5MPCW
CY-2025

Old-growth forests and flora conservation in Menorca (Balearic Islands)

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FUNDACIÓ PRIVADA

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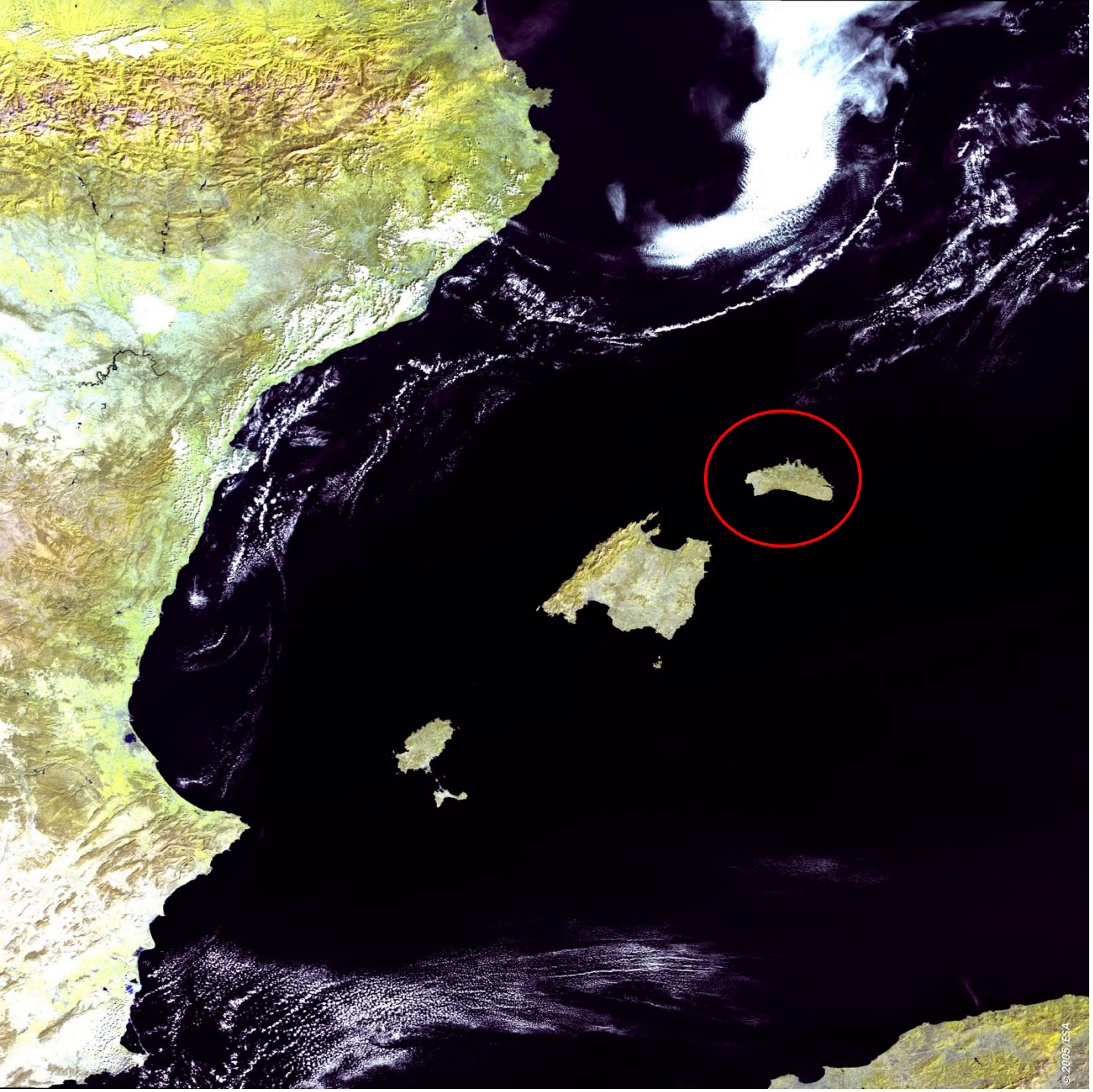
CONSELL INSULAR DE MENORCA



Surface: 700 km^2
Highest point: 356 m (Altoro)
Rainfall (annual): 536 mm
High influence of north wind (tramontana)
Two very differentiated geological regions: migjorn (southern part, limeston), tamuntana (northern part, mainly siliceous)
Climatic differences between east (less harsh, more humid) and west (mores harsh, hottest and drier).
Catastrofic meterorological phenomena somewhat frequent: tornados, downbursts.
Human population: ca. 100.000 habitants.
Main economic activity: tourism.
90% soil property is private.
Agriculture management: 70 % of the land.

The importance of old-growth forests

Old-growth forests are unique places

The importance of old-growth forests

They hold an important biodiversity

The importance of old-growth forests

And have also heritage values

What are old-growth forests?

Disparity of criteria in the identification of old-growth forests

Europarc–España (2020)

i. **Diversity of tree species**. An old forest must be made up of different tree species.
ii. **Presence of trees that are exceptional in size**. A symptom of the formation's old age.
iii. **Horizontal complexity**. The old forest must be heterogeneous in the sizes and dimensions of the trees.
iv. **Vertical layers**. There must be vegetation at different levels in the vertical dimension of the forest.
v. **Dead wood**. Dead wood must be abundant, of different sizes, mainly large and in different stages of decomposition.
vi. **Clearings**. Old forests, within their stability, must show irregularities in the form of clearings or other openings that favour a diversification of the vegetation.
vii. **Microhabitats**. Old trees due to their decay process are irregular, have cavities, wounds, which favour microhabitats that favour a specific biodiversity.

Badalamenti *et al.* (2018)

i. **Dead wood**. In a broad sense, both that of large dimensions and that of finer ones, which is already part of the soil.
ii. **Tree size**. The abundance of large trees is an indicator of the absence of human intervention for a long time, therefore it also indicates an old forest.
iii. **Structural characteristics**. It brings together criteria such as: horizontal and vertical stratification, presence of a shrub layer, heterogeneity of sizes and ages, presence of clearings.
iv. **Diversity of tree species**. They consider that 3 different species are sufficient. They argue that the richness of tree species is not a differential data with respect to young forests.
v. **Biological value**. Beyond the overall biodiversity of the forest, they value the presence of threatened or endemic species.
vi. **Threat situation**. They evaluate the threats for each forest as an identification indicator.

What are old-growth forests?

European Comission (2023)

Main indicators (all three must be met):

i. **Native species**. The old forest is made up of native species. The presence of small populations of non-native species does not disqualify, as long as they do not alter ecological processes.

ii. **Dead wood**. There must be a quantity and diversity of dead wood.

iii. **Old and large trees**. An old forest must have a significant quantity of trees of considerable size, indicators of a significant age of formation, always considering the characteristics and local growth conditions. There must also be old trees, a sign of the maturity of the forest.

Complementary indicators (at least two must be met):

i. Origin of the forest. Most old forests are of natural regeneration. However, planted or seeded forests can also have this consideration if over time they develop the characteristics of natural ones.

ii. Structural complexity. The old forest must have a complex structure either due to vertical stratification, horizontal heterogeneity or micro-relief of the soil due to movement or lifting of roots due to falling trees.

iii. Habitats in the trees (microhabitats). The old forest is characterized by the presence of a diversity of microhabitats linked to trees, both living and dead.

iv. In the old forest there are usually species that are indicators of stability or climactic community and that characterize specific forests, which also have the qualification of threatened according to the IUCN criteria.

Old-growth forests in Menorca?

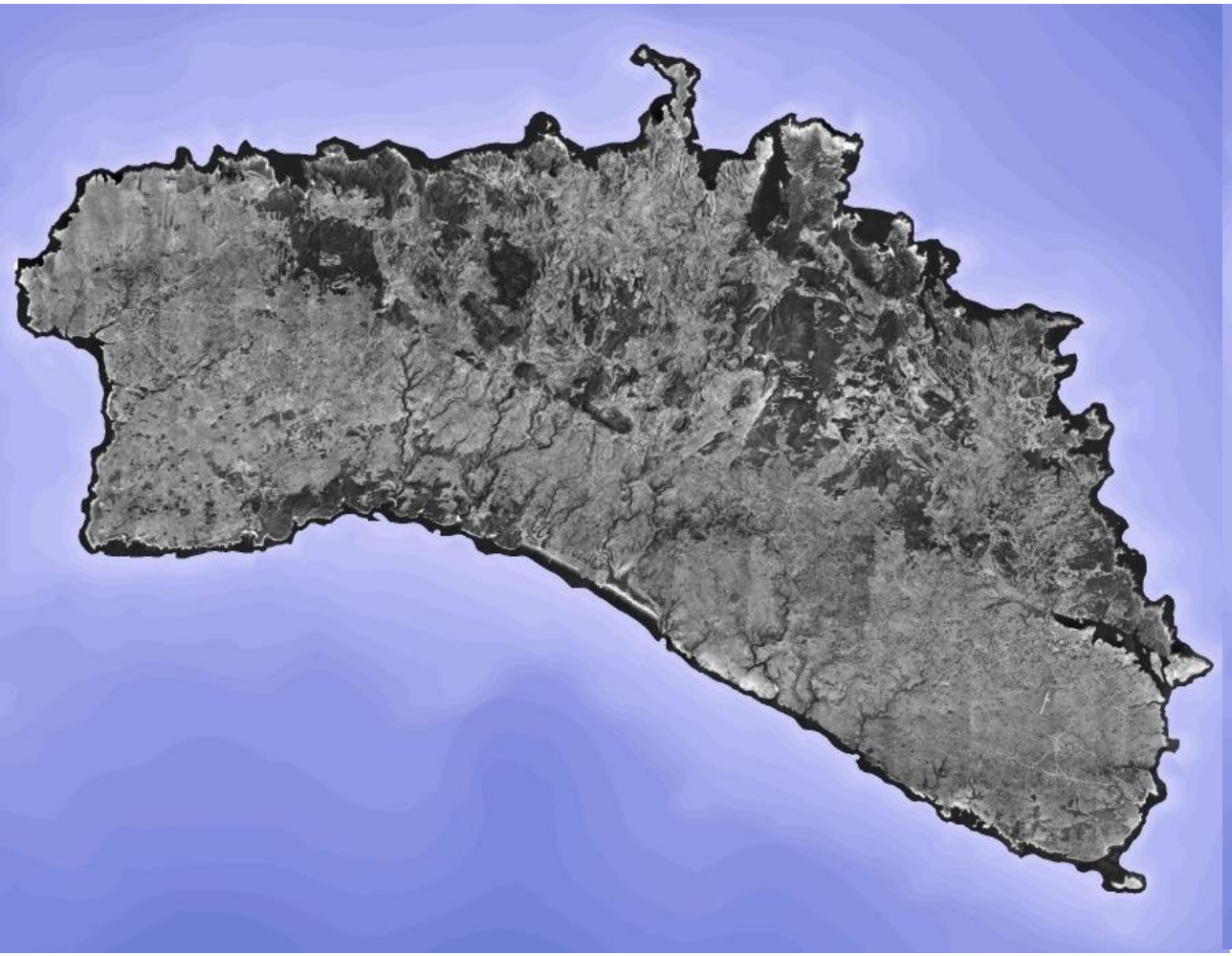
Menorca is a highly anthropized territory

Old-growth forests in Menorca?

A first step has been the identification of the types of forests that exist in Menorca. 17 types of forest have been identified, based on the dominant or characteristic tree species. For each one, a diagnosis has been made, listing the tree species and the main companion species.

Name	Diagnosis and structure	Tree or arborescent species	Companion species
Tamarellar (Tamarix forest)	Forest on the banks of watercourses or on the periphery of wetlands. Indifferent to soil conditions, but more developed in the impermeable lands of the north. Summer cycle. Medium tree layer (> 10 m). High dynamism. Abundant presence of dead wood. Understory formed mainly by herbaceous vegetation. Moderate presence of lianas.	*Tamarix africana*, *Tamarix boveana* (molt rar), *Tamarix gallica*, altres *Tamarix sp. pl.*, dominant *Rhamnus alaternus,* companiom Vitex agnus-castus, companion	*Allium triquetrum, Aristolochia rotunda, Bolboschoenus maritimus, Carex vulpina, Carex muricata, Carex divisa, Leucojum aestivum* subsp. *pulchellum, Ranunculus macrophyllus, Rubia peregrina subsp. longifolia.*
Ullastrar (Wild Olive forest)	Forest of flat lands or south-facing slopes of ravines and gullies. It develops best in calcareous or Palaeozoic materials, little presence in the siliceous Buntsandstein. Winter cycle. Medium tree layer (> 10 m). Frequent and abundant vertical layer of lianas. Understory mainly of herbaceous plants at maturity.	Olea europaea var. sylvestris, dominant Phillyrea latifolia, companion Juniperus turbinata, ocasional	*Arisarum vulgare, Arum italicum, Asparagus acutifolius, Asparagus albus, Cyclamen balearicum, Phaganalon saxatile, Prasium majus, Ruscus aculeatus, Smilax aspera, Theligonium cynocrambe*

Old-growth forests in Menorca?

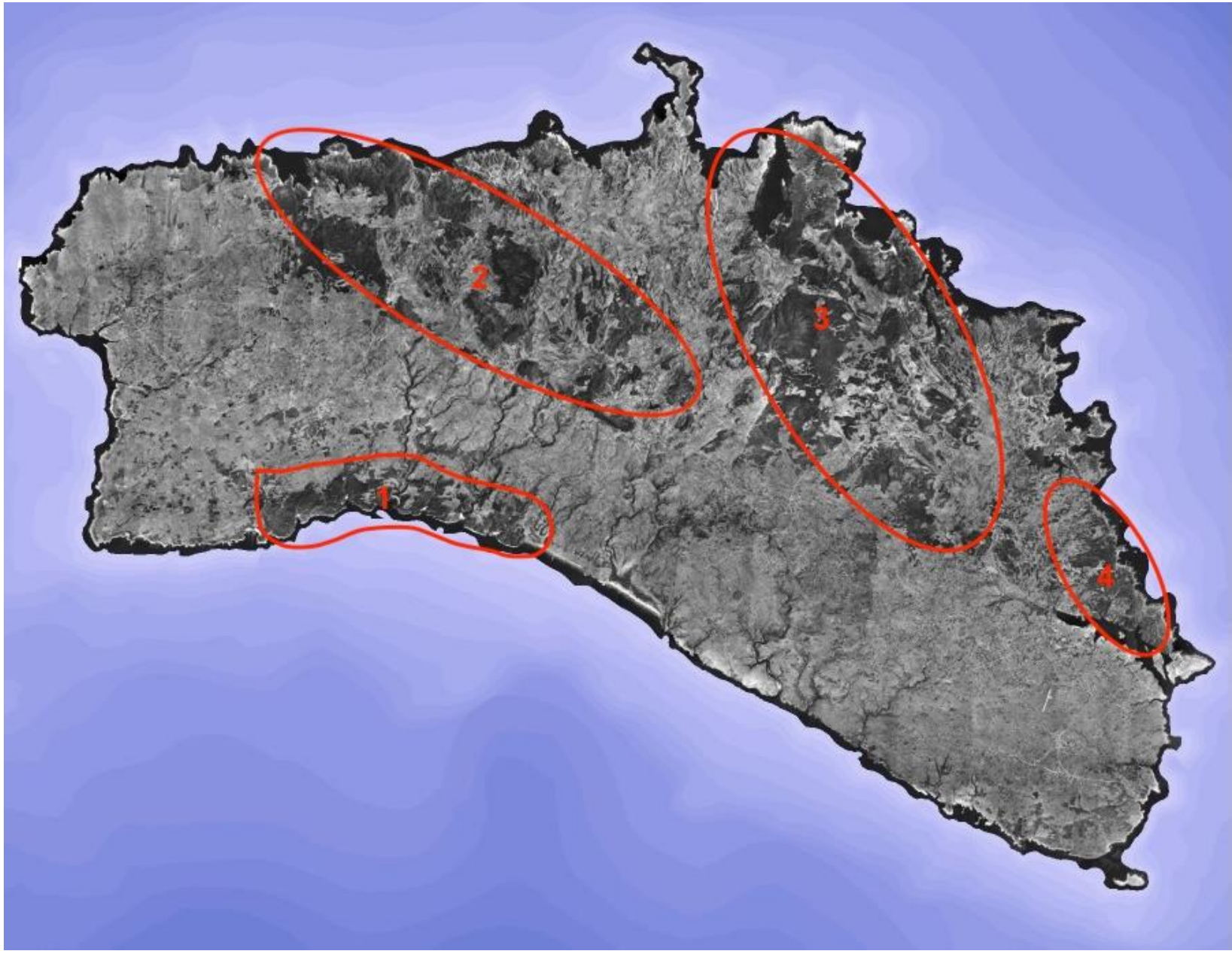


1956, the island deforested in the post-Spanish War.

2023, expansion of forests due to the abandonment of agricultural land.

Old-growth forests in Menorca?

In 1956, despite deforestation, forested areas persisted.



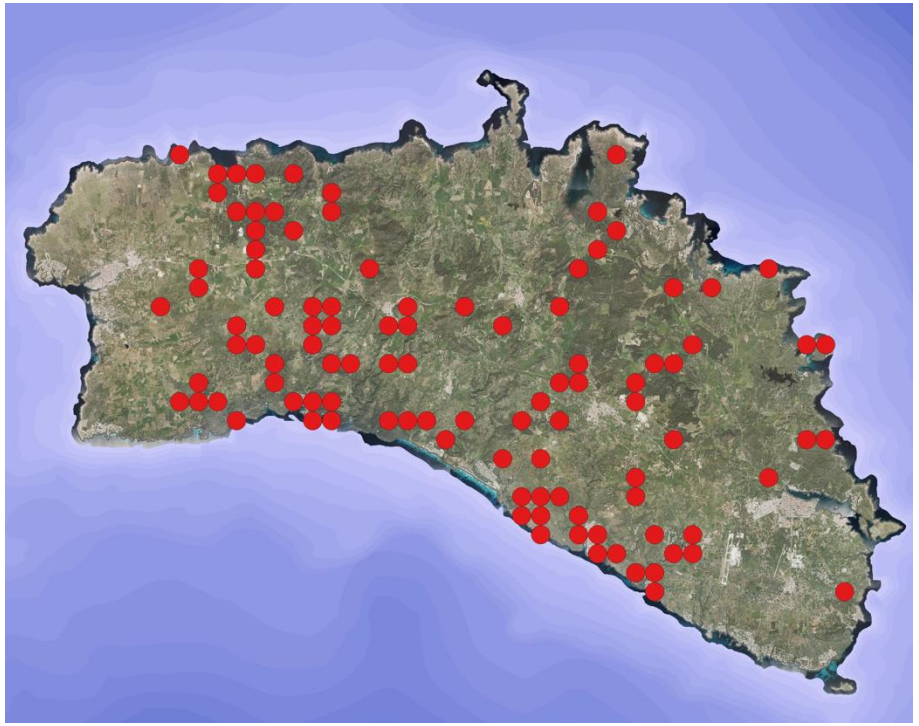
Old-growth forests in Menorca?

Now, there is a general expansion of forests on the island. It is like the rebirth of pre-human Menorca, when, like other Mediterranean islands, it was all forest.

Old-growth forests in Menorca?

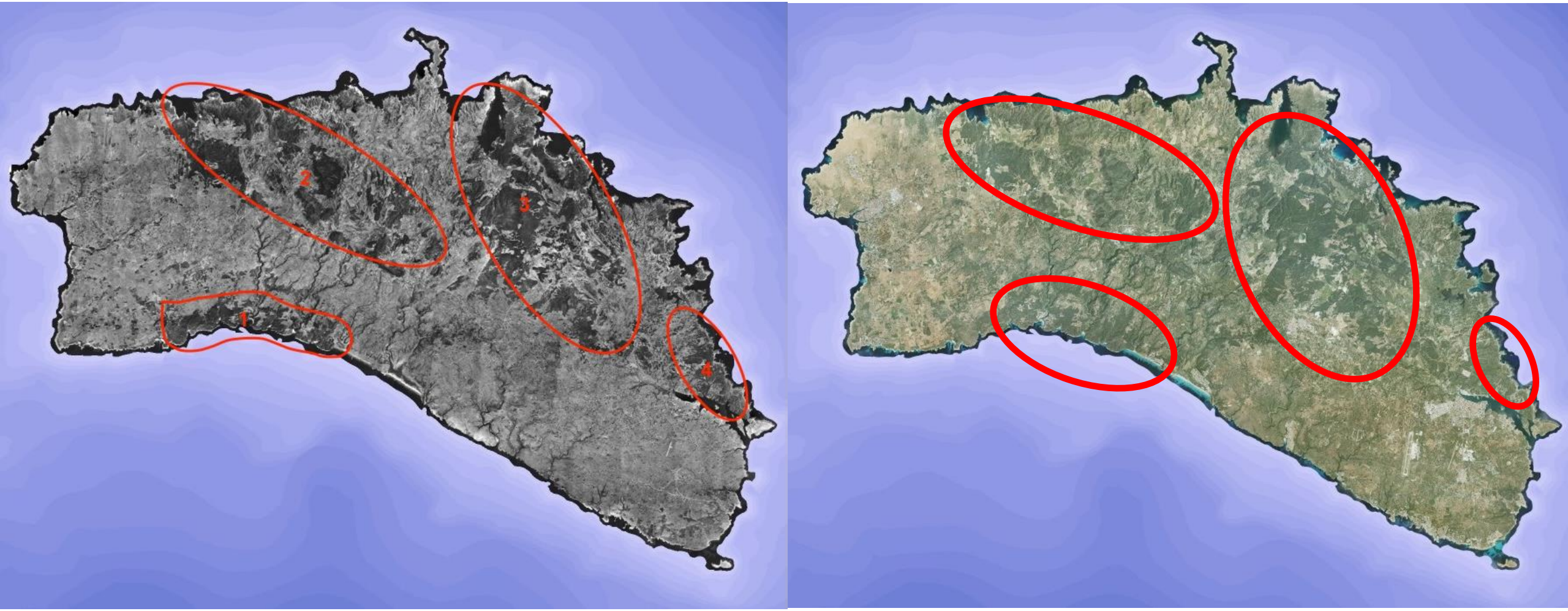
As other Mediterranean islands, the pre-human Menorca was mainly a forest island, as there wasn’t a megafauna able to disturb forest vegetation.

Old-growth forests in Menorca?



Forest species, like *Cyclamen balearicum*, are expanding its distribution area.

Old-growth forests in Menorca?



At the same time, the forest patches that were saved during the post-war period persist.

Old-growth forests in Menorca?

Exploration of some of this saved areas confirmed the existence of small areas of old-growth forests.

Old-growth forests in Menorca?

Elm riparian forest in Algendar ravine

Old-growth forests in Menorca?

Most old-growth forests are found in special places, like ravines

Old-growth forests in Menorca?

Pistacia lentiscus grove

Natural regeneration of forests and expansion of endemic and endangered flora

The two permanent wild populations of *Lysimachia minoricensis* are around regenerated and aging forests.

Natural regeneration of forests and expansion of endemic and endangered flora

Some threatened and endemic plant taxa related to mature forests

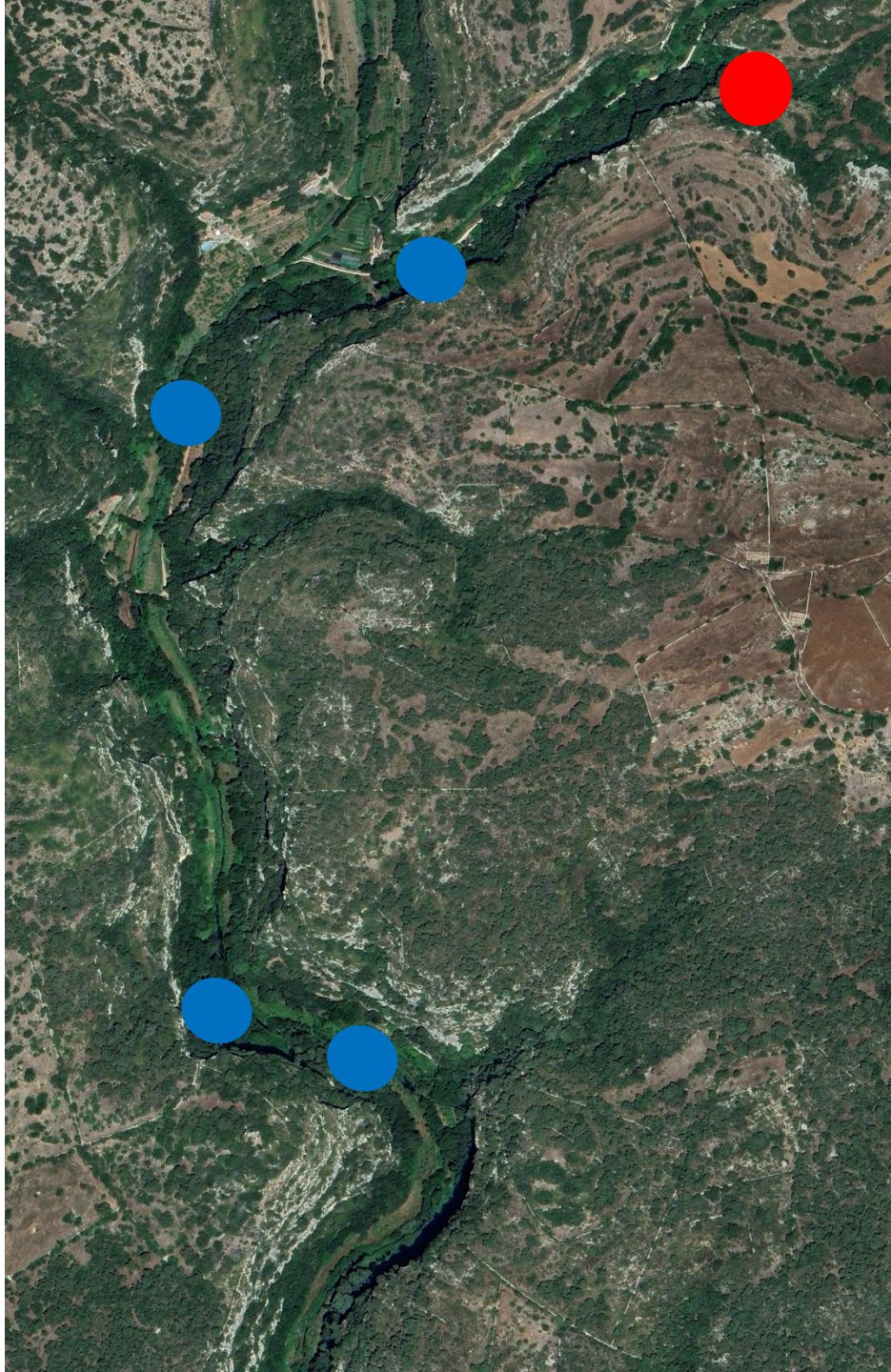
Taxon	UICN Cat.	Endemic
Aristolochia baetica L.	CR	
Asplenium azomanes Rosselló, Cubas & Rebassa	VU	
Asplenium foresiense Le Grand	CR	
Cephalanthera damasonium (Mill.) Druce	CR	
Ficaria verna Huds.	CR	
Paeonia cambessedesii (Willk.) Willk.	LC	✓
Rubia peregrina subsp. *requienii* (Duby) M.A. Cardona et Sierra	VU	✓
Teucrium asiaticum L.	VU	✓
Viburnum tinus L.	VU	
Viola alba Ten.	VU	
Viola stolonifera J.J. Rodr.	NT	✓

Natural regeneration of old-growth forests and expansion of endemic and endangered flora

Teucrium asiaticum (Gymnesian endemic) formerly known as a chasmophytic (refuge) species, now is found also as a terricolous where thermophilous evergreen forests are becoming mature

Natural regeneration of forests and expansion of endemic and endangered flora

- Historical population
- New population related to regenerated riparian forests



Lack of knowledge

The most common forest on the island is the wild olive grove, a local plant formation, but we know little about its dynamics and, especially, what are the attributes of what could be considered old-growth forests.


Thanks!