



EXPERTISE REPORT

December 2013



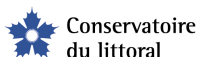
# Sazani island (Albania) : pollution and wastes field survey

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## Résumé / Abstract

### RESUME :

Une mission de terrain PIM s'est déroulée en Mai 2013 sur l'île de Sazani (Albanie) en vue d'améliorer les connaissances sur ce territoire méconnu et d'élaborer des recommandations en matière de gestion.

Une étude préliminaire sur la gestion des déchets de l'île et les sources de pollutions terrestres a été menée à cette occasion.

**Mots-clés :** Sazani, Albanie, expertise, déchets, pollution, état de conservation du bâti

### ABSTRACT :

A PIM field mission has been organized in 5 May 2013 in the framework on Sazani island (Albania), in order to improve the knowledge on this unknown territory and to define recommendation in term of site management.

A preliminary study on waste management and terrestrial pollution has been carried out at this occasion.

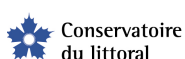
**Key-words :** Sazani, Albania, expertise, wastes, pollution, state of preservation of built heritage

## Mission data

**Location :** Sazani island - Vlorë (Albania)

**Dates :** May 27th to June 1st 2013

### Participants :



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**PIM Initiative for Mediterranean Small Islands**

Since 2006, the Conservatoire du Littoral (French coastal protection agency) have coordinated an international program dedicated to the promotion and assistance to the management of micro-insular territories, called the PIM Initiative, co-funded by the French GEF (FFEM), the French Water Agency and the City of Marseille. The PIM initiative aims to exchange and share knowledge and know-how necessary for the emergence of good management practices of these exceptional areas.

At the occasion of field missions and trainings, wardens, scientists, technicians, naturalists, managers, NGOs or representatives of local authorities work together to promote the conservation of Mediterranean small islands, and the implementation of concrete management actions, with a positive impact on ecosystems, biodiversity, natural resources and uses.

**Partnership** This mission was organized in the framework of a cooperation between the Conservatoire du Littoral, the UNDP Program in charge of Albanese Marine Protected Areas, the Universities of Tirana and Vlora and the APAWA (Association for the Protection of Aquatic Wildlife of Albania), with the support of the French Embassy in Albania.

The main objective of this mission is to realize a management scheme of the island, based on the inventories done during the mission of September 2012 on the basis on the new expertise and data collected during the mission.

The inventories will improve naturalist knowledge on the site in order to define management recommendations (integrated land-sea) on the area (potentially, in coordination with the UNDP project dedicated to drafting the management plan of the MPA-Karaburuni Sazani - newly created in 2010).

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## 1. General data



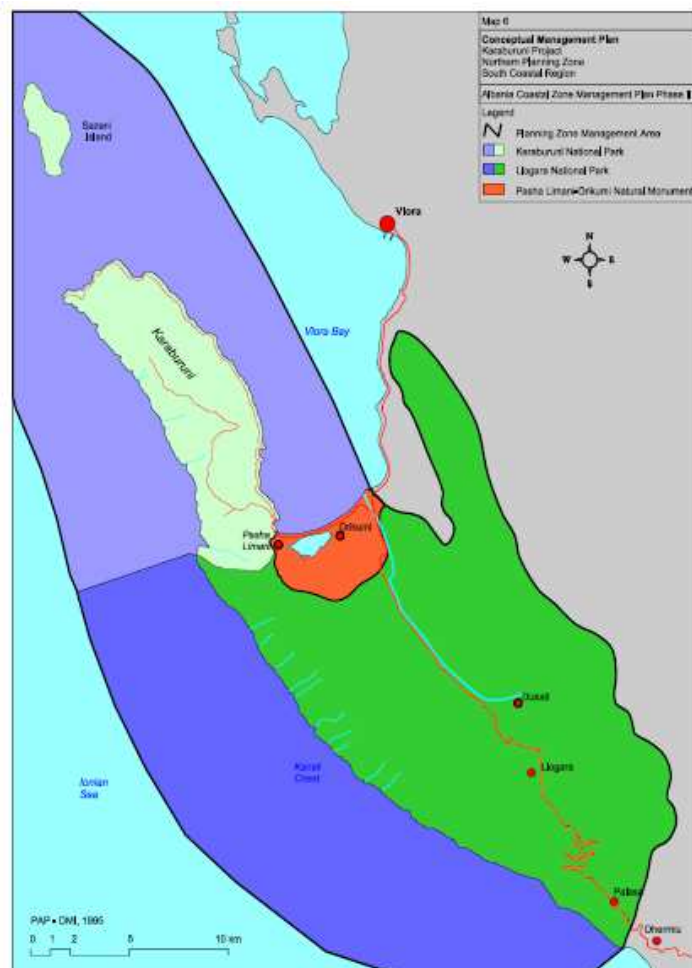
Included in the Karaburun-Sazani's AMP perimeter, Sazani Island is the biggest Albanian (570 ha, 4,8 km long and 2km wide), with a maximum altitude of 337 meters.

Located in the administrative area of the city of Vlora, the island is situated 6,5 nautical miles west from the Port of Vlora.

© C. Damery, 2011

Karaburun peninsula represents the western part of the Vlora bay and is crossed by the formal border line between the Adriatic and Ionian seas. Including Sazani Island, the whole area has been identified as a priority conservation area from different national and international study sources.

However, Sazani Island is not included in the Llogara-Karaburun National Park perimeter. The establishing of the MPA of Karaburun-Sazani in 2010 (first Albanian MPA) is the first step to allow sustainable exploitation of marine area resources, while preserving its biodiversity and landscape.





Marine and terrestrial area proposed in the Management plan for coastal areas  
(source : MedWetCoast, 2004)



## 2. Uses and history of the site

In view of its position between the Adriatic and the Ionian Sea, the island has always been a strategic military defence point.

The history of the occupation of the island is very complex, notably between the Second World War and nowadays, and the presence of military buildings, bunkers and a network of galleries are a testimony of the former important military uses of the area.

In the 15<sup>th</sup> century it was a Turkish possession, then Italian in the 18<sup>th</sup> century and then the island was handed over to Greece in 1864 and subsequently abandoned in 1914. The installation of an Italian military base was ratified in 1915 in the Treaty of London. The Italian authorities built a lighthouse and naval fortifications before settling the families of fishermen.

The island was under German occupation from 1943 to 1944 before it was taken over by Albania. The island has also certainly hosted a Russian military base.

The access to the island is controlled and ruled by the Albanian army. An Italian-Albanian military unit was set up in 1997, aiming to control the illegal traffic at sea.



*Photo: C. Damery, 2011*

In the 1970s, the island was thought to have been inhabited by over 300 families, mainly employed by the army and marine fleet. Buildings allowing the welcoming of a permanent population have been realized, in parallel with the development of the military base: houses, schools, hospital, library, cinema, party hall, football field. In the middle of 1980s these families were removed from Sazani and currently the island is not inhabited. The remains of numerous buildings are still to be seen today.



*Photo: C. Damery, 2011*

The island's inaccessibility and the lack of inhabitants made it possible to conserve the natural habitats. Currently, access to the island is possible by authorization from the Ministry of Defence and the Border Police. An additional permit is necessary from the Ministry of Environment in case of research and environmental activities. There is no regular transport to the island, but access by boat can be provided by dealing with local fishermen, when the necessary authorizations and permits from the authorities have been provided preliminary.

Actually, only a small population of military (Italian and Albanian) is living in the island.

- Visit of the deserted buildings (without taking into account buildings actually in service and bunkers), tracking and estimation of the quantities of the main waste classified in family (in the buildings and their immediate environment) ;
- Gamma rays measures for " raise the radiological doubt " ;
- Location of soil pollution indexes and samples for analyses ;
- Estimation of the state of preservation of buildings and their cultural or environmental interest within the prospects of showcasing the island for a possible public welcoming on the site ;

Limits : little known history, evaluation without weighing, only gamma rays measures, no measuring device for metallic pollution

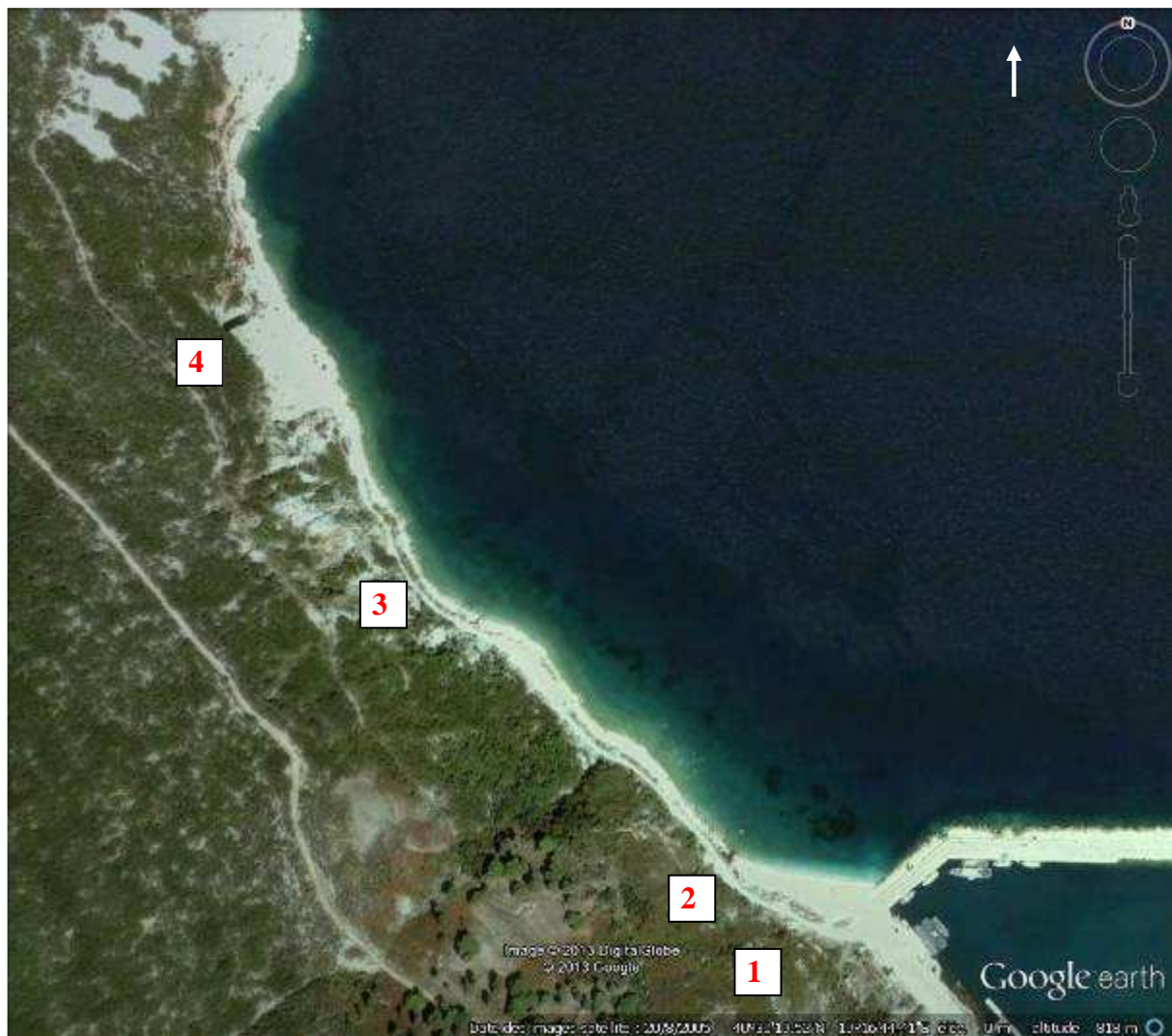
## OBSERVATIONS ON THE SITE

### General layout plan





## Eastern sector



Location :

1

### Location 1 :

Close to the harbour, this place is a wasteland area. Soils are littered of pieces of metal as : a big tank (about 100 m3), a crane, a truck wreck,....

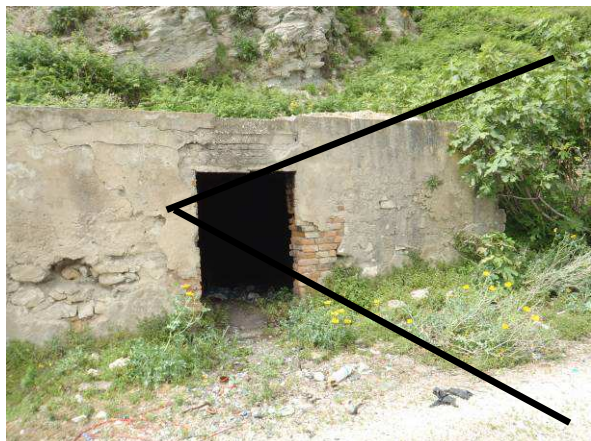
We estimate at 3 tons of easy metal to remove (except big tank), and about 1 ton of non-hazardous industrial waste (plastic, wood,...).





**Location 2 :**

A brick-built construction which is used nowadays to burn waste. Around this place, pieces of metal: about 3.5 tons  
Plastics litters: 0.1 ton



**Location 3 :**

In front of a bunker, another burning site, with about 0.1 tons of metal and glass.





**Location 4 :**

3 larges natural limestone caves reinforced with concrete vault (about 100 m long, 15 m large, 8 m height). The vault of the first one (coming from the south), is partly collapsed and dangerous. In the middle-one, about 50 m2 of demolition waste, and 10 m2 of asbestos plate (vault is in good condition). The third one is half bathed. In front of and close to the bunkers, there are pieces of metal and 3 tanks, frame (4 tons).





Location plan - harbour



**Location 1:**

Small single floor building with a damaged roof (10 m2 of asbestos plate) and walls made of masonry.

Metal: 3 tons

Wood: 0.5ton



**Location 2:**

Small damaged brick building full of wastes.

0.5 ton of non-hazardous industrial waste (plastic, wood,...).

0.5 ton of metal.

**Location 3:**

Ruined buildings.

100 m2 of plate in asbestos.





**Location 4:**

Large ground-floor masonry construction and concrete flat roof.  
Metal : 1.5 tons  
Wood : 0.1 tons



**Location 5:**

Group of four ground-floor masonry and concrete flat roof constructions.  
Metal : 2.5 tons

**Location 6:**

Large two-floors masonry and bricks construction with concrete flat roof.  
Average condition.  
Metal : 1 ton  
Garbage (Wood, plastic,...) : 0.2 tons



**Location 7:**

At the top of the small beach in the south of the quay. A thin soil polluted layer (0.2 m thick and about 15 m<sup>2</sup>), result of backfilling with burning wastes.





## Location plan - village



### Location 1:

School : Ground-floor bricks construction with bricks flat roof. Average condition.

Metal : 0.3 ton

Garbage (wood, plastic,...) : 0.1 tons

3 wooden school desks





**Location 2:**

Housing : Two-floors masonry construction partly collapsed.  
Metal : 1.5 tons  
Garbage (wood, fabrics, mattress, plastic,...) : 0.2 tons



**Location 3:**

Housing : Two-floors masonry construction in average general condition (locally bad).  
Metal : 1 tons



**Location 4:**

Small semaphore : Concrete and masonry construction in bad condition.  
Metal : 0,3 tons (empty barrels)  
Battery : 10 units  
Garbage : 0.1 ton





**Location 5:**  
Concrete and masonry ground floor construction in average condition.  
Metal : 0,1 tons

S



**Location 6:**

Housing : Two-floors brick construction in average condition.  
Metal : 1.5 tons  
Garbage : 0.2 ton

**Location 7 to 12:**

Housing : three-floors brick construction in average condition.  
Metal : 6.5 tons  
Small stock of cement stone floor  
Garbage : 1 ton







**Location 13:**

Dancing room: Masonry construction in average condition.

Metal : 1 ton

Garbage : 0.2 ton

Glass : 0.5 ton



**Location 14:**

Small school : Ground floor limestone construction in average condition (cracks in angle).

Metal : 0.3 tons

**Location 15:**

Cinema : One floor bricks construction in middling condition (locally bad - cracks).

Metal : 0.1 tons

Wood : 5 tons (scene+ roof)



**Location 16:**

Small masonry construction.

**Location 17:**

Two floors bricks and masonry construction in middling condition and partly collapsed, and small electric transformer station (electric cupboard without pyralene oil).

Metal : 0.6 tons





**Location 18:**

Eight small traditional houses in middling condition (3 of them in ruin) and locally bad (roof partly collapsed and).  
Metal : 0.6 tons  
20 m<sup>2</sup> of plate in asbestos.



**Location 19:**

Bricks construction in good condition.

**Location 20:**

Group of four small ground-floor masonry constructions in middling condition and locally bad.  
Metal : 1 ton  
Garbage (wood) : 0.5 ton





## Location plan - center



### Location 1:

Two limestone blocks constructions in good condition (unsteady concrete roof on the small construction). 3 generators sets and 2 metallic tanks.  
A bunker with 2 generators sets.

Metal : 3.5 tons (not counting generators to leave).  
Garbage (wood) : 0.5 ton







**Location 2:**

Hospital (1929). Two grounds limestone blocks constructions in quite good condition - basement inaccessible (locally collapsed parts). Concrete roof must be inspected in detail.

Metal : 3 tons (counting boiler).  
Battery : 30 units





**Location 3:**

Bakery?. Ground floor limestone construction in middling condition.

Metal : 3.5 tons (screen?, crusher,...).



**Location 4:**

Ground floor concrete blocks construction.

**Location 5:**

Ground floor bricks construction.

Metal : 0.3 ton

Wooden boxes : 0.3 ton

**Location 6:**

Ground floor bricks construction.

Metal : 0.4 ton (5 empty barrels, 8 beam balances)

Boxes with glass bottles: 0.3 ton

Near and in the south-est of this construction, a thin soil polluted layer, result of backfilling with burning wastes (0.3 m thick, area extension area undefined).

10 metallic elements (tanks, part of a truck,...) : 3 tons



**Location 7:**  
Only foundations remains.  
Metal : few military helmets



**Location 8:**  
Ground floor bricks construction with concrete roof (partly collapsed).  
Metal : 0.4 ton (large metallic wheels)

**Location 9:**  
Ground floor collapsed masonry construction.  
Metal : 0.5 ton (car wreck)



**Location 10:**  
Two ground floor collapsed masonry and bricks constructions.  
Metal : 2 tons  
0.3 ton of non-hazardous industrial waste (wood,...).



**Location 11:**  
Two smalls ground floor masonry and bricks constructions.  
Metal : 0.2 ton



**Location 12:**  
Two ground floor masonry and bricks construction.  
Metal : 0.2 tons  
Non-hazardous industrial waste (plastic bottles) : 0.1 ton

**Location 13:**  
Ground floor bricks construction.  
Metal : 0.5 tons  
Non-hazardous industrial waste : 0.2 ton (wood, mattress,...)  
3 barrel of hazardous wastes (calcium hypochlorite : Oxidant (O)Corrosive (C)Harmful (Xn)Dangerous for the environment (N) - R-phrases :R8, R22, R31, R34, R50)

5 barrels full of undefined substances.



**Location 14:**

Ground floor bricks and concrete construction.

Metal : 2 tons (screen, counting boiler,...)

Grey to black backfill (polluted soil?)



**Location 15:**

Ground floor bricks and concrete construction.

Metal : 1 ton

**Location 16:**

Ground floor masonry construction.

**Location 17:**

Ground floor masonry construction. Roof in asbestos plates collapsed (30 m<sup>2</sup>).

Metal : 0.1 ton (empty barrels)







**Location 18:**

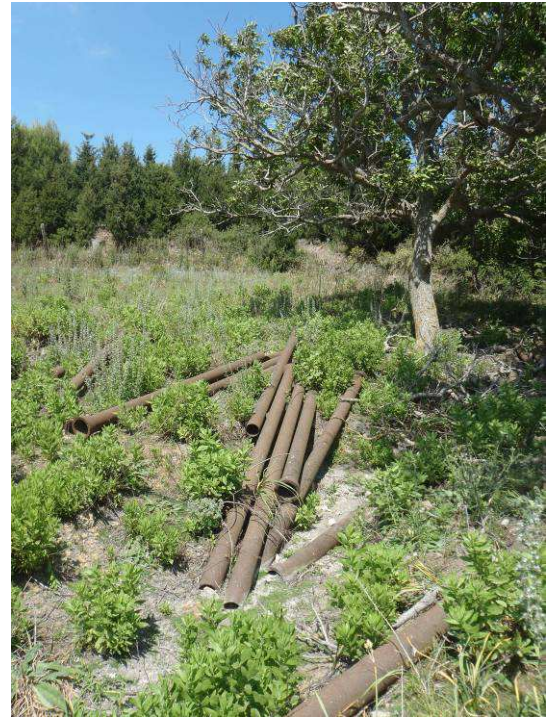
Two ground floor bricks and concrete construction in quite good condition.

Metal : 2 tons

Non-hazardous wastes (wood,...) : 0.1 ton.

**Location 19:**

Metal : About 30 metallic pipes (5 m long) : 4 tons



**Location 20 :**

Two ground floor bricks and concrete construction in poor condition.

Metal : 0.3 tons



**Location 21:**  
Ground floor impair masonry construction.  
Metal : 0.3 ton



**Location 22:**  
Ground floor bricks construction in middling condition.  
Metal : 0.2 tons





**Location 23:**

Two small ground floor bricks and limestone blocks constructions in quite good condition.

Metal : 0.1 ton



**Location 24:**

Two small ground floor bricks and limestone blocks constructions (roof altered).

Metal : 0.1 ton



**Location 25:**

Ground floor bricks construction.

Metal : (2 metallic frames outside) 0.2 ton



**Location 26:**  
Ground floor bricks constructions in quite good condition.  
Metal : 0.1 ton  
Wood : 0.3 ton  
Uniforms and garments: 0.5 ton

**Location 27:**  
Ground floor bricks constructions in average condition.



**Location 28:**  
Ground floor bricks construction in average condition.  
Metal : 0.2 ton  
Wood : 0.1 ton

**Location 29:**  
Ground floor bricks construction in average condition.  
Metal : 0.2 ton  
recent grenades (10 boxes).  
Wood : 0.2 ton



## PROVISIONNAL ESTIMATION OF WASTES

	Metal tons	Non Hazardous Waste (wood,...) tons	Hazardous Waste tons	Hazardous Waste - asbestos in square meter
Est sector	10.6	1.1		10
Harbour	8.5	1.3		110
Village	14.8	7.8	0.01	20
Center	28.3	2.9	0.03 + 8 barrels	30
<b>Total for the field survey</b>	<b>62.2</b>	<b>13.1</b>	<b>0.04 + 8 barrels</b>	<b>170</b>

## GAMMA SURVEYS

External exposure measurements have been carried on with a portable DG5 gamma survey meter, based on the use of a scintillation detector (Novelec)  
Background gamma counting on the island pier is about 50 counts per second.

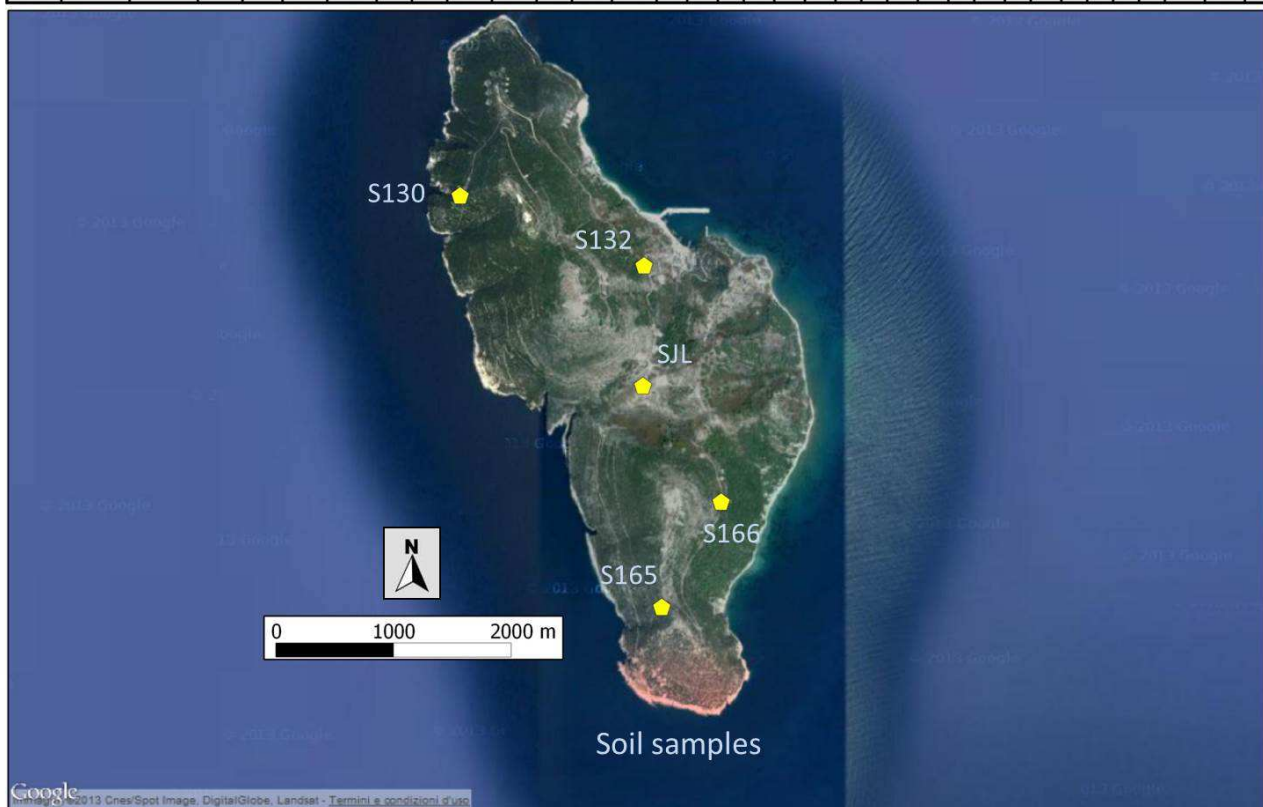
Measurements have been done for each investigated area previously described in this note.  
Only some very local values are greater than the background level: Harbour building location 1 (120 c/s), Center building location 1 (180 c/s), Center building basement at location 2 (200c/s). These increased levels are probably due to the presence of building materials like lead pipes.

## SOIL POLLUTION MONITORING

The study consists in the observation of pollution indications and in collection of 5 soil samples.  
One sample corresponds to a scoria soil (waste incineration residue).  
The other four have been randomly sampled on surface soils (15cm) to quantify the background level.  
Only metals have been analyzed. Results are presented on Table below.  
They show a relatively high background level but with no predictable effect on the public or on the environment.  
The SJL sample, which corresponds to obviously polluted soils, exhibits limited anomalies compared with background level for Zn, Ni, S, Ba and Cu.



Sample	LON	LAT	SiO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	LOI	V	Cr	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Y	Zr	Nb	Ba	La	Ce	Pb	Th	S	Br	U
S130	19.28192	40.48014	28.14	0.54	12.73	4.61	0.16	3.58	7.69	0.37	1.24	0.72	40.21	115	154	12	80	76	205	10	29	110	152	27	214	22	407	47	51	51	14	2470	2088	6
S132	19.28645	40.48623	31.57	0.6	13.13	5.07	0.15	2	6.29	0.35	1.55	0.31	38.99	112	244	13	110	27	92	11	48	87	82	23	189	18	336	49	68	33	10	2090	927	<2
SJL	19.28048	40.49295	17.32	0.38	8.59	4.07	0.11	1.61	16.02	0.41	0.85	0.42	50.23	98	108	18	148	120	317	6	36	42	668	27	20	7	889	40	47	69	6	9080	240	5
S166	19.28057	40.49991	31.51	0.53	9.79	5.03	0.12	2.78	22.65	0.5	1.36	0.09	25.66	93	176	13	157	47	99	2	36	62	268	19	73	9	378	31	33	15	4	300	280	5
S165	19.26653	40.50396	28.14	0.57	12.92	4.73	0.19	3	6.9	0.38	1.25	0.59	41.34	99	177	13	92	73	135	8	56	53	53	15	117	10	476	49	64	34	8	160	879	7



## STATE OF CONSERVATION OF PATRIMONIAL BUILDING

Generally, remaining buildings represent poor architectural concern.

Most of them are in bad state.

Some building may represent heritage sites for the Island history. Moreover, some few could be kept and adapted for use like public reception, desk use or technical place.

The next Table briefly presents the list of buildings which may provide any interest (except bunkers), considering four criteria:

Preservation, achitectoral concern, historical concern, heritage concern.

Location	Preservation	Architectural concern	Historical concern	Technical concern
Zone Harbour- location 6	average	+	-	+ : close to the pier
Zone village- location 1	average		+	-
Zone village - location 14	average	+	++	-
Zone village - location 15	average	-	+	+
Zone village - location 19	Quite good	-	-	++
Zone center - location 1	average	++	++	-
Zone center - location 2	average and bad locally	++	++	+
Zone center - location 18	average	-	-	++
Zone center - location 23	average	+	+	-

## CONCLUSION - RECOMMENDATION FOR MANAGEMENT

Generally, this waste and pollution diagnosis does not reveal any major risk for public health or ecosystems (taking into account limits described in the introduction). The main challenge consists in the management of the impacts on landscape due to several metal wastes dispatched on soils and ruins.

Most of the buildings are not interesting to be preserved or restored and should be destroyed. Therefore, the island would recover some natural landscape. This activity will generate many inert wastes that should be mainly used locally on the island (to fill the building basements for example).

The metal waste cleaning operation should be partly financially offset by their resale on the continent.

One management possibility should be the containment of non-dangerous waste containment (wood, rubble...) inside a bunker in a good structural state (East zone - location 4), with reversibility possibility. Some works on the access pathway should be necessary.

Dangerous wastes (batteries, asbestos, powder filled barrels ...) must be evacuated on the continent by a specialized company (with specific individual equipment).

Considering this monitoring step, soil pollution and radioactive exposure diagnosis do not reveal any potential risk. A complementary monitoring plan should be considered to confirm these results (with X-fluorescence portable device measurements).