

Information Sheet on Ramsar Wetlands

1. **Date this sheet was completed/updated:**
2. **Country:** Spain
3. **Name of wetland:** Salinas de Ibiza and Formentera
4. **Geographical coordinates:**

01° 26' West longitude
38° 46' North latitude

5. **Altitude:** sea level
6. **Area:** 1640 hectares
7. **Overview:**

The Salinas de Ibiza and Formentera are formed by a group of lagoons, beaches and small islands. The largest areas of stagnant water on Formentera are two coastal lagoons, the Estany de's Peix and the Estany Pudent, the first connected to the sea. In the straights that separate the two islands there are low-lying islands and islets. On the largest of them, Espalmador, there is an endorheic inland lagoon.

The flora, strongly influenced by the proximity of the sea, the high salinity and the mobility of the sand substratum, is of great botanical interest.

There is a wide diversity of bird life because of the closeness of environments as diverse as the salt marshes, the small islands, the garigue and the marine channels. The sea birds, the *Calonectris diomedea*, *Hydrobates pelagicus*, *Larus audouinii*, *L. cachinnas* and *Puffinus yelkouan mauretanicus* (endemic to the Balearic Islands) have established large breeding colonies. Other birds, rare for the Mediterranean, can be seen here in the winter or during migration, such as the *Alca torda*, *Fatrerula arctica*, *Rissa tridactyla*, *Sula bassana* and *Uria aalga*. The Estany Pudent is the most important wintering area in Spain for the *Podiceps nigricollis*. The population of *Larus audouinii* represents 1.25 per cent of the total world population. The presence of the *Himantopus himantopus* is also important.

8. **Wetland type:**

Marine/coastal: E, H, J
Artificial: 5

9. **Ramsar criteria:** 3c

10. **Map of site included? Please tick yes -or- no**

11. **Name and address of the compiler of this form: -**

12. **Justification of the criteria selected under point 9, on previous page:**

Because of the waterfowl, this wetland meets criterion 3c as regards *Podiceps nigricollis* and *Larus auduinii*. Criterion SEO 1988 is also met.

Surveys of *zampullín cuellinegro* made in the Estany Pudent provide data making this the most important wintering area in Spain. It is estimated that a maximum of 500 specimens winter in all of Spain. There are more than the 150 specimens required for the SEO criterion, although there is little data on the total European population, but this is amply more than the 1 per cent required by the Regina criterion.

One hundred pairs of *Larus auduinii* bred here in 1978, while about 140 in 1982, 150 in 1983, which would be more than 1.25 per cent of the total world population.

The *Himantopus himantopus* is more that the numerical criteria of Scott because 77 to 80 nesting couples were counted in the area.

13. **General location:** The Salinas de Ibiza and Formentera are formed by a large group of lagoons, beaches and small islands located in a flat area formed by Quaternary soils out of which two high elevations rise: Puig d'es Corb Marí (160 metres) and Puig d'es Falcó (144 metres). The Salinas de Formentera are similar to those of Ibiza, but the areas of stagnant water are more extensive and correspond to two coastal lagoons: the Estany d'es Peix and the Estany Pudent. The first communicates with the sea. The strait that separates the two largest islands has many low-lying small islands and islets. The largest, Espalmador, has an endorheic inland lagoon.

14. **Physical features:**

Climate: The temperature in the area is stable and high. The average annual for Ibiza is 18-19° C and in no month is the temperature less than 10° C. In June, July, August and September, the temperature is more than an average of 25° C. On Formentera, the averages are slightly higher, but the maximum average is less than 30° C and are highest in the autumn than in the spring, while the minimum averages are in December, January and February. It can freeze from December to March on Ibiza, but this never happens on Formentera. The annual range of temperature is 14° C on Ibiza and 13° C on Formentera (one of the lowest in the Balearic Islands), while the average annual range is between 5° and 6° C. It is a climate with high average temperatures, mild winters, long summers, low annual average oscillation and high isolation (2800 hours per year).

Rainfall is irregular and light, a total of 380 millimetres on Ibiza and 350 millimetres on Formentera. The rainy season begins at the beginning of August in the form of storms

and continues until December with a maximum in October. In January, there is a decrease in rainfall until the arrival of the spring storms (*chubascos*) in April, when the second highest level is reached. Then, there is a decrease that continues until the end of the summer dry season. The rainfall is usually torrential, while the *chubascos* come during the unstable autumn and spring weather. The maximum of just one day of rain can be as much as 26 per cent of the total annual rainfall. This extreme heavy rainfall affects erosion and degrades the soil. There is no month that has an excess of water, quite on the contrary, the water deficit is spread over nine months on Ibiza and ten months on Formentera.

The dominant winds are from the west and southwest in winter as a result of the continental anticyclone and from the east in summer, because of the thermal depression in the centre of Spain. The area of the island is not large enough to form breezes. The lack of relief that would otherwise protect from the dominant winds increases erosion.

Evaporation is high all year round, somewhat lower than on Formentera, except during the winter. The lowest levels are in February (from 75 to 79 millimetres) and the highest are in August (from 211 to 225 millimetres). Evapotranspiration is high and in accordance with Thornthwaite's classification, the salt marshes on Ibiza and Formentera have a semiarid mesotermic climate without much water in winter, similar to the other areas in the Balearic Islands, although the aridity is exceeded by the salt marshes on eastern Mallorca.

Water regime: No stream supplies water, even seasonally, to the salt marshes on Ibiza and Formentera. The only continuous replenishment is sea water from the industrial use of the salt marshes. There is a dyke parallel to the outside of the pond that maintains the salt water used to extract salt separate from the freshwater from rain, surface runoff and surface seepage. In the Estany d'es Peix, the salinity is always identical to that of the sea, because they are joined. Only rainwater, runoff or groundwater can decrease the salinity. The salt marshes on Ibiza and the Estany d'es Peix and the Estany Pudent have small watersheds. Surface runoff on the edges of these basins is almost non-existent. The island of Espalmador has a small endorheic basin that collects rainwater that ends up in the pond. In general, surface runoff is low, except on the Corb Marí hill, which has clay soil that is almost impermeable. The other areas are very permeable, except the area of crops that is semi-abandoned, especially the dune systems, although the extreme nature of storms, already mentioned, prevents infiltration necessary to compensate the water deficit of the soil and the ground water, which is heavy with salts.

Geomorphology: The Penya Roja and Corb Marí hills south and east of the salt ponds on Ibiza formed in the Quaternary part of the chain of islets that are found between Ibiza and Formentera (Caragoler, Negres, Penjats). They are elevations of calcareous materials from the Secondary that were linked to the rest of the two islands by a chain of coastal chain of islets. The changes in sea level during the quaternary created a coastal bar that joined Ibiza with Formentera and in other periods separated the two islands, converting the two hills into islets. An alluvial plain of little or no slope formed by material from the Pleistocene joins the two former islands to Ibiza. The Corb Marí and Falcó hills are formed by calcareous materials, dolines and *margas* from the Secondary. The substratum of the alluvial plain is formed by Cretaceous *margas* that

serve as a base for the ground water.

Among the current geomorphologic formations, the cliff areas from sector O (Cap Falcó-Pont de Baix). The other elevations are relatively steep slopes that coincide, in general, with the dip of the secondary material in this area. At Cap Falcó, there are abundant piles of detritus at the base of the cliff. The rest of land in the Ibiza salt marshes are residual formations by alteration that created silt-sandy soils. At Point Ses Portes, there are in situ formations of worn-down substratum.

As for the beaches, the edges of the d's Codolar are of local origin and are formed by limestone reworked by erosion. The other beaches are formed by fine detritus material of allogenic origin.

The Salinas de Formentera, forming the area between Punta Pedrera and Punta Prima plus the island Espardell and Espalmador, are recent geological formations from the Quaternary. The rest of the coast is formed by beaches that could have originated from the breaking-down of material formerly accumulated (silts and former dunes) or through the accumulation of allogenic detritus material that is advancing towards the interior forming chains of dunes. At Punta Pedrera and the extreme northern part of Espalmador Island, there are in situ formations created by meteorization of the substratum.

The estanques d'es Peix and Pudent are separated from the sea by formations of dunes. Although the first maintains communication with the sea, Estany Pudent is completely closed now although formerly there could have been an outlet to the sea located close to the two windmills having opened later a canal that joined it with the sea through a outlet. In these two estanques, there are silt deposits of very unstable consistency over which the only hydrophilic vegetation on the island grows. In the southern part of Estanque Pudent, there is a shallow area of mud becoming impermeable.

As for the soils, in the salt marshes of Ibiza and Formentera there are regosols in the current sandy formations, in the mares in decomposition at Point Ses Portes, in the dunes and beaches around Estany Pudent, Punta Trocadors and the islands of Espalmador and Espardell. These are soils poor in humus but which have evolved, such as near Estany Pudent, toward Xerorendzina, thanks to the implantation of forests and later crops. The Xerorendzinas are associated, almost always, with *terra fusca*, leached in the more mountainous areas of the hills of Corb Marí and d'es Falcó. The *terra rosa* is found in the few places used for farming.

15. **Hydrological values:** -

16. **Ecological features:**

UN code	Types of habitat or association
11.34	Pastures of <i>Posidonia</i> (<i>Posidonetum oceanicae</i>)
15.11	Annual pioneer vegetation of <i>Salicornia</i> and others in areas of mud or sand

	(<i>Salicornietum emerici</i>)
15.15	Saline Mediterranean pastures (<i>Juncetalia maritimi</i>) <i>Plantaginion crassifoliae</i> , <i>Elymo elongati/Juncetum maritimi</i> , <i>Schoeno/Plantaginietum crassifoliae</i> , <i>Spartino/Juncetum maritimi</i>
15.16	Mediterranean and thermo Atlantic halophytic <i>matorrales</i> (<i>Arthrocnemetalia fruticosae</i>)
15.18	Saline steppes (<i>Limonetalia</i>) (<i>Ruppion maritimae</i>) (<i>Limonietum retuso/Fromenterae</i>) (<i>Frankenio pulverulenti/Limonietum grossi</i>) (<i>Limonium virgatum/Inula crithmoides</i>)
16.211	Shifting dunes with embryonic vegetation (<i>Cypero mucronati/Agropyretum juncei</i>)
16.212	Shifting coastal dunes with <i>Ammophila arenaria</i> (<i>Medicagini marinae/Ammophiletum australis</i>)
16.228	Dunes of <i>Malcomietalia</i> (<i>Chaenorhino formenterae/Silenetum cambessedesii</i>) (<i>Vulpiello tenuis/Cutandietum maritimae</i>) (<i>Lotus halophilus/Linaria pedunculata</i>)
16.223	Fixed coastal dunes of <i>Crucianellon maritimae</i> (<i>Loto cretici/Crucianelletum maritimae</i>)
16.27	<i>Matorrales</i> of juniper (<i>Juniperus</i> spp.) (<i>Clematido balearicae/Juniperetum turbinatae</i>)
17.2	Annual pioneer vegetation on accumulated marine detritus (<i>Salsolo kali/Cakiletum maritimae</i>)
18.22	Cliffs with vegetation of the Mediterranean coasts with endemic <i>Limonium</i> spp.
21*	Lagoons <i>Ruppion maritimae</i> , <i>Ruppium maritimae</i> (<i>Althenia barrandoni/Zosteretum noltii</i>)
22.13	Natural eutrophic lakes with vegetation <i>Magnopotamion</i> or <i>Hydrocharition</i> (<i>Potamogeton pectinatis</i>)
22.34*	Seasonal Mediterranean ponds (<i>Heleochoion</i>)
32.24	Thermo Mediterranean and pre-steppe <i>matorrales</i> (<i>Cneorotricocci/Pistacietum lentisci</i>)
34.5*	Sub steppe areas of gramineae and annuals (<i>Thero/Brachypodietea</i>) (<i>Limonium echioides</i>)
42.A2*	Endemic Mediterranean forest of <i>Juniperus</i> spp.

* Priority habitats

17. Noteworthy flora:

Because of its botany, the flora of the Salinas de Ibiza and Formentera is the most important of the Pitiusas. It is strongly influenced by its proximity to the sea, its high level of salinity and the mobility of the sandy substratum. The transit of visitors and vehicles directly threatens the dune communities of plants. In the coastal dunes, there are mixed communities of *Ammophiletea juniperetum* and *Chrithmolimonietea*. The maritime influence is extremely strong, the wind is humid and the soil forms differences in elevation and dunes that favour the formation of microclimates. The vegetation is arranged in bands parallel to the coast. At Punta Trocadors, the influence of the sea breezes blow from both sides, and it is impossible to distinguish these structures from

the typical structures of the Mediterranean beaches. Closest to the beach, some twenty metres from the water's edge, there is a community of *Agropyretum mediterraneum* with *Agropyron junceum mediterraneum* associated with *Cutandia maritime*, *Eryngium maritimum* and *Sporobolus arenarius*. This is where *Ammophila arenaria arundinaceae* begins to grow and then becomes dominant on the crest of the dunes, contributing to their fixation and giving the name to the association *Ammophiletum arundinaceae*, *Crepis bulbosa*, *Pancratium maritimum*, *Silene littorea nana* and *Senecio leucanthemifolius* as characteristic species. On Formentera, *Lotus cytisoides* appears in this area in great abundance. On the islet d'es Porcs, *Mattiola sinuate*, a plant characteristic of *Ammophilion*, grows. This the only site in the Pitiusas. In the more consolidated soils, camephytes, *Crucienella maritima* and *Helichrysum stoechas*, grow. In the last bands, in the fixed soil, a relatively dense garigue takes hold in which *Juniperus phoenicia* and *Pinus halepensis* dominate. The undergrowth is formed by *Anthyllis cytisoides*, *Cistus clusii*, *Pistacia lentiscus* and *Rosmarinus officinalis*. Species such as *Juncus acutus*, *Salsola vermiculata* and *Schoenus nigricans* can be found in the garigue in the area closest to the salt flats. The *sabinar* on Formentera is especially well developed. It is abundant and is relatively undisturbed by human activity. There are many rare species in the Balearic Islands or endemic to Ibiza and Formentera, such as *Chaenorrhinum organifolium*, *C. rubrifolium formenterae*, *Diplotaxis catholica*, *Senecio leucanthemifolius* and *Silene littorea*.

In the salt flats, the presence of ground water close to the surface and heavy in salts prevents the growth of forests. Near these areas, there is a gradient of salinity that produce gradual changes in the vegetation that range from *sabinar* to areas of *Juncus* and the community of *Arthrocnemum* that also appears on some islets. In altered areas, the transition is more brusque. The changes caused as a result of the salt extraction has modified the structure of the vegetation and has introduced ruderal species. On Ibiza, there are the purest communities in the area next to where crops are grown and near the airport. Near the Estany Pudent, periodic changes in salinity create unique characteristics in the structure of the vegetation. *Arthrocnemum fruticosum* is very abundant. In an area of less brackish springs, there is *Phragmites communis*. There is *Lotus halophilus*, a species found primarily in the eastern Mediterranean, that is found in the Balearic Islands only on Formentera. In the rest of the Formentera salt marshes, communities of *Salicornietalia* and *Juncetalia maritime* appear. The first also appears near the pond on the island of Espalmador. Also found here is *Cynomorium coccineum*, a parasite.

On Ibiza, the salt marshes and beaches are protected by rocky hills with low shrubs in which the association *Rosmarino ericion* with *Asparagus horridus*, *Cistus albidus*, *C. clusii*, *Cneorum tricoccon*, *Fumana ericoides*, *Helicrisum stoechas*, *Juniperus oxycedrus*, *J. phoenicea*, *Lavandula dentate*, *Pinus halepensis* and *Thymus inodorus* are characteristic species. On Formentera, *Thymus inodorus* grows on eroded rocky surfaces of els Pujols. On the hills of d'es Corb Marí and d'es Falcó, *Cytinus hypocistis pitiusensis* grows. On Ibiza, throughout the interface between the hills and the sea, there is *Chritmo-Limonion* with *Limonium ebusitanum* and *Chritmun maritimum* as the dominant species. On the islands of Espardell and Espalmador, as well as on the other small islands, there are poorly developed communities of *Chritmna-Limonietaea*, with species such as *Genista dorycnifolia*, *Limonium formenterae*, *L. frosii*, *L. gibertii* and *L. retrisum*. In the areas most altered by man, there are communities of *Chenopodietalia*,

Selaginetalia and *Thero-brachypodietalia*. On Formentera, several abandoned cultivated fields are occupied by ruderal species that displace other more interesting species such as *Chaenorrhinum rubrifolium*, *Corynephorus divaricatus*, *Diplotaxis catholica*, *Senecio leucanthemifolius crassifolius* and *Silene littorea*.

18. Noteworthy fauna:

The salt marshes of Ibiza and Formentera are the place of the greatest importance for fauna in the Pitiusas, above all for waterfowl, although there is information on other groups. There are records of 36 species of fish belonging to 15 families. *Lithofagus mormyrus*, *Mullus barbatus* and *M. surmuletus* are especially abundant. The amphibians are represented by *Bufo viridis* and *Rana perezi*, although the *Bufo* is not found on Formentera. The populations of reptiles are of exceptional interest. On the islets and the larger islands, up to 14 endemic subspecies have been identified of *Podarcis pityusensis*, a lizard that is endemic to the Pitiusas. Some of these subspecies have not been confirmed; only six have been confirmed. Other reptiles are *Hemidactylus turcicus*, *Tarentola mauritanica* and *Testudo graeca*, which is rare on Formentera and seems extinct on Ibiza. There are no snakes.

There is a large diversity of bird life because of the nearness of varied environments, such as salt marshes, small islands, the garigue and marine cliffs. At Estany Pudent, up to 125 species have been identified, including frequent and occasional species. In the Estany d'es Peix, there are up to 30 aquatic and sea species. The sea birds have large breeding colonies in this area, including the *Puffinus yelkouan mauretanicus*, endemic to the Balearic Islands, *Calonectris diomedea*, *Hydrobates pelagicus*, *Larus audouinii* and *L. cachinnans*, which nest on the islands. Other rare sea birds in the Mediterranean can be seen here in winter or during migration, such as the *Alca torda*, *Fratercula arctica*, *Rissa tridactyla*, *Sula bassana* and *Uria aalge*. The salt flats and lagoons are an important resting area for migratory waterfowl. Seven species of ducks frequently winter here. *Phoenicopterus ruber* bred in the Estany Pudent until the eighteenth century and are still frequently seen in winter and during migration in groups of up to 30 specimens. Among the aquatic wintering birds are the *Podiceps nigricollis*, which can be seen in large numbers in the Estany Pudent. Shore birds are frequent, especially during migration. Up to 40 species can be seen in the ponds and salt marshes. The following species breed in the area: *Charadrius alexandrinus*, *C. dubius* and *Himantopus himantopus*. In the Estany d'les Peix only *C. alexandrinus* breeds because of the lack of shore vegetation. During migration, the absence of any of these groups is frequent. Among the birds of prey, *Pandion haliaetus* bred in the area until recently, but specimens are frequently seen. *Falco eleonora*, *F. peregrinus* and *F. tinnunculus* are sighted and other species of migrating eagles and kestrels are seen. In winter, the *Alcedo atthis* is a frequent visitor. Among the reproducing passeriformes are the *Galerida theklae* and the *Sylvia sarda balearica*.

19. Social and cultural values: -

20. **Land tenure/ownership of:** All the land in this area is private property.

21. **Current land use:** The most important use of this area is for recreation, extraction

of salt and hunting. There is almost no farming or livestock raising.

22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects: -

23. Conservation measures taken:

This area is designated as a nature reserve by Law 4/1989 of 27 March 1989. This designation is backed up by the constitutional court. Law 1/1991 of 30 January 1991 on nature areas and urban planning of the area for special protection in the Balearic Islands designates it as a nature area of special interest. There is no use or management plan.

4. Conservation measures proposed but not yet implemented: -

25. Current scientific research and facilities: -

26. Current conservation education: -

27. Current recreation and tourism: -

28. Jurisdiction:

Consellería de Medi Ambient, Ordenació del Territori I Litoral del Govern Balear

29. Management authority:

Consellería de Medi Ambient, Ordenació del Territori I Litoral del Govern Balear

30. Bibliographical references: