military installation or reservation where weapons or other military technology are experimented with or are tested, or where military tactics are tested.

MA - Military areas: Is a facility that houses military equipment and personnel

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References

1. Angiolini, C. S. A. La questione dei beni comuni: un itinerario fra regimi dei beni e diritti fondamentali. PhD Thesis, Università Ca' Foscari, Venezia, **2018**.
2. Imperiale, F. *Il valore dei beni culturali nel patrimonio dello Stato italiano*; FrancoAngeli: Milano, Italy 2018.
3. Caruso, R. *Chiamata alle armi: i veri costi della spesa militare in Italia*; EGEA spa, 2018.
4. Hardin, G. The Tragedy of the Commons. *Science* **1968**, *162*(3859), 1243–48.
5. Marciano, A., Frischmann, B. M., Ramello, G. B. Tragedy of the Commons after 50 Years. *Available at SSRN* **2019**, 3451688.
6. Heller, M. A. The Tragedy of the Anticommons: Property in the Transition from Marx to Markets, *Harv. L. Rev.* **1997**, *111*, no. 3, 621–88. Heller, M. The Tragedy of the Anticommons: Property in the Transition from Marx to Markets. William Davidson Institute. 1997.
7. Heller, M. A., Eisenberg, R. S. Can Patents Deter Innovation? The Anticommons in Biomedical Research, *Science*, **1998**, *280*, 698–701.
8. Gastaldi, F., Camerin, F. Processi di dismissione degli immobili militari. Temi e problemi aperti per la rigenerazione urbana in Italia. *Scienze Regionali*, **2017**, *16.1*, 103–120.
9. Odoni, M. Degrado ambientale prodotto da esercitazioni militari tra interessi individuali e sicurezza nazionale alla luce del principio di non discriminazione. *Diritti umani e diritto internazionale*, **2018**, *2*, 269–306.
10. Esu, A., Maddanu, S. Military pollution in no war zone: The military representation in the local media. *Journalism*, **2018**, *19.3*, 420–438.
11. Hreško, J., Petrovič, F., Mišovičová, R.. Mountain landscape archetypes of the Western Carpathians (Slovakia). *Biodivers. Conserv.* **2015**, *24*, 3269–3283.
12. Spulerová, J., Dobrovodská, M., Izakovičová, Z., Kenderessy, P., Petrič, F., Stefunková, D. Developing a strategy for the protection of traditional cultural landscapes based on a complex landscape-ecological evaluation (the case of a mountain landscape in Slovakia). *Morav. Geogr.* **2013**, Rep. 21, 15–26 <http://dx.doi.org/10.2478/mgr-2013-0017>;
13. Zentelis R., Lindenmayer D. Bombing for Biodiversity—Enhancing Conservation Values of Military Training Areas, *Conservation Letters*, July/August **2015**, *8*(4), 299–305;
14. Silvia. Arimoro, O. A., Reis Lacerda, A. C., Tomas, W. M., Samuel Astete, S., Roig, H. L., Marinho-Filho, J., Artillery for Conservation: The Case of the Mammals Protected by the Formosa Military Training Area, Brazil. *Tropical Conservation Science* **2017**, *10*, 1–13.
15. Ellwanger, G., Müller, C., Ssymank, A., Vischer-Leopold, M., & Paulsch, C. Management of Natura 2000 sites on military training areas. *Naturschutz und Biologische Vielfalt* **2016**, *152*.
16. Reinhardt I., Kluth G., Nowak C., Szentiks C. A., Krone O., Ansorge H., Mueller T. Military training areas facilitate the recolonization of wolves in Germany. *Conservation Letters* **2019**, *12*, e12635. <https://doi.org/10.1111/conl.12635>

17. Lee Jenni G. D., Peterson M. N., Cubbage F. W., Katz Jameson J., Assessing biodiversity conservation conflict on military installations. *Biological Conservation* 2012, 153, 127–133
18. Paloyo A. R., Vance C. and Vorell M. The regional economic effects of military base realignments and closures in germany. *Defence and Peace Economics* 2010, 21:5-6, 567-579, DOI: 10.1080/10242694.2010.524778
19. Camerin, F., Gastaldi, F. Il ruolo dei fondi di investimento immobiliare nella riconversione del patrimonio immobiliare pubblico in Italia. *Working papers. Rivista online di Urban@it* 2018, 2/2018.
20. Ellwanger , G., Reiter, K. Nature conservation on decommissioned military training areas – German approaches and experiences. *Journal for Nature Conservation* 2019, 49, 1-8.
21. Smith, H.E., Semicommon property rights and scattering in the open fields. *Journal of Legal Studies* 2000, 29, 131-169.
22. Bertacchini, E., De Mot, J. PB., Depoorter, B. Never two without three: Commons, anticommons and semicommons. *Review of Law & Economics*, 2009, 5.1, 163-176.
23. Perelli, C. Geografie militari e nuovi movimenti di opposizione alle basi in Sardegna. Proceedings of the international conference Military Landscapes. A future for Military Heritage, La Maddalena, Italy, 21-24.06.2017; Skira: Milan, Italy, 2017; paper n. 026, 1210-1217.
24. Colavitti, A. M., Serra, S., Usai, A. Demanio Militare e “Beni Comuni”: regolazione dei rapporti interistituzionali e coinvolgimento della società civile nei processi di valorizzazione della Regione Sardegna. In Commons/Comune: Geografie, luoghi, spazi, città., Giornata di studio della Società di Studi Geografici Rome, Italy, 11 dicembre 2015 2016; Società di Studi Geografici: Firenze, Italy, 2016; NS 14, 613-620.
25. Codonesu, F. *Servitù militari modello di sviluppo e sovranità in Sardegna*. CUEC editrice: Cagliari, Italy, 2013, Volume 23.
26. SardegnaAmbiente web site. Available online: http://www.sardegnaambiente.it/documenti/18_183_20140507151419.pdf
27. Marx, J. T., Liebenberg, I. Into the future: Donkergat Military Training Area and the Langebaan Ramsar site. *The Journal for Transdisciplinary Research in Southern Africa* 2019, 15.1, 1-11.
28. Seidel, V., Dourte, D., Diamond, C. Applying Spatial Mapping of Remotely Sensed Data to Valuation of Coastal Ecosystem Services in the Gulf of Mexico. *Water* 2019, 11.6, 1179; <https://doi.org/10.3390/w11061179>
29. Leone, F., &Zoppi, C. (2019). Local Development and Protection of Nature in Coastal Zones: A Planning Study for the Sulcis Area (Sardinia, Italy). *Sustainability* 2019, 11.18, 5095.
30. Sardegna territorio web site. Available online: <http://www.sardegneruote.it/paesaggio/pianopaesaggistico2006.html>
31. Ministero dell'Ambiente e della tutela del territorio e del mare web site. Available online: <https://www.minambiente.it/pagina/rete-natura-2000>
32. Santolini, R., Morri, E., Scolozzi, R. I servizi ecosistemici nelle aree protette e oltre i loro confini. *Urbanistica e informazioni.i.* 2015, 263, 41-43.
33. Regione Sardegna web site. Available online: <http://82.85.20.38/profilo/stazione/profilo/id/665>
34. Lai S.; Leone, F. La pianificazione nei paesaggi costieri: l'applicazione del concetto di integrazione nelle esperienze di due aree protette italiane. Proceedings of Seventh International Symposium Monitoring of Mediterranean coastal areas: problems and measurement techniques, Livorno, Italy, June 19-21 2018; Edit by Fabrizio Benincasa, Firenze University Press: Firenze, Italy, 2018
35. Ling, G. H. T., Ho, C. S., Tsau, K. Y., Cheng, C. T. Interrelationships between Public Open Space, Common Pool Resources, Publicness Levels and Commons Dilemmas: A Different Perspective in Urban Planning. *International Journal of Built Environment and Sustainability* 2019, 6.2, 13-21.
36. Cannas, I., Lai, S., Leone, F., Zoppi, C. Green infrastructure and ecological corridors: A regional study concerning Sardinia. *Sustainability* 2018, 10.4, 1265.
37. Lai, S., Leone, F., Zoppi, C. Strategic environmental assessment and enhancement of ecosystem services: a study concerning spatial planning in Sardinia (Italy). *Current Politics & Economics of Europe* 2018, 29.4, 61-84.