Conservation of the island wetlands of the Mediterranean Basin
"Mediterranean Island Wetlands" project

The Island wetlands of Malta

A technical report on the project and its outcomes

Pembroke, Malta, December, 2021

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Project team / Acknowledgements

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Pace, Andrea, GIS expert, M.Sc. Core researcher for the project since 2018, he was responsible for mapping and participated in wetland inventorying.

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1. Introduction

The Mediterranean Island Wetlands (MedIsWet) project seeks to implement the XII.14 Ramsar Resolution "Conservation of Mediterranean Basin island wetlands" and was launched in 2017. The project brings together 13 partners from nine Mediterranean countries. Training workshops were organised to better monitor the project progress and for team building purposes.

The project aimed at creating an inventory of the wetlands in the Mediterranean islands and rapid broad-brush surveys were carried out to collect information about these sites within a short time period. Ultimately, this inventory will provide researchers with a platform for a better understanding of the Maltese wetlands.

This report presents some general statistics on the wetlands in the inventory. Parameters presented include the size and location of the wetlands, their characteristics, biotic and abiotic factors. The conditions of the wetlands and what is threatening them were also recorded. Finally, the types and levels of environmental and cultural protection are presented.

NTM-FEE will maintain the website with the latest information and will also use it for educational purposes and as a tool to improve conservation of wetland ecosystems in the Maltese islands.

2. Methodology

The project started with the identification of potential wetlands using Google Earth. Only wetlands with a minimum area of 1 ha were considered. At this initial stage 126 potential wetlands were identified and delineated. Each wetland was assigned a code.

Existing literature about these wetlands was collated. To date, a list of 83 references has been compiled. The search for relevant literature remains an ongoing action.

Broad-brush surveys were undertaken to determine the characteristics and values of the wetlands. Floral and faunal species identified during the site visits were listed and additional species noted in the literature were also included. A standardised checklist was used to ensure comparability with the findings and data collated by the project partners. The surveys validated the delineation drawn from the desktop exercise. Photographs were taken to record what had been noted on site.

The particularities of the Maltese islands were also considered. Considering the context of Malta's water scarcity and the Ramsar definition of what constitutes a wetland[1]; large reservoirs, dammed watercourses and rock-cut salt pans were considered as wetlands even though they do not fall within the traditional definition of a wetland.

Finally, the data collated was organised into a database and a website (www.maltawetlands.org) was developed.

[1] *wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres...*

3. Results

3.1 Abundance, size and location

Sixty-six sites on Malta and twenty-five sites on Gozo were identified, mapped and surveyed, see **Figure 1**. Most of the recorded water bodies are particularly small with more than half of them being under 2,000 m^2. In accordance with the MedisWet project's requirements, the smallest site has an area of 1,000 m^2. The relatively small size of the wetlands reflects the small surface area of the Maltese Islands, which is 316 km^2. Moreover, the Maltese Islands is one of the most densely populated countries in the world and competition for space is high. The climate is described as semi-arid, and water in general is scarce.

Figure 2 below shows the number of wetlands identified in each census district. The Northern Harbour and the Southern Harbour are the districts with the least wetlands (two and five wetlands, respectively). This is explained by the highly urbanised land cover of these two districts. The district with the highest number of wetlands is Gozo (25 wetlands) and the Western district (22 wetlands). The locality with the most wetlands is Ir-Rabat (eight wetlands), which is in the Western district. This is followed by Marsaxlokk, In-Naxxar, Ħad-Dingli and Ħ'Attard, which have six wetlands each.

Figure 1: Map showing wetlands in the Maltese Islands

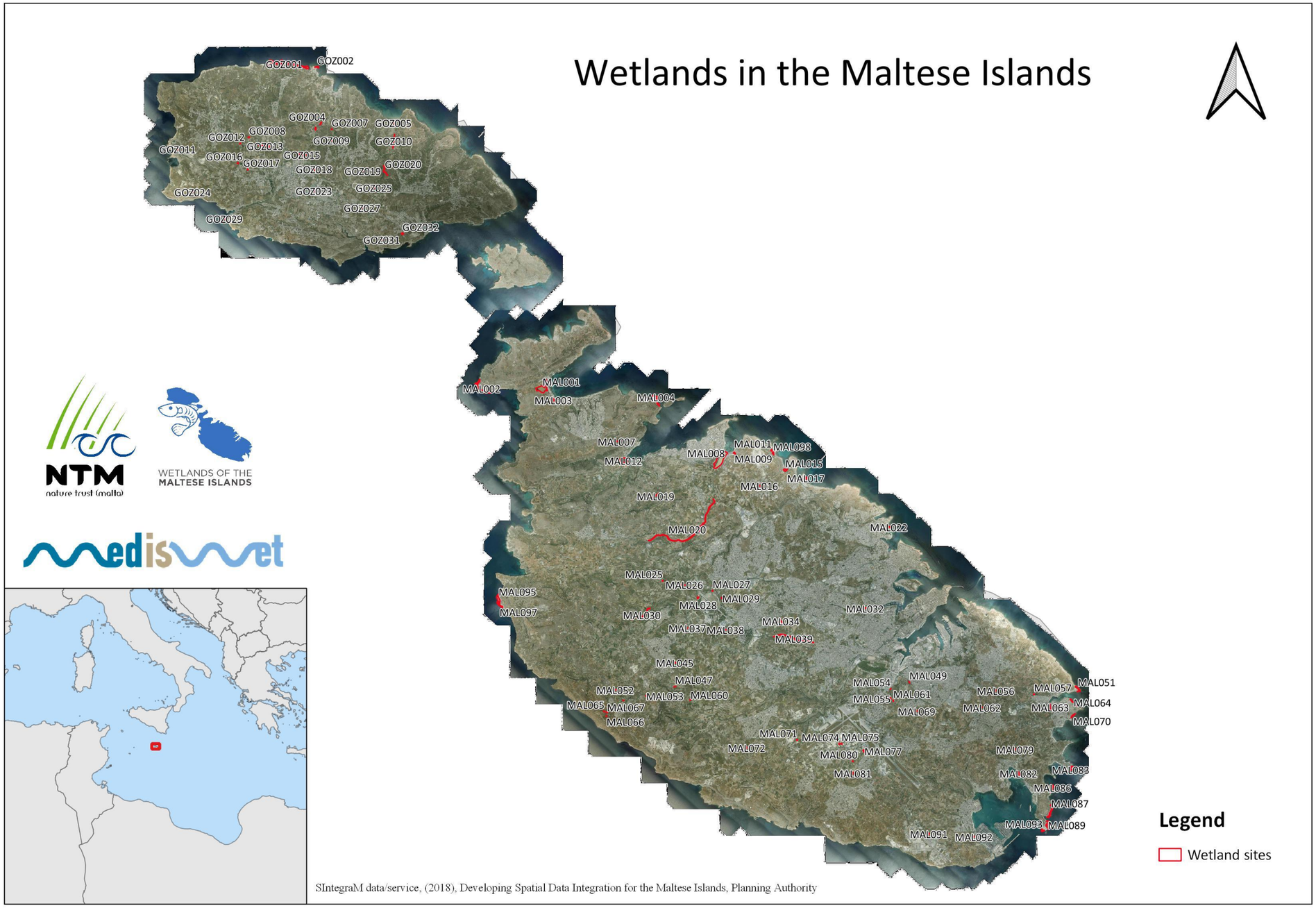

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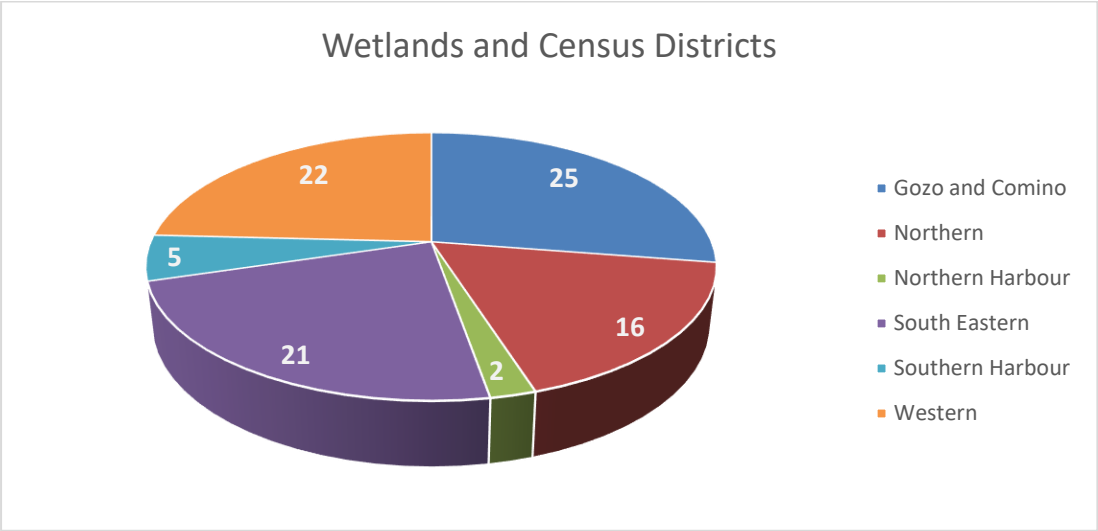
Figure 2: Wetlands and census districts

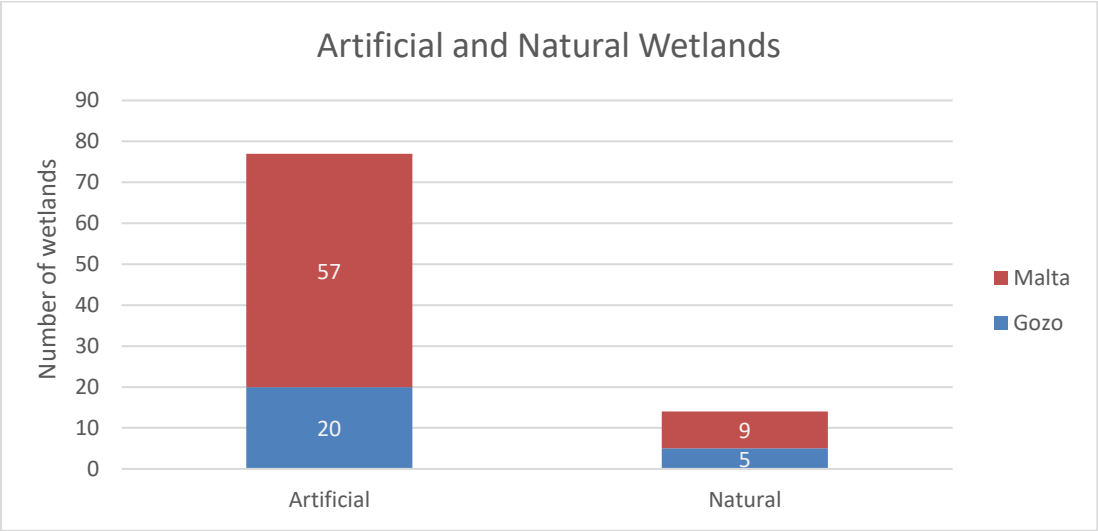


3.2 Wetland types and abiotic factors

The Maltese Islands have been inhabited since prehistoric times. The extensive history and high population density have resulted in an intensive anthropological influence on the land cover and landscape. It is for this reason that practically all Malta's surface has been influenced and / or modified by human activity and presence. This explains the dominance of artificial as opposed to natural wetlands in these islands.

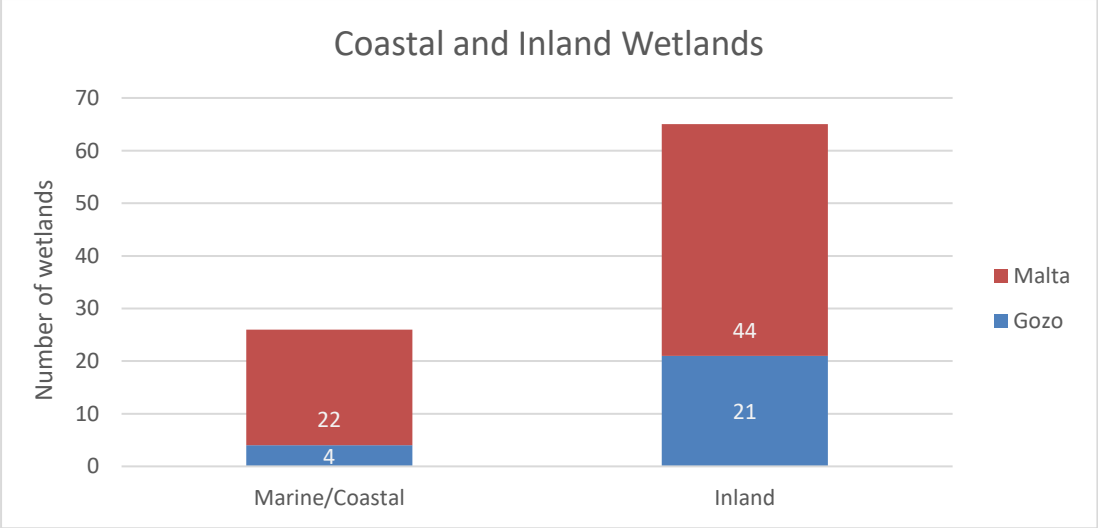
Eighty-five per cent of the wetlands in the Maltese Islands are artificial wetlands (77 sites). The remaining 15 per cent of the wetlands (14 sites) are natural wetlands, see **Figure 3**. Natural wetlands include artificial wetlands that have become naturalised over time. These specific wetlands have been classified as natural following an internal MedIsWet discussion defining each term. In the Maltese context, sites that have been engineered and that have become self-sustaining and stable without interventions can be considered to be natural sites (for example L-Għadira and Is-Simar). The share of natural wetlands in Gozo (20 per cent) is higher than the ones in Malta (16 per cent).

Figure 3: Artificial and natural wetlands



Around 71 per cent of the wetlands are located inland, see **Figure 4**. The remaining 28 per cent of the wetlands are located on the coast or in the surrounding area. These coastal sites include salt pans and salt marshes.

Figure 4: Coastal and inland wetlands



The wetlands were classified in accordance to their type, see **Figure 5** and **Figure 6**. The most common wetland types are the reservoirs, with a total of 40 sites, which is equivalent to 44 per cent of all the sites. The next most common type were saline / salt pan complexes of which there are 16 sites.

Figure 5: Wetland types

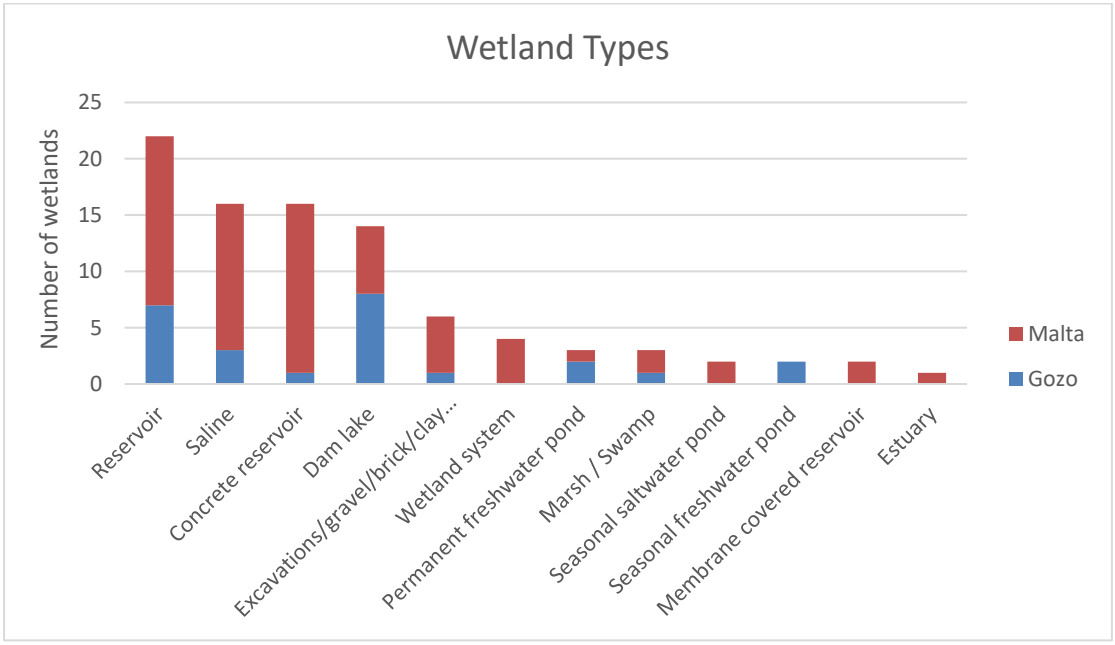


Figure 6: Images of different wetland types

Reservoir (It-Tafal ta' Xmejxi – MAL045)

Concrete reservoir (Wied ta' Sant' Andrija – MAL072)

Saline (rock-cut) (Il-Ponta ta' Delimara – MAL089)

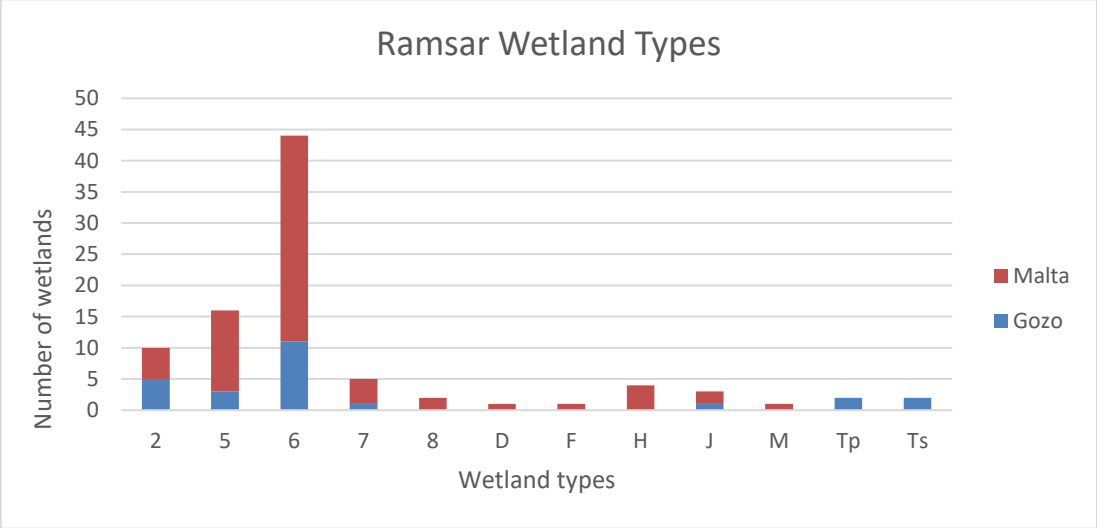
Dam Lake (Wied Qannotta – MAL019)

Excavation (Tal-Isqof 1 – MAL074)

Salt marsh (L-Għadira – MAL001)

The wetlands were also categorized using the Ramsar classification types, see **Figure 7**.

Figure 7: Ramsar wetland types



KEY:

2 -- Ponds; includes farm ponds, stock ponds, small tanks; (generally below 8 ha)

5 -- Salt exploitation sites; salt pans, salines, etc.

6 -- Water storage areas; reservoirs/barrages/dams/impoundments (generally over 8 ha)

7 -- Excavations; gravel/brick/clay pits; borrow pits, mining pools

8 -- Wastewater treatment areas; sewage farms, settling ponds, oxidation basins, etc.

D -- Rocky marine shores; includes rocky offshore islands, sea cliffs

F -- Estuarine waters; permanent water of estuaries and estuarine systems of deltas

H -- Intertidal marshes; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes

J -- Coastal brackish/saline lagoons; brackish to saline lagoons with at least one relatively narrow connection to the sea

M -- Permanent rivers/streams/creeks; includes waterfalls

Tp -- Permanent freshwater marshes/pools; ponds (below 8 ha), marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season

Ts -- Seasonal/intermittent freshwater marshes/pools on inorganic soils; includes sloughs, potholes, seasonally flooded meadows, sedge marshes

Activities within the wetland site and its catchment were observed and noted. Resource conservation was the most popular activity within the wetland sites (74 sites) followed by water pollution (60 sites) and irrigation (45 sites). Fertilisation and use of pesticides were the most common activities within the

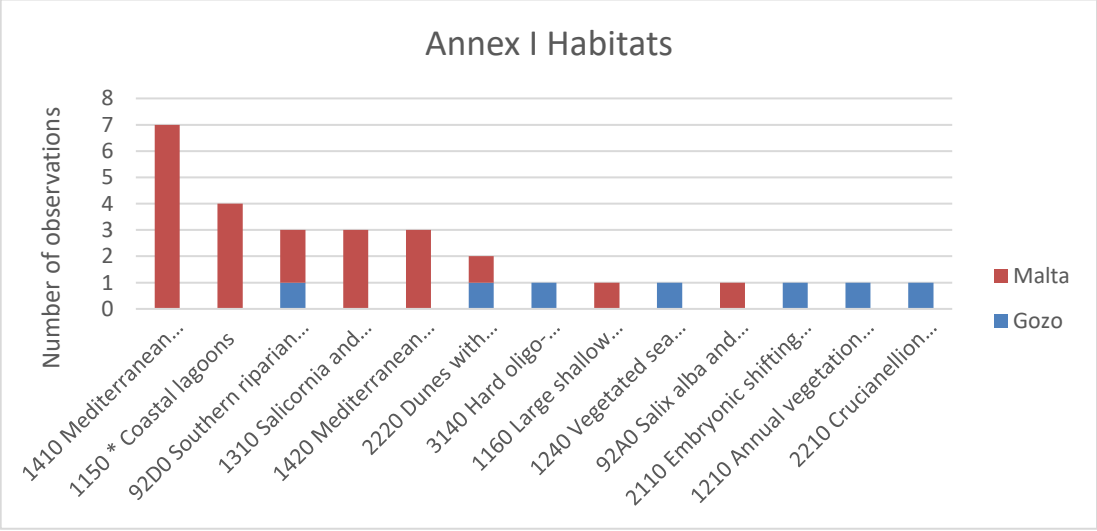
wetlands' catchment areas (66 sites), followed by cultivation (63 sites), irrigation (61 sites) and roads / motorways (60 sites).

3.3 Biotic characteristics

3.3.1 Vegetation and habitat types

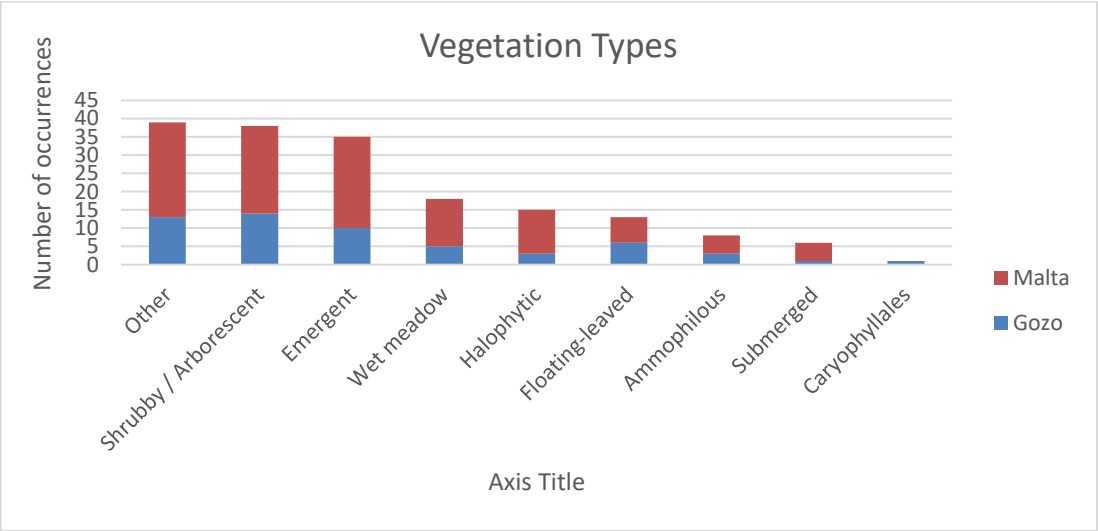
The habitats observed in 11 different sites were 14fricana14ed using the Annex I Habitat Directive classification, see **Figure 8**. The most common habitat observed in Malta's wetlands is Habitat 1410 – Mediterranean salt meadows (*Juncetalia 14fricana*) (seven sites), followed by Habitat 1150 – Coastal lagoons (four sites). Habitat 1410 refers to habitats that include salt marshes generally dominated by *Juncus maritimus* (Sea rush). This habitat has been observed at L-Għadira (MAL001), L-Għadira ż-Żgħira (MAL003), Is-Salini (MAL008), Qalet Marku (MAL015), Għadajjar ta' l-ilma ħelu fil-Qaliet (l/ta' San Ġiljan) (MAL022), Il-Ballut ta' Marsaxlokk (MAL082) and Il-Magħluq tal-Baħar ta' Marsaskala (MAL063). Habitat 1150 refers to stretches of shallow sea water with different salinity levels and volumes. The water body is separated from the sea with embankments made from different materials e.g. sand, shingle or rocks. This habitat has been observed at L-Għadira (MAL001), Is-Salini (MAL008), Is-Simar (MAL012) and Il-Magħluq tal-Baħar ta' Marsaskala (MAL063).

Figure 8: Annex I Habitat Directive classification types



The vegetation observed on site was also grouped by type, see **Figure 9**. The most popular type is the 'other' category, which includes alien and invasive species amongst others. The most common species in this category are the *Ricinus communis* (Castor oil tree), *Rumex conglomeratus* (Clustered dock) (which is not an alien species and is typical of Maltese water courses) , *Oxalis pes-caprae* (Cape Sorrel) and *Foeniculum vulgare* (Common Fenn el) (which is not an alien species and grows on disturbed land). The 'other' category is followed by the Shrubby / Arborescent category. The most common species are the *Tamarix 14fricana* (African tamarisk), followed by the *Ceratonia siliqua* (carob tree), *Tamarix* sp. (tamarisk) and the *Opuntia ficus-indica* (prickly pear).

Figure 9: Vegetation types



3.3.2 Fauna

Amphibians

Two species of frog were observed and recorded in the wetland sites during the field surveys. *Discoglossus pictus* (Painted frog), is the only endemic frog species in the Maltese Islands, see **Figure 10**. *Pelophylax bedriagae* (Levant Water Frog) is an alien species, which was recorded in some of the Gozo sites during the field surveys, it wasn't recorded in Malta during the MedIsWet field surveys. However, other studies have recorded it in Malta too (Sciberras and Schembri, 2006). The alien frogwas introduced in the late 1990s and poses a potential threat to the population of the endemic frog.

Figure 10: Pelophylax bedriagae at Għajn Klin (Gozo) (GOZ032)

Source: Thanos Giannakakis WWF Greece

Birds

Based on existing literature, *Sylvia melanocephala* (Sardinian Warbler) is the most common bird species recorded in the wetland sites. This species has been recorded in six different sites. *Acrocephalus schoenobaenus* (Sedge Warbler), *Cisticola juncidis* (Zitting Cisticola), *Erithacus rubecula* (European Robin), *Gallinago gallinago* (Common Snipe), *Phylloscopus collybita* (Common Chiffchaff), *Phylloscopus sibilatrix* (Wood Warbler), *Phylloscopus trochilus* (Willow Warbler) and *Saxicola rubetra* (Whinchat) were recorded in five sites. All the above species are passerines except for *Gallinago gallinago*, which is a wader.

Invertebrates

A total of 127 different species have been recorded in the sites and their surrounding areas. The following species have been recorded in three different sites:

- *Anthicus fenestratus*;
- *Brachytrupes megacephalus*;
- *Cyclodinus humilis*;
- *Gammarus aequicauda;*
- *Philanthus raptor siculus*;
- *Pseudoseriscius cameroni*;
- *Stenosis melitana*;
- *Stenosis schembrii* and
- *Tetragnatha extensa*.

Mammals

The literature review has shown that the mammal that has mostly been recorded within the wetland sites and their surrounding areas is *Pipistrellus pipistrellus* (Common Pipistrelle). This species has been recorded in four different wetland sites: Ir-Ramla (GOZ005), L-Għadira (MAL001), L-Għadira ż-Żgħira (MAL003) and Is-Salini (MAL008). This species is followed by *Myotis punicus* (Maghreb mouse-eared bat), *Plecotus austriacus* (Grey long-eared bat) and *Suncus etruscus* (Etruscan shrew).

Reptiles

Chalcides ocellatus tiligugu (Ocellated skink), see **Figure 11**, *Chamaeleo chamaeleon* (Mediterranean chameleon), *Coluber viridiflavus carbonarius* (Green Whip Snake) and *Podarcis filfolensis maltensis* (Maltese Wall Lizard) are the most common reptiles observed and have been recorded in four sites.

Figure 11: Chalcides ocellatus tiligugu at Wied tal-Qlejgħa 2 (MAL030)

Source: Thanos Giannakakis WWF Greece

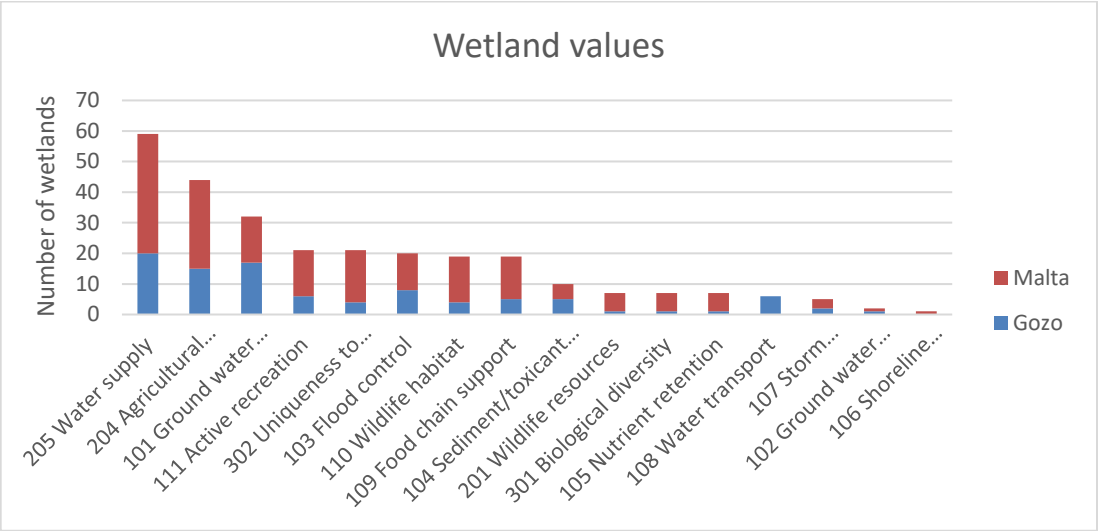
3.3.3 Flora

On site observations have shown that the most common species recorded during the field surveys is *Arundo donax* (Giant Reed). This species is found in 25 per cent of the wetland sites (23 wetland sites). This species is an archaeophyte (introduced to the Maltese Islands in antiquity) which often dominates wetland and watercourse habitats since it is fast growing. Its presence tends to result in a reduced biodiversity at the site due to its aggressiveness. The second most common species recorded is *Ricinus communis* (Castor Oil Tree), an invasive alien that is present in 13 sites. Other species recorded frequently include *Jacobaea crithmoides* (Golden Samphire), *Lemna minor* (Common Duckweed) and *Phragmites australis* (Lesser Reed) that were recorded in ten sites.

3.4 Wetlands' values

Wetlands provide a variety of ecosystem services. Their contribution to this effect has been recorded in line with Habitats Directive descriptions and summarized in **Figure 12** below. The most common value or service provided as identified during the field surveys is water supply, followed by agricultural resources. This reflects the high percentage of artificial wetlands and the dominance of reservoirs and concrete reservoirs.

Figure 12: Wetlands values



3.5 Condition and threats

3.5.1 Natural wetlands condition

From a total of 12 wetland sites, it was estimated that five had an original habitat that was partially modified (10-50 per cent untouched). Four sites had an original habitat which was still predominant (more than 50 per cent). These three sites were Rdum and Ras Il-Qammieħ (MAL002) (**Figure 13**), Għadajjar tal-ilma ħelu fil-Qaliet (MAL022) (**Figure 14**), Ir-Ramla (GOZ005) (**Figure 15**) and Il-Qattara (GOZ011) (**Figure 16**).

Figure 13: Rdum and Ras Il-Qammieħ (MAL002)

Figure 14: Għadajjar tal-ilma ħelu fil-Qaliet (MAL022)

Figure 15: Ir-Ramla (GOZ005)

Figure 16: Il-Qattara (GOZ011).

3.5.2 Significance of artificial wetlands

On site observations have shown that the artificial wetlands largely have poor biological significance. Eighty-nine per cent of the artificial wetlands have been classified as having of low biological significance (71 sites). Only four of the artificial wetlands merited high biological significance. These sites include Is-Salini (MAL008) (**Figure 17**); Is-Simar (MAL012) (**Figure 18**); Il-Wied tal-Qlejgħa 2 (MAL030) (**Figure 19**) and Għajn Klin (GOZ032) (**Figure 20**).

Figure 17: Is-Salini (MAL008)

Source: Thanos Giannakakis WWF Greece

Figure 18: Is-Simar (MAL012)

Figure 19: Il-Wied tal-Qlejgħa 2 (MAL030)

Figure 20: Għajn Klin (GOZ032)

Source: Thanos Giannakakis WWF Greece

3.5.3 Threats from human activities

Impacts were recorded and a distinction made between positive and negative impacts. The two dominant impacts identified are pesticide pollution and increased economic potential (positive). These two impacts were noted in 72 per cent of the sites (66 sites). They are followed by impacts from fertilizer / excess nutrient pollution (64 sites) and increased water supply (63 sites). The positive impacts are linked to the increased economic potential and water supply, whilst the negative impacts are linked to pollution. All these impacts are related to the link between these wetland sites and agricultural activity. This has already been noted in the wetland types and wetland values section.

3.6 Protection statuses

Protection statuses have been classified as international, national and other. International protection refers to Special Areas of Conservation – International Importance (Natura 2000 site – Environment Protection Act (Act I of 2016)), Special Protection Areas (Natura 2000 site – Environment Protection Act (Act I of 2016)), Ramsar sites, Important Bird and Biodiversity Areas, Transitional waters (Water Framework Directive) and Pools (Water Framework Directive). National protection refers to the other environmental designations: Areas of Ecological Importance / Site of Scientific Importance; Areas of High Landscape Value, Areas of Ecological Importance, Bird Sanctuaries, Tree Protection Areas, Special Areas of Conservation – National Importance and Protected Beaches. These are protected through the Development Planning Act (Act VII of 2016). 'Other' protection refers to protection that is not linked to the environmental character of the sites. This category consists of scheduling related to architecture and archaeology.

There are 34 sites that have at least one level of protection within the site, see **Figure 21**. Five of these sites have all types of protection levels within the site (international, national and other). These are Is-

Salini (MAL008), Il-Blata tal-Melħ 1 (MAL095), Il-Blata tal-Melħ 2 (MAL097), Ir-Ramla (GOZ005) and Il-Qattara (GOZ011).

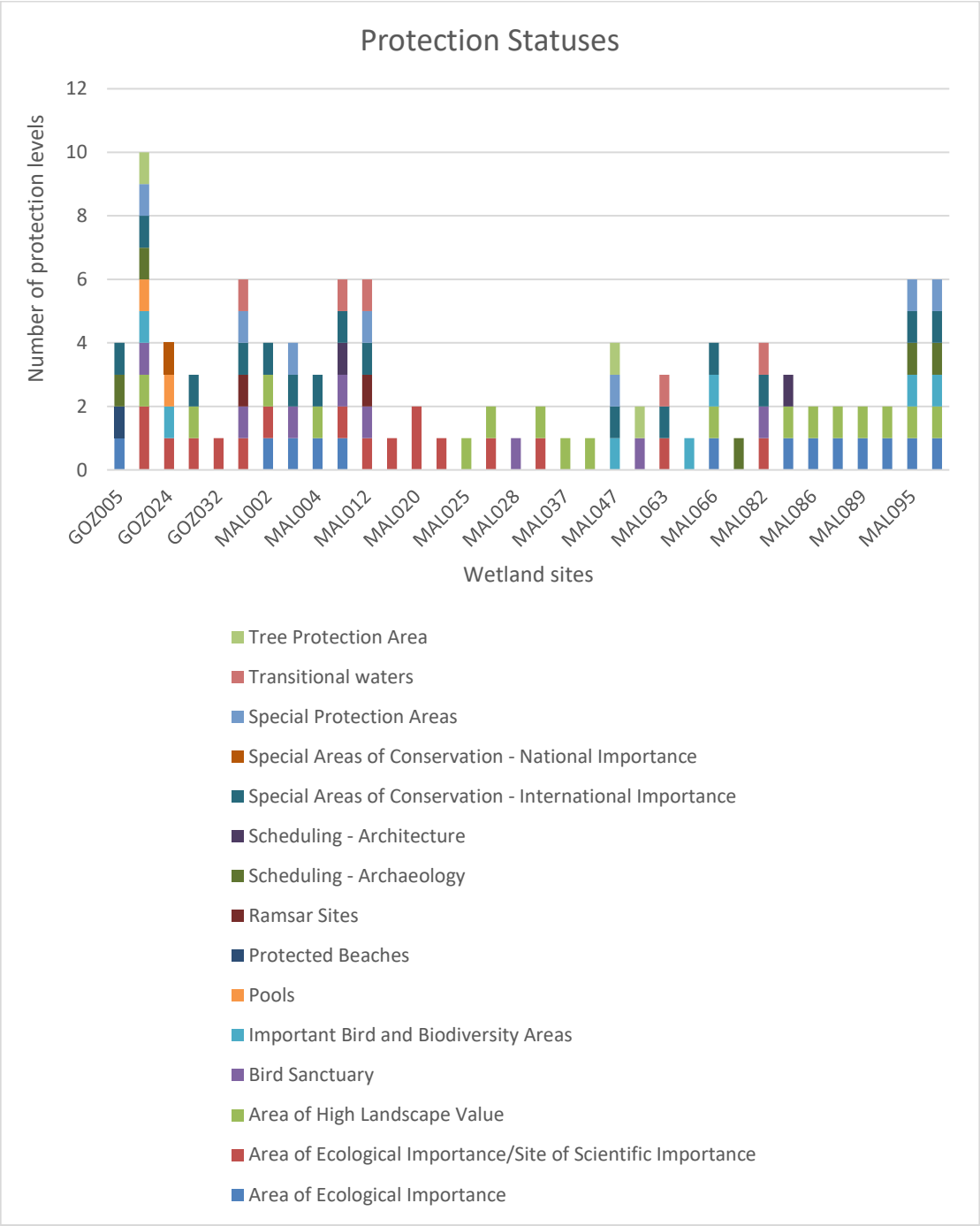
The protection designations are not always site specific and can include designations that go beyond the site boundaries and can also overlap with other sites. Sites can include overlapping designations. It has been estimated that 93 per cent of the designations identified in each site cover over 95 per cent of the wetland site.

The site with the most protections levels is Il-Qattara (GOZ011). This site has ten protection levels. This is followed by L-Għadira (MAL001), Is-Salini (MAL008), Is-Simar (MAL012) Il-Blata tal-Melħ 1 (MAL095) and Il-Blata tal-Melħ 2 (MAL097) that have six protection levels each. The last two sites are close to each other and hence share the same designations.

There are only two Ramsar Sites in the Maltese Islands, namely, L-Għadira (MAL001) and Is-Simar (MAL012). The Second Water Catchment Management Plan for the Maltese Islands identified important transitional waters (Is-Salini, Il-Magħluq ta' Marsaskala, Il-Ballut ta' Marsaxlokk, Is-Simar and L-Għadira), water courses (Wied tal-Baħrija, Wied il-Luq, Wied il-Lunzjata) and pools (Il-Qattara, L-Għadira ta' Sarraflu).

To date there is no specific designation for wetlands. Wetlands can either be protected based on their ecological significance (e.g. Areas of Ecological Importance) or based on their hydrological value (e.g. transitional waters and pools through Water Framework Directive). This project, which has created an inventory of the wetlands of the Maltese Islands can be used to lobby for a case to provide protection for these important water bodies in their own right.

Figure 21: Protection Statuses



Note:

GOZ005 Ir-Ramla
GOZ011 Il-Qattara
GOZ024 L-Għadira ta' San Raflu
GOZ029 Ras il-Bajda Salt Pans
GOZ032 Għajn Klin
MAL001 L-Għadira
MAL002 Rdum and Ras il-Qammieħ
MAL003 L-Għadira ż-Żgħira
MAL004 Tal-Blata Salt Pans
MAL008 Is-Salini
MAL012 Is-Simar
MAL015 Qalet Marku
MAL020 Għajn Rihana
MAL022 Għadajjar ta' l-ilma ħelu fil-Qaliet (l/ta' San Ġiljan)
MAL025 It-Tellerit
MAL026 Il-Wied tal-Qlejgħa 1
MAL028 Ta' Qali 2
MAL030 Il-Wied tal-Qlejgħa 2
MAL037 Il-Wiliġa tal-Ħemsija
MAL045 It-Tafal ta' Xmejxi
MAL047 Ġnien iż-Żgħir
MAL049 Vjal Santa Luċija
MAL063 Il-Magħluq tal-Baħar ta' Marsaskala
MAL065 Ta' Kalċ
MAL066 Tal-Pitkal
MAL079 Ħal Ġinwi
MAL082 Il-Ballut ta' Marsaxlokk
MAL083 Xrobb l-Għaġin
MAL086 Ras il-Qali
MAL087 Il-Kalanka L-Fonda & Il-Ponta tat-Tawwalija
MAL089 Il-Ponta tal-Gidien & Il-Ponta ta' Delimara
MAL093 Taħt l-Irdum
MAL095 Il-Blata tal-Melħ 1
MAL097 Il-Blata tal-Melħ 2

4. Conclusions

The project has created an inventory of wetlands across the Maltese Islands. It has been noted that most of the wetlands in the Maltese Islands are artificial and man-made. These wetlands' main purpose is the storage of water to support agricultural activity. The artificial wetlands tend to have a low biological significance, whilst the natural ones have been modified through anthropological influence. One of the greatest values of Maltese wetlands is thus provision of water. These aspects mirror the Maltese context of a densely populated island with a dry climate with seasonal winter rains.

Key threats to the Maltese wetlands are pollution from excess nutrients from fertilisers and pesticides; invasive species and the pressure of sprawling urban areas; and the proliferation of rural structures.

The wetlands with the highest biological significance are already protected internationally and/or nationally. Nonetheless, a specific protection type for wetlands would help to enhance the value of wetlands both for humans and the environment. For example, the rock-cut salt pans are traditional artificial seasonal water bodies that require further protection, even in terms of their cultural value.

The most common artificial water storage type is the reservoir. On site observations have shown that both public and private reservoirs are being roofed. This has resulted in some reservoirs being removed from the wetlands' inventory. Notwithstanding the loss in wetland surfaces, such projects improve water efficiency and sustainability.

Notwithstanding watercourses do not fit within the description of wetlands, local dammed watercourses have been included in the inventory since the dams create areas of standing water. Hence watercourses are converted into multiple 'reservoirs' which provide a wetland setting. This type of watercourse is typical of the Maltese rural environment and is the result of Malta's dry climate and the need to store water to sustain agricultural activity.

The abiotic factors and species presented in the inventory are based on broad-brush surveys and existing literature. The NTM-FEE team will ensure that the database will be updated with the latest literature and internal and external research. NTM-FEE will also use the inventory as an educational tool and as an aid to lobby for improved, specific protection of wetland ecosystems.

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