MSP-OR
Advancing Maritime Spatial Planning in Outermost Regions

MS23 - CANARY ISLANDS GEOGRAPHICAL INFORMATION SYSTEM

August 2023

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ABSTRACT

While the Outermost Regions of Azores, Madeira, Canaries, and French Guiana are in different stages of development in their Maritime Spatial Planning (MSP) processes, they all share common challenges. The MSP-OR project aims to address gaps in data, stakeholder involvement, and planning tools necessary for effective MSP. The specific case of the Canary Islands is explored, where the Canary Islands Coastal GIS Tool (HPL) is highlighted as a vital integrated management tool for coastal and maritime information.

The work undertaken by the MSP-OR consortium, focusing on Work Package 3 (WP3) - Filling Gaps linked with on-going MSP processes, with Subtask 3.2 specifically, concentrates on addressing knowledge gaps through comprehensive data integration. The Canary Islands is successfully including geological resources, underwater cultural heritage, and coastal heritage data into the Canary Islands GIS tool. This added information assists in assigning activities to maritime areas, supporting MSP processes. The cataloging of subaquatic and coastal heritage elements, with georeferencing and categorization, highlights the importance of accurate and accessible heritage data for effective planning. Furthermore, the development of subaquatic geological maps will enrich the understanding of seabed geology. The document emphasizes the role of collaborative platforms and comprehensive data integration in advancing maritime spatial planning in these outermost regions.

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ABBREVIATIONS AND ACRONYMS

BIC	Declarations of Assets of Cultural Interest (BIC, for its acronym in Spanish: Bienes de Interés Cultural)
EU	European Union
FRCT	Fundo Regional para a Ciência e Tecnologia
GIS	Geographical Information System
GOBCAN	Gobierno de Canarias
HPL	Canary Islands Coastal GIS Tool (HPL, for its acronym in Spanish: Herramienta de Pilotaje del Litoral Canario)
IDECanarias	Spatial Data Infrastructure of the Canary Islands (IDECanarias, for its acronym in Spanish: Infraestructura de Datos Espaciales de Canarias)
MarSP	Macaronesian Maritime Spatial Planning
MSP	Maritime Spatial Planning
MSP-OR	Advancing Maritime Spatial Planning in Outermost Regions
OGC	Open Geospatial Consortium
OR	Outermost Region
PIO	Insular Management Plans (PIO, for its acronym in Spanish: Planes Insulares de Ordenación)
PGO	General Management Plan (PGO, for its acronym in Spanish: Plan General de Ordenación)
POEM	Maritime Spatial Planning Plan (POEM, for its acronym in Spanish: Plan de Ordenación del Espacio Marítimo)
PORN	Natural Resources Management Plans (PORN, for its acronym in Spanish: Planes de Ordenación de los Recursos Naturales)
PRUG	Master Plans for the Use and Management of Protected Natural Spaces (PRUG, for its acronym in Spanish: Planes Rectores de Uso y Gestión de Espacios Naturales Protegidos)
REDPORMAR	Network of the Government of the Canary Islands for the monitoring and surveillance of marine life in Macaronesia (REDPROMAR, for its acronym in Spanish: RED del Gobierno de Canarias para el seguimiento y vigilancia de la vida marina de la Macaronesia)
WMS	Web Map Service
WP	Work Package
ZPS	Zones with Submerged Cultural Heritage (ZPS, for its acronym in Spanish: Zonas con Patrimonio Cultural Sumergido)

INTRODUCTION

The European outermost regions of Azores (Portugal), Madeira (Portugal), Canaries (Spain), and French Guiana (France) have joined cooperation efforts to support the implementation of the MSP Directive in their marine territories, in order to advance with their regional processes. Despite the different development stages of MSP processes among them, these outermost regions (ORs) share common challenges. In the case of the Macaronesia regions, Azores, Madeira & Canaries, they present several maritime common features and resources. Moreover, the project MarSP (Macaronesian Maritime Spatial Planning) gathered and developed important planning components for Marine Spatial Planning (MSP) processes, such as data, knowledge, stakeholder involvement, and tools needed for MSP implementation in the Macaronesian archipelagos of the Azores, Madeira and the Canary Islands. Nevertheless, there is still much work to be done, both by regions/states and by economic sectors and human activities.

Therefore, the project Advancing Maritime Spatial Planning in Outermost Regions (MSP-OR) grants an innovative approach where an Ocean Governance Platform provides a virtual arena to collect, exchange information, participate, and build capacities. Important developments are tailored by the MSP-OR according to the specific needs of each region, namely: filling the gaps, interactive stakeholders' involvement, sectorial planning approach, and ecosystem approach applied to regional downscaling.

The four ORs involved in the MSP-OR consortium are immersed in the elaboration process of MSP. Each region is at a different stage of development, however, all have still some work ahead, part archived by the previous EU co-funded project MarSP (Macaronesian Maritime Spatial Planning), which has to do with most of the components concerning the MSP Plan, such as data to be gathered and incorporated, the actual MSP Plan to be elaborated, and approved, instruments to display and give access of public information to citizens and stakeholders, administrative vehicles to authorize the different uses and activities in maritime zones or studies on the economic potential of new blue sectors. The Work Package 3 (WP3) aims to develop, under a common approach, all these inputs and tools that the regions are missing to have an effective MSP in place and appropriately functioning.

Task 3.2 MSP-OR Filling the Gaps aims to address what is missing from both MarSP and related projects, as well as from current ORs MSP Plans.

CANARY ISLANDS GEOGRAPHICAL INFORMATION SYSTEM

The **Canary Islands Coastal GIS Tool** (HPL, for its acronym in Spanish), hosted in https://www.pilotajelitoralcanario.es/ and belonging to the General Directorate of Coasts and Management of the Canarian Maritime Space, is an integrated management tool for coastal information, in accordance with the lines of action at a National and European level.

Public administration, for the management and planning of the maritime-terrestrial space, requires management instruments that enable the collection, production, and permanent updating of the necessary information in coordination with the rest of the administrations and institutions. All of which allows to make decisions about its use and preservation in line with a balanced territorial model, in harmony with the generation of wealth and maintenance of natural resources, through the promotion of urban planning instruments, the development of inter-administrative consultation policies, and the promotion of a culture of management.

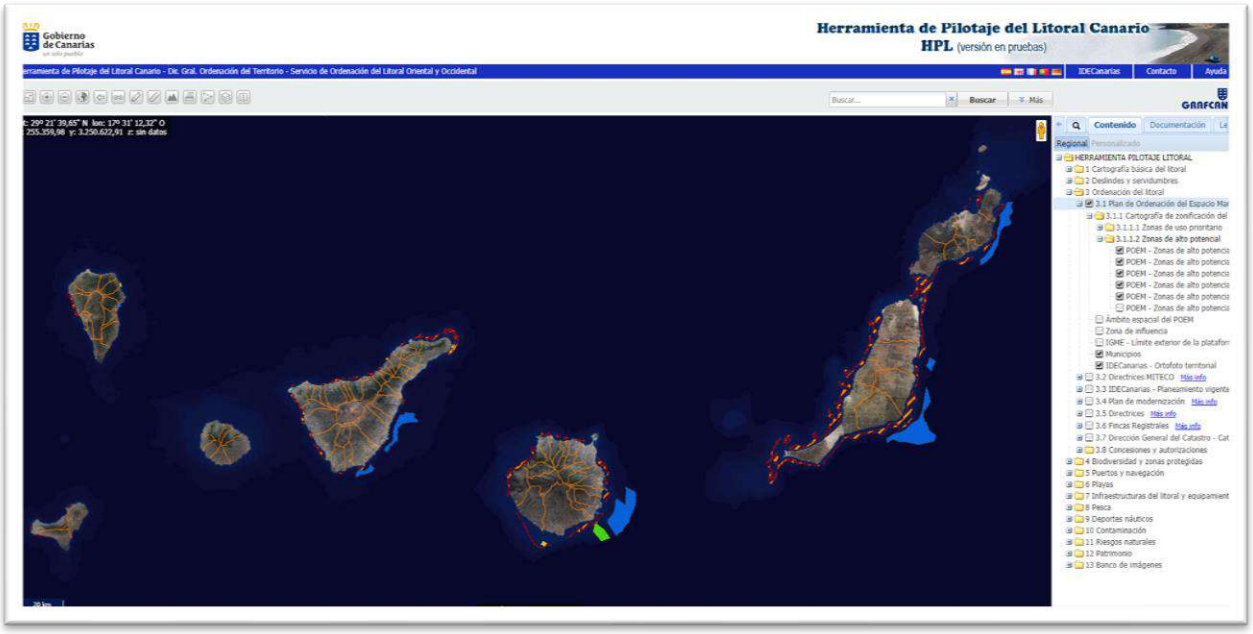


Figure 1. Screenshot from the Coastal GIS Tool (*Herramienta de Pilotaje del Litoral Canario*, HPL) with the POEM layers activated for visualization. URL: https://www.pilotajelitoralcanario.es/

The HPL is an instrument that facilitates the exchange, treatment, and exploitation of mostly georeferenced information, which is needed by the different administrations and public institutions involved for the exercise of their competencies, with an objective not only to support terrestrial, marine, and intertidal information but also as a useful tool for decision-making in the economic field and for efficient and equitable planning and allocation of resources at the territorial level, reinforcing transparency in the application of public resources. The Canary Islands GIS Tool collects detailed information from various authorized sources, integrating it and consolidating it rigorously in a single place of consultation in order to allow more efficient management. Therefore, HPL contributes to solving issues such as the uncertainty that occurs on the coast when it comes to delimiting public spaces from private ones, due in large part to having dispersed, out-of-date information, in various formats and reference systems, and the disputes that derive from this situation, with the consequent penalties for both the Administration and the citizen.

In addition, the tool represents a crucial element for the promotion of planning on the coastline, since the promoters and drafters of the planning will find updated data on demarcations and effects of the maritime-

terrestrial zone, infrastructures, and port and airport conditions, sanitation, protected areas, delimitations of management elements, and in general all the necessary elements to be considered in urban planning.

GIS TOOL STRUCTURE AND DATA COLLECTION

The information produced within the framework of the Canary Islands Coastal GIS Tool can be consulted through the viewer and a Web Map Service (WMS). This service allows access to information of interest to planners, managers and stakeholders on the Canary coast. The HPL (Figure 1) follows the structure of the Spatial Data Infrastructure of the Canary Islands (IDECanarias), which makes available to its users the geographic information produced by the Government of the Canary Islands, or gathered from other sources, through its viewer and standard services defined in accordance with the Open Geospatial Consortium (OGC) specifications. The OGC is an international consortium that brings together more than 430 entities for the development of open and interoperable standards within Geographical Information Systems (GIS), which allows the interoperation of geoprocessing systems and facilitates the exchange of geographic information for the benefit of users.

The Canary Islands Coastal GIS Tool aims to offer a complete navigation system throughout the Canary Islands coast and maritime area, providing complete and detailed visual information in an easy and intuitive way for all types of users. The main function of the tool is to display geographic information and it also allows searching on the database or positioning yourself at any point in the territory. Additionally, HPL offers us tools such as zoom in and out, navigation, measurement tools, layer selection, information, image printing, or double windows.

The data structure established for the HPL is summarized below, all these sections are continuously maintained, and new content and headings are added as new data is available.

- **Demarcations and easements:** compiles diverse information related to aeronautical easements together with easement plans for aerodromes and radio stations or aircraft operations, in addition to port public domain or lines of the Canary Water Law. Information is also included on the Public Maritime Terrestrial Demarcation and easement areas.

- **Coastal Planning**: includes information on offshore wind areas, limits of Management units, or authorizations granted in easements and in the maritime-terrestrial public domain.

- **Biodiversity**: includes data such as Marine Reserve, Marine Zones of Special Conservation, and Macaronesian species sighting areas for REDPROMAR citizen science project.

- **Ports**: includes State and Autonomous Community port information, including data on the Islands, distances between them, port uses, lighthouses, and nautical stations, among others.

- **Beaches**: includes information on sea currents, Red Cross posts, blue and Q flagged beaches, and water quality on the beaches, among others. Especially relevant in this section is the delimitation of the Canary Islands beaches (non-existent until 2016) which have been relevant for the planning and implementation of various services such as emergency, access and evacuation, and seasonal services.

- **Coastal infrastructures**: includes various information on the infrastructures inventoried on the coast, such as car parks, sports, cultural, health or educational facilities, electrical and data networks, sanitation networks and trails, among others.

- **Fishing**: includes information on the marine zoning of the Natural Resources Management Plans (PORN), of underwater fishing areas and aquaculture areas. Likewise, the systematization of fishing information and pelagic species, as well as benthic of the archipelago, is included.

- **Nautical sports**: includes information on the places of practice and the location of the main Federations of nautical sports, among others. It also includes the Catalog of breakwater, an inventory which will provide information to planners when carrying out civil engineering works that could affect the breakwater and endanger the practice of wave related sports.

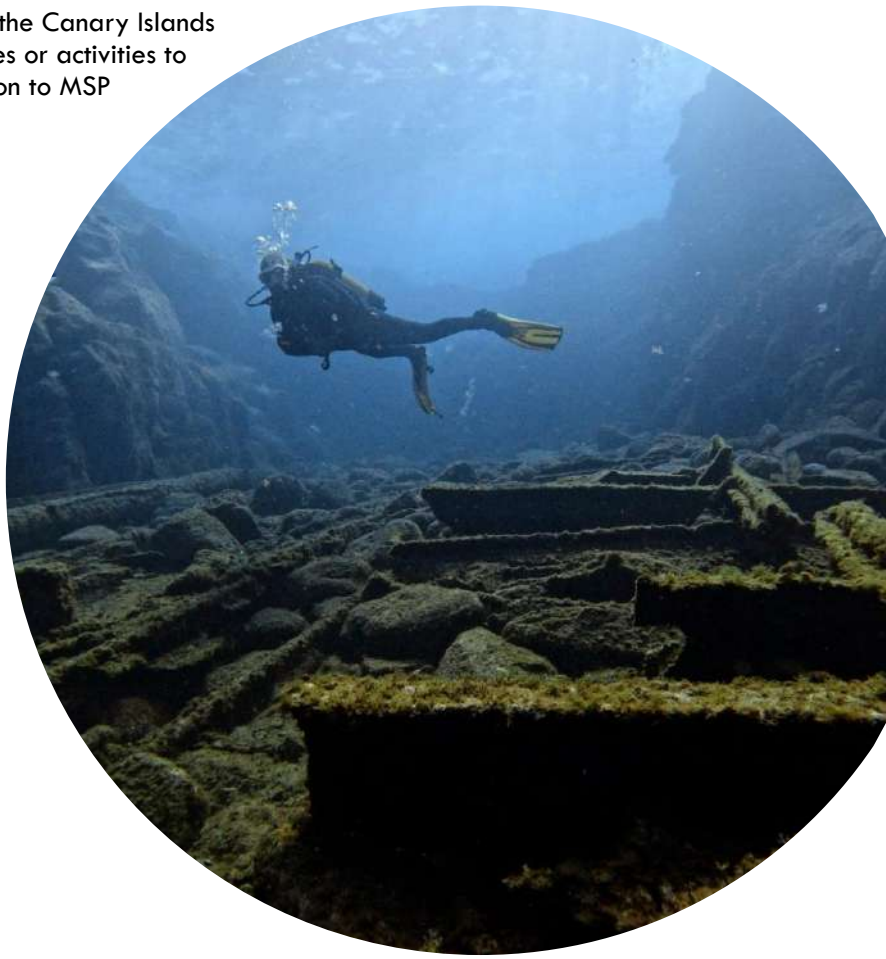
- **Water quality**: includes information on the location of desalination plants, treatment plants, outfalls and existing censuses of discharges from land to sea, as well as Hydrographic Demarcations or maritime areas of special sensitivity, among others.

- **Heritage**: includes information on historic piers, coastal heritage, and submerged cultural heritage, among others.

A wide range of sources and methodologies are used to include new data in the HPL, among them are the consultation of bibliographic sources and official documents, field studies, data digitalization, consultation of official cartography, and photointerpretation.

Under Subtask 3.2.3, Canary Islands aimed to both integrate the information and knowledge obtained by other partners within MarSP project and produce new data that is missing and turns crucial for the MSP regional process. As a consequence of identifying the gaps of knowledge, the Canary Islands is focusing on the production of new information and knowledge on geological resources and underwater cultural heritage in the context of the Canary Islands GIS. Additionally, as it was not included in the Inception Report, coastal heritage data has also been included in the GIS platform.

The new addition of these geospatial data for the Canary Islands contributes to determining the assignment of uses or activities to maritime areas, becoming a relevant contribution to MSP processes.



SUBAQUATIC HERITAGE

Within Maritime Spatial Planning processes, having detailed information of the cultural subaquatic heritage is essential for the responsible management of the marine environments. The availability of this geographical information allows to balance the preservation of cultural and historical treasures with the sustainable use of marine resources, promoting economic development, scientific research, and environmental conservation. This integrated approach is crucial for supporting sustainable development within the specific geographic context.

GOBCAN has completed a subaquatic heritage inventory for the Canary Islands, all known pieces are cataloged and geolocalized on HPL (GIS tool). Additionally, a protection area was implemented around the locations and a management proposal for the aquatic heritage was developed.

All submarine cultural heritage are pieces and elements that lie on the seabed of the Canary Islands, and the catalog includes submarine archaeological sites and any element that has cultural or patrimonial value. There are 131 elements included in the HPL (Table 1) and an index card (Figure 2) was developed for each cataloged subaquatic heritage item.

Table 1. Categories used to classify subaquatic heritage elements.

Type (English)	Type (Spanish)	Total Count
Wreck	Pecio	21
Large area where, based on Historical Data, caution should be exercised	Zona amplia donde debe de tenerse precaución de acuerdo con los datos históricos	8
Zones with Submerged Cultural Heritage (ZPS)	Zonas con Patrimonio Cultural Sumergido (ZPS)	59
Zones of possible influence of ZPS or that, due to objective historical data, may be sensitive	Zonas de posible influencia de ZPS o que por datos históricos objetivos puedan ser sensibles	43

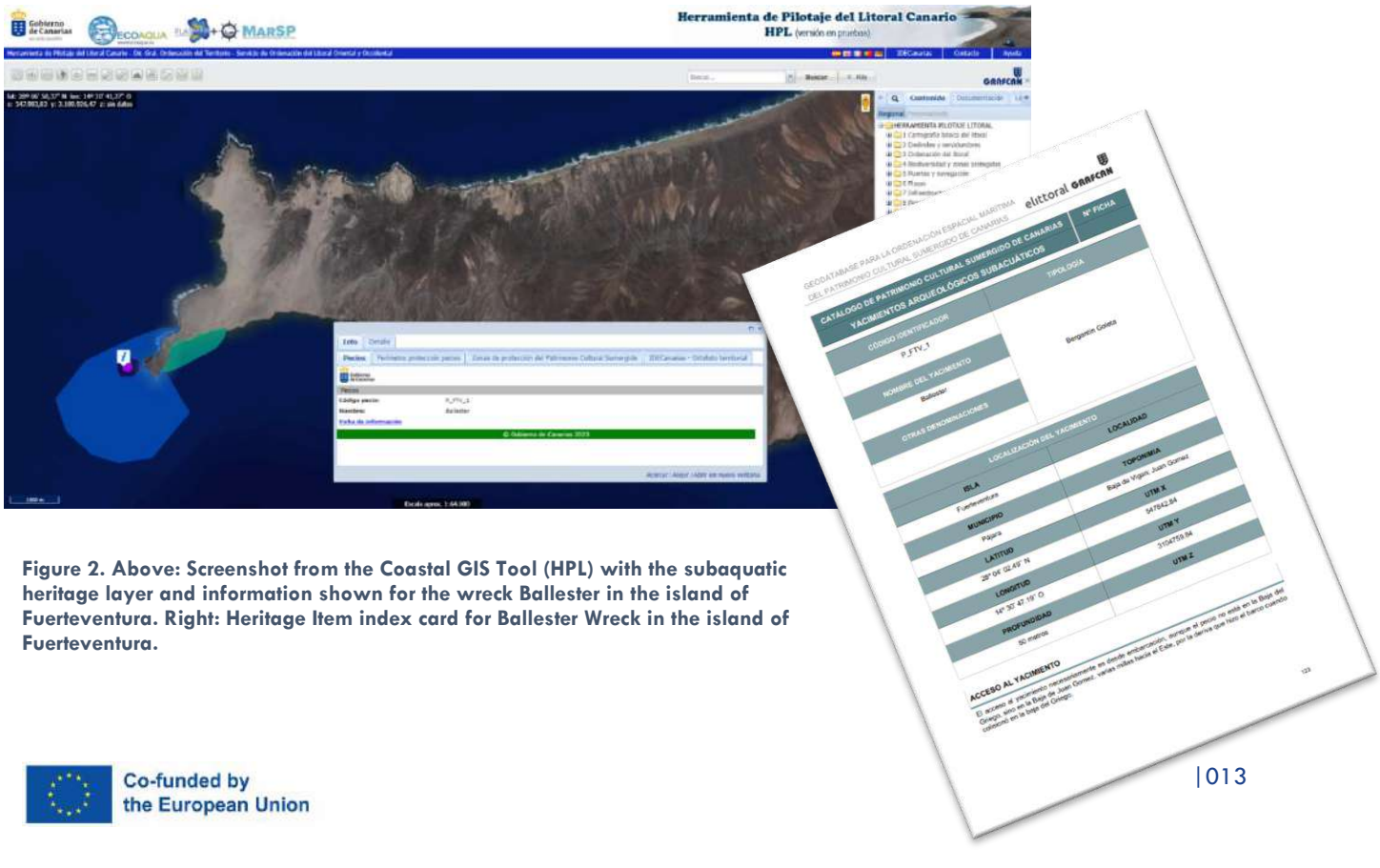


Figure 2. Above: Screenshot from the Coastal GIS Tool (HPL) with the subaquatic heritage layer and information shown for the wreck Ballester in the island of Fuerteventura. Right: Heritage Item index card for Ballester Wreck in the island of Fuerteventura.

COASTAL HERITAGE

Furthermore, a Coastal heritage inventory which was not initially included in the Grant Agreement has been completed for all known elements of the Canary Islands. The advantages of having these data available are similar to the ones for subaquatic heritage, as it allows for the sustainable development of coastal areas while preserving the elements with cultural value.

The objective was to collect the existing information and appropriately georeferenced it the official cartography of the Canary Islands, generating an inventory of elements with georeferenced heritage value within the scope of study, which can be consulted in the Canary Islands Coastal Planning Tool (Figure 3). A total of 1395 elements were included in the catalog, and all the elements have been categorized (Table 2) and included in the HPL.

Among the information sources are:

- Territorial heritage plans (Planes Territoriales de Patrimonio)
- Insular Management Plans (PIO, for its acronym in Spanish: *Planes Insulares de Ordenación*) and, when available, their Heritage Catalogs
- Special Territorial Plans for the Management of Historical Heritage (*Planes Territorial Especiales de Ordenación del Patrimonio Histórico*)
- General Management Plan (PGO, for its acronym in Spanish: *Plan General de Ordenación*)
- Master Plans for the Use and Management of Protected Natural Spaces (PRUG, for its acronym in Spanish: *Planes Rectores de Uso y Gestión de Espacios Naturales Protegidos*)
- Declarations of Assets of Cultural Interest (BIC, for its acronym in Spanish: *Bienes de Interés Cultural*) of the Government of the Canary Islands
- Archaeological and/or ethnographic letters
- Orthophotos, which are aerial photographs planimetrically corrected.
- Street view and 360 images from Google Maps

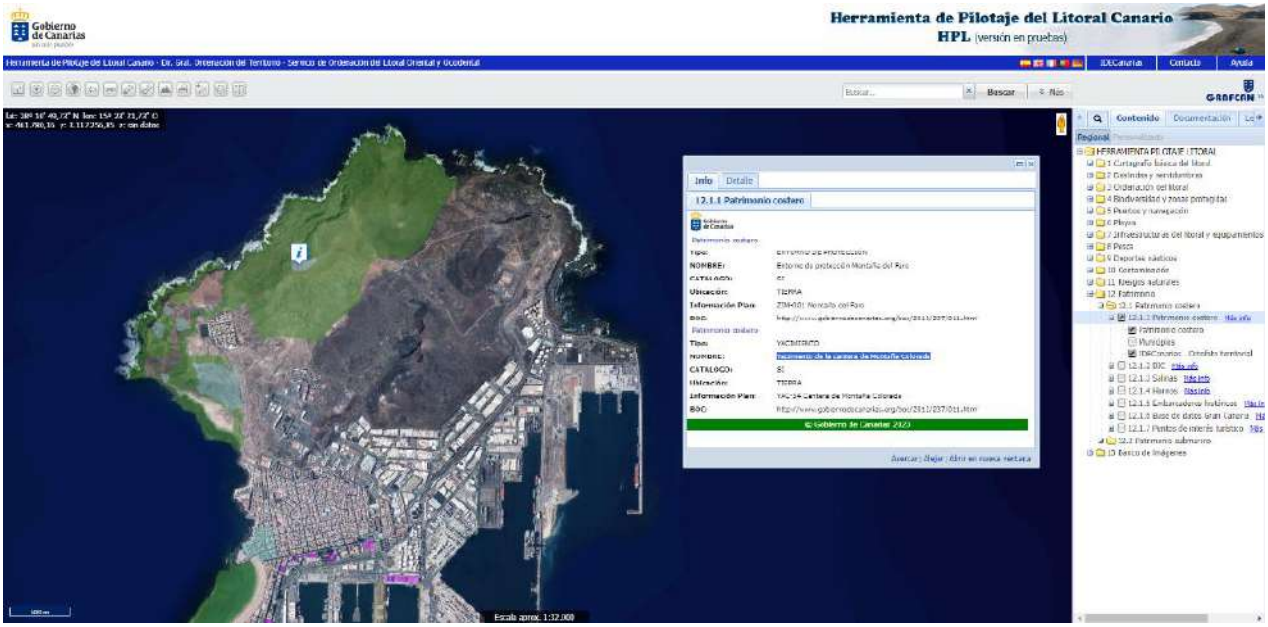


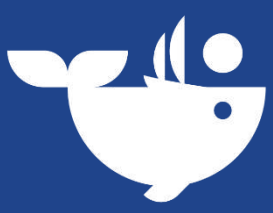
Figure 3. Screenshot from the Coastal GIS Tool (HPL) with the coastal heritage layer and information shown for the Montaña Colorada quarry site (Yacimiento de la cantera de Montaña Colorada) in the island of Gran Canaria.

Table 2. Categories used to classify coastal heritage elements by type. (* Type with a single element)

Type (English)	Type (Spanish)	Definition	Total Count
BUNKER	Bunker	Military building for surveillance or installation of machine gun nests and strategic surveillance points.	62
PATH	Camino	Path or path of patrimonial value as it forms a means of communication used for decades or even hundreds of years by the local population.	8
CHANNEL*	Canal*	Water access channel to the Salinas del Carmen.	1
DOCK*	Dique*	Shelter construction to allow the docking of ships and generating a body of calm waters (dock). 1st and 2nd Alignment of the eastern dock of the Port of Santa Cruz de Tenerife.	1
DOCK - DOCKING RAMP*	Dique - Rampa de Varada*	Shelter construction associated with a ramp for the entrance and exit of boats. Playa del Cable.	465
SHELTER DOCK	Dique de Abrigo	Structure to provide protection to certain areas. They are usually built with breakwater or concrete shoulders.	25
BUILDING	Edificación	Constructions of various types, which include churches, lime kilns, water ponds, castles, warehouses or industrial buildings, etc. The element typology is described in the comments or in the element name.	347
JETTY	Embarcadero	Element near the seashore that allows the loading and unloading of ships, both merchandise and people.	4
PROTECTION SETTING	Entorno de protección	Protection area to safeguard the element. This category includes various elements, such as salt flats, squares, natural caves, etc.	14
STAIRS	Escalera	Access the area to the coast by stairs. They are usually stairs that appear in the orthoimage of 1951-1957.	12
LIGHTHOUSE	Faro	Tower of different heights that is used for maritime signaling. Normally a construction that served as the residence of the lighthouse keeper is attached to it.	34
MONUMENT	Monumento	Construction, generally large, which has historical value. It can also be an artistic work to decorate a space.	1
PIER	Muelle	Construction at the edge of the sea for the docking of boats, and for their stowage and unstowage.	1
PIER-JETTY*	Muelle – Embarcadero*	Set of various piers and piers DAVIT Series of pillars located on the coast and on which a metal lattice is installed as a crane that it allowed the loading and unloading of ships as they could be located in waters further from the coast.	7
SQUARE	Plaza	Recreation and leisure areas, normally with large garden areas and other urban furniture in which to carry out various leisure activities.	10
DAM	Presa	Large wall that interferes with the flow of a ravine to accumulate behind it significant amounts of water.	4
BRIDGE	Puente	Construction carried out to cross deep depressions in the ground such as ravines.	7
DOCKING RAMP	Rampa de varada	Construction, normally rectangular in shape, made with a slope that allows the entry and exit of ships.	5
SITE	Yacimiento	Place where elements belonging to ancient populations, both human and animal or plant, are located. It usually contains remains of a diverse nature, from ceramic remains to bone remains from burials or fossilized deposits of ancient plant or animal communities.	361
ARCHAEOLOGICAL ZONE	Zona arqueologica	Space in which preserved remains and utensils are located, which allows the study and interpretation of ancient civilizations.	26

SEABED GEOLOGICAL DATA

A subaquatic geological map that acknowledges the known features of marine geology is expected to be developed and updated within the final year of implementation for the MSP-OR. The Canary Islands Coastal GIS Tool currently includes very limited data on mineral resources, sediment distribution and seabed morphology. Therefore, new data is expected to be gathered, when available, through consultation with specialized institutions and also studying all available sources, such as archaeological charts, that show both proven discoveries and indications based on history.



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