



Strengthening the Restoration of Mediterranean Wetlands for Nature and People



ASSESSMENT AND IDENTIFICATION OF POTENTIAL WETLANDS TO BE RESTORED IN MEDITERRANEAN COUNTRIES

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October 2021

This report has been produced in the framework of the project “Strengthening the Restoration of Mediterranean Wetlands for Nature and People” funded by the MAVA Foundation under the M3 Action Plan “Enhancing the conservation of coastal wetlands” between 2020 and 2022.

Citation: Tomàs-Vives, P, T.Gil-Gil & C. Viada-Sauleda. *Assessment and identification of potential wetlands to be restored in Mediterranean countries*. WWF Spain & MAVA Foundation. 36 pp

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ASSESSMENT AND IDENTIFICATION OF POTENTIAL WETLANDS TO BE RESTORED IN MEDITERRANEAN COUNTRIES

EXECUTIVE SUMMARY

Between December 2020 and March 2021, an online survey was carried out in order to compile potential wetlands to be restored in the Mediterranean region. 265 responses were received corresponding to 224 wetland sites from 24 countries. The total wetland area identified in the 265 questionnaires is 399,912 ha. A number of questionnaires are duplicates since different respondents have answered about the same sites, often giving different wetland areas. The total wetland area in need of restoration ranges between 233,146 ha and 330,706 ha for the 224 sites identified. The methodology and the main findings are presented in this report.

The objective of this assessment is to obtain a more ambitious and realistic target of the number hectares that can be restored across the Mediterranean by 2022.

A second objective is to provide data to support policy and advocacy actions in favour of Mediterranean wetlands.

An online app has been developed and it allows access to the data collected during this assessment:

https://www.wwf.es/nuestro_trabajo/agua/humedales/potential_wetlands_to_be_restored_in_mediterranean_countries/

INTRODUCTION

Wetlands in the Mediterranean are subject to strong pressures that in many cases cause their destruction or degradation. There is a consensus among the conservation community about the need to take urgent action to restore these wetlands that have undergone ecological change. This need is strongly recognized by the Ramsar Convention and the MedWet Initiative.

In the framework of the MAVA Foundation Operation Action Plan “Coastal Wetlands” (OAP3), WWF-Spain coordinates the project “FPP 7, Strengthening the restoration of Mediterranean Wetlands for nature and people” (from now on, FPP 7 Restoration), in partnership with Tour du Valat, the MedWet Secretariat, the MedSea Foundation and the Mediterranean Small Islands Initiative (PIM).

One of the OAP3-level objectives of the project was: “By 2022, at least 1,500 ha of degraded wetlands across the Mediterranean have been identified and have initiated the process of wetland ecological restoration following good practices”. The MAVA Foundation requested to update this restoration target and for this an assessment of potential wetlands to be restored in the region has been carried out (action 7.1.1.0).

OBJECTIVE

The objective of this assessment is to obtain a more ambitious and realistic target of the number hectares that can be restored across the Mediterranean by 2022.

A second objective is to provide data to support policy and advocacy actions in favour of Mediterranean wetlands.

METHODOLOGY

WWF Spain developed an online survey in order to obtain the information needed to carry out the assessment. The two main and most powerful platforms for online surveys, SurveyMonkey and Google forms, were assessed and Google forms (or Gforms) was chosen as it has several important advantages over SurveyMonkey; first, it is a free platform, fully integrated into the Google Toolkit and the results are directly exported to a Google sheets file which in turn can be converted to an Excel file for data analysis. More importantly, Google forms allows an unlimited number of questions (only ten in SurveyMonkey free edition) and an unlimited number of responses (in front of only 40 in SurveyMonkey).

Initially the survey was planned to be in English only, but in order to obtain a higher response rate, it was conducted in four languages: English, French, Spanish and Italian.

The questionnaire was circulated through the contact networks of the five partners of the FPP 7 Restoration project as well as some external partners. Each partner circulated it to their own networks in the 27 Contracting Parties to the Ramsar Convention in the Mediterranean region¹ plus Palestine, asking them to recirculate it to their respective contacts. This allowed to obtain a cascade effect and reach a large audience.

The target audience included any person or organization involved in wetland conservation, including site managers, technical staff, national and subnational government services, local authorities, scientists, NGO, individual experts, etc. In summary, anyone who can provide feedback to help identify potential wetlands for restoration in the region was invited to participate in the survey. Respondents were asked to answer the questions on the basis of their own personal knowledge according to the wetland condition at the time of answering. The average time to complete the survey was five minutes.

In a first phase, the online survey was launched on 1st December 2020 and it was open for completion until 15th December. A second phase was launched on 2nd February 2021, at the occasion of the World Wetland Day, and was open until 31st March.

The questionnaire

The questionnaire is composed of two sections (see annex 1): the first one includes questions about the wetland site and its restoration, and is mandatory. The second is optional and requests more detailed information about the project. In this way, the basic information necessary to meet the objective was obtained and at the same time the respondent was able to provide more information if he/she wanted.

RESULTS

¹ Albania, Algeria, Andorra, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Jordan, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Portugal, Serbia, Slovenia, Spain, Syrian Arab Republic, The former Yugoslav Republic of Macedonia, Tunisia and Turkey (MedWet n.d., *List of members of the Mediterranean Wetlands Committee*, accessed 1 August 2021 <https://medwet.org/wp-content/uploads/2021/03/MedWetCom-members.pdf>).

GENERAL INFORMATION

Number of responses

A total of 265 responses were received from 189 people identified. People from 24 countries answered the questionnaire, while no responses were obtained for only four countries: Andorra, Bulgaria, Monaco and North Macedonia. The 265 questionnaires answered correspond to 224 wetland sites as there are 33 duplicates (sites that have more than one response). Table 1 and figures 1a and 1b show the number and percentage of responses and sites for each country. A full list of the wetland sites can be found in annex 2.

The countries with the higher number of responses are Spain (95, 35.9%), Italy (43, 16.2%), Croatia (40, 15.1%), France (21, 7.9%) and Greece (15, 5.7%). Altogether, 214 questionnaires are from these five countries, representing 81% of the total replies and 82% of the sites (213). Twenty-four countries sent at least one reply and only four did not respond.

This does not indicate that most of the wetlands in need of restoration are in those five countries, but rather that the survey has received more attention, most likely because there is a higher number of people working on wetland conservation or the survey did not reach the adequate people in other countries.

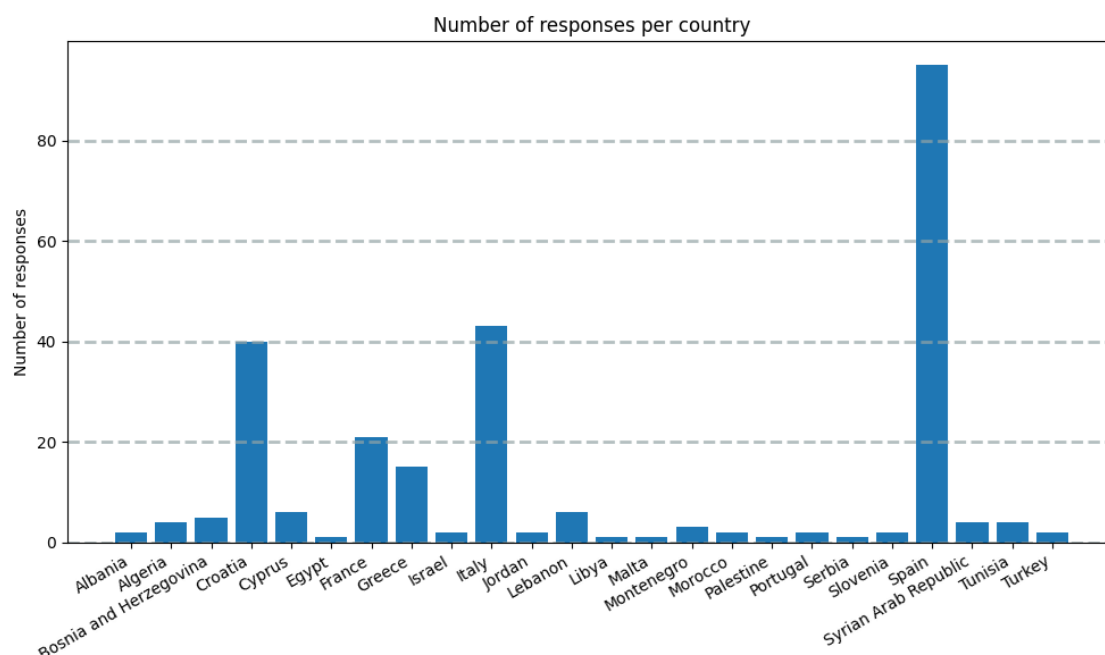


Figure 1a. Number of responses per country (countries with no response are not shown)

Country	No. responses	Percentage	No. sites	Percentage
Albania	2	0,8	1	0,4
Algeria	4	1,5	4	1,8
Bosnia and Herzegovina	5	1,9	2	0,9
Croatia	40	15,1	35	15,9
Cyprus	6	2,3	4	1,8
Egypt	1	0,4	1	0,4
France	21	7,9	21	9,4
Greece	15	5,7	15	6,7
Israel	2	0,8	2	0,9
Italy	43	16,2	42	18,8
Jordan	2	0,8	1	0,4
Lebanon	6	2,3	4	1,8
Libya	1	0,4	1	0,4
Malta	1	0,4	1	0,4
Montenegro	3	1,1	2	0,9
Morocco	2	0,8	2	0,9
Palestine	1	0,4	1	0,4
Portugal	2	0,8	2	0,9
Serbia	1	0,4	1	0,4
Slovenia	2	0,8	2	0,9
Spain	95	35,9	70	31,3
Syrian Arab Republic	4	1,5	4	1,8
Tunisia	4	1,5	4	1,8
Turkey	2	0,8	2	0,9
TOTAL	24	265	224	

Table 1. Number and percentage of responses and sites per country
(countries with no response are not shown)

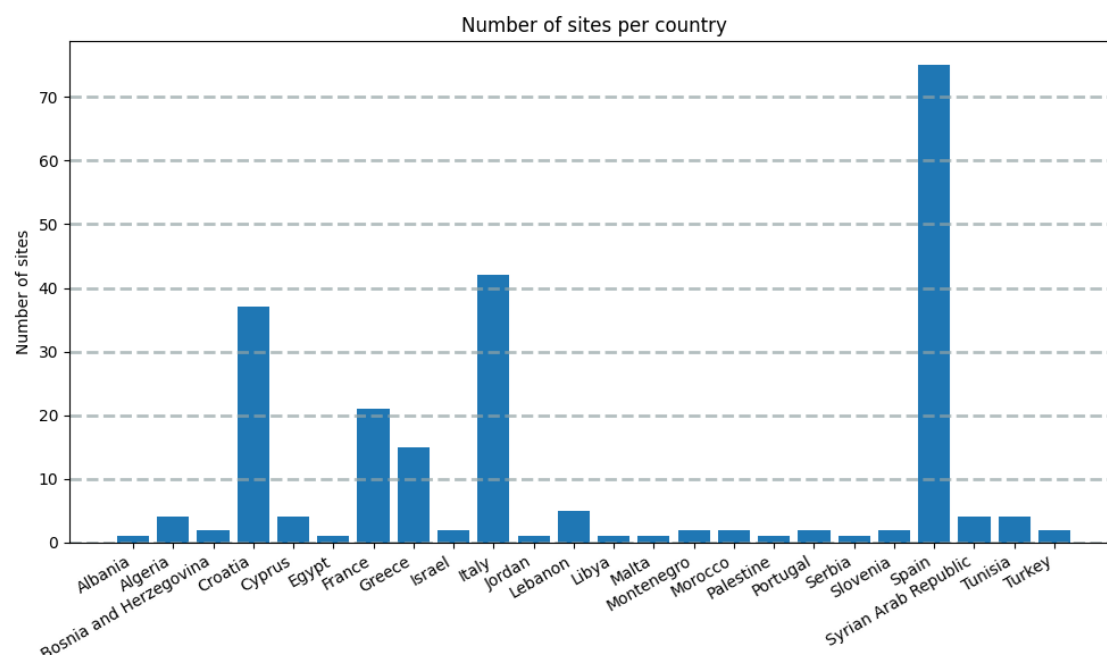


Figure 1b. Number of sites per country (countries with no response are not shown)

Type of wetland: inland / coastal

Among the 265 replies, 125, almost half, refer to coastal wetlands (47.2%), 99 to inland wetlands (37.4%) and 26 sites to wetlands that are both inland and coastal (15.5%). In this last case, it is considered that part of the wetland is inland and another part is coastal according to the respondent. This shows that the majority of wetlands in need of restoration, 166 sites (63%), are coastal.

Type of wetland	Number	Percentage
Inland	99	37.4%
Coastal	125	47.2%
Both inland and coastal	41	15.5%
TOTAL	265	

Table 2. Number and percentage of replies: inland / coastal wetlands

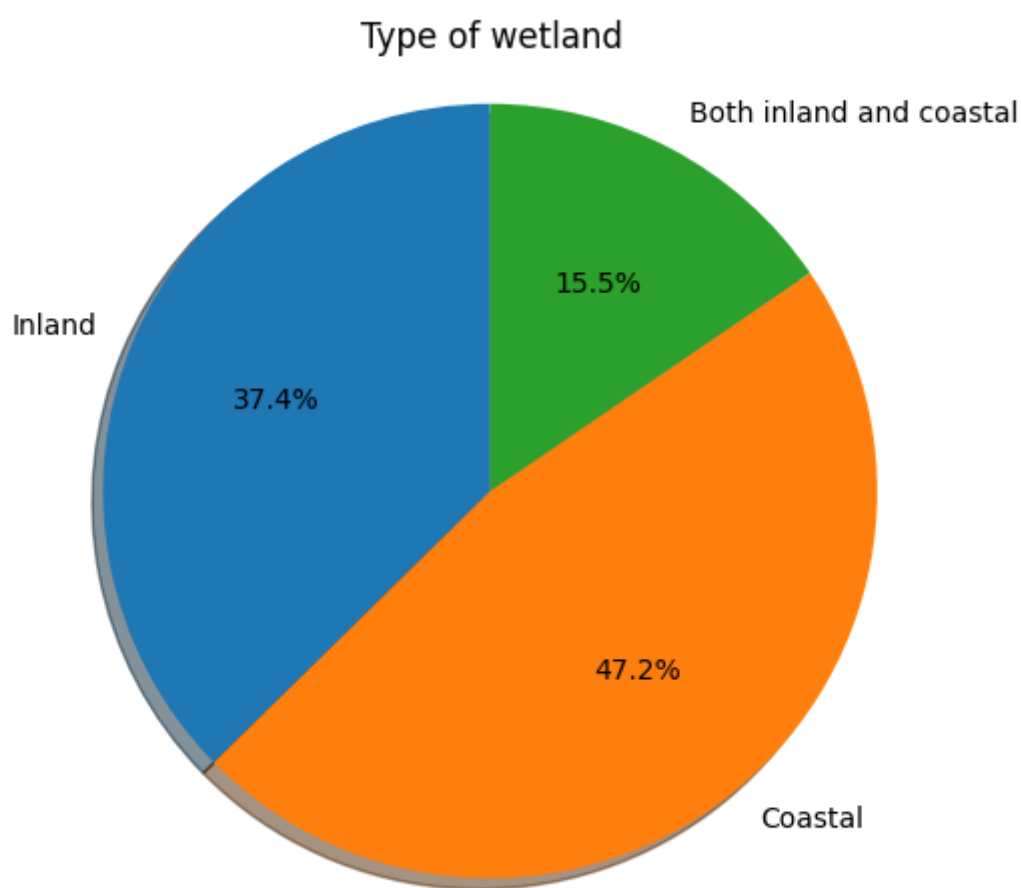


Figure 2. Percentage of replies: inland wetlands, coastal and both

Type of wetland: natural / artificial

Only 16 replies (6%) concern artificial wetlands, while two thirds (177) refer to natural wetlands and the remaining 72 sites (27.2%) are natural wetlands that have suffered some type of ecological change. Obviously, natural wetlands have more values and provide more services than artificial ones and they have been lost during human intervention. Therefore, there is a greater priority to restore them.

Type of wetland	Number	Percentage
Natural	177	66.8%
Artificial	16	6.0%
Both natural and artificial	72	27.2%
TOTAL	265	

Table 3. Number and percentage of replies: natural / artificial wetlands

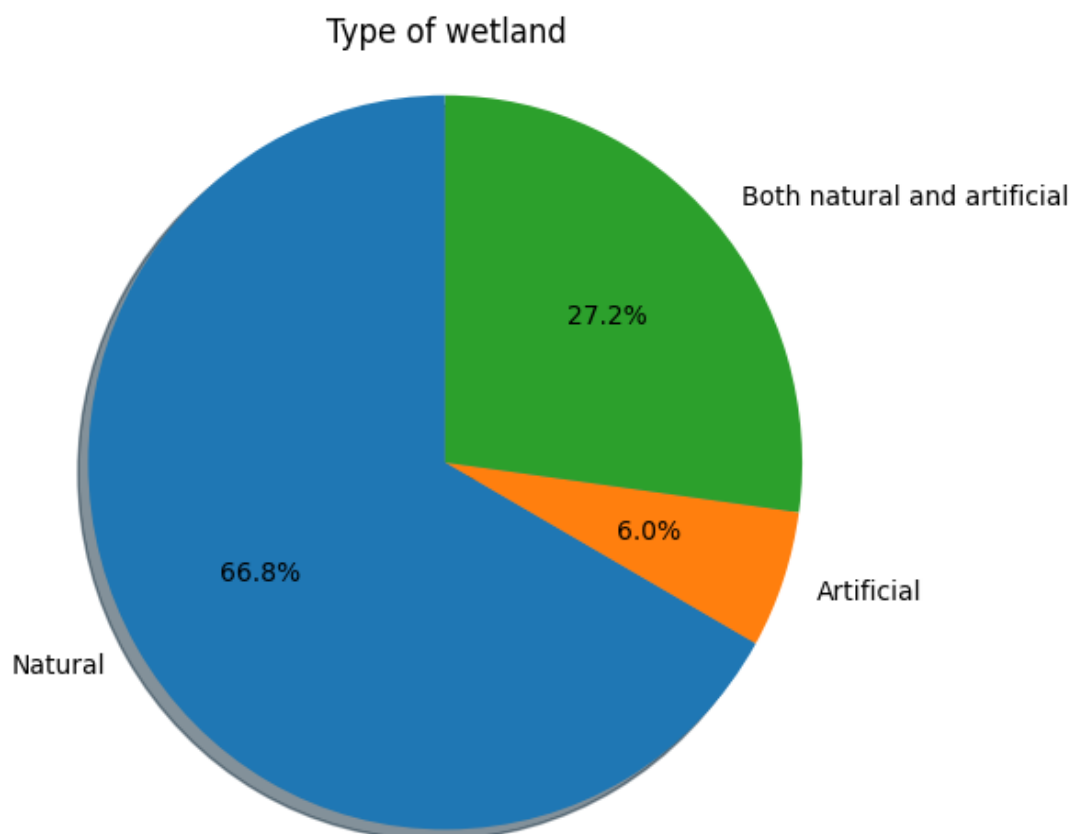


Figure 3. Percentage of replies: natural wetlands, artificial and both

Surface of the area affected by restoration projects

The total surface area of wetlands identified in the 265 questionnaires is 399,912.35 hectares. However, as mentioned above, a few questionnaires have been completed by different respondents for the same sites (duplicates), often giving different wetland areas. Considering the actual number of sites (224), the total wetland area ranges between 233,145.65 and 330,706.39 ha.

There is a large range of variation, from 600 m² of Lago Turchino in Italy to 23,000 ha of Marais de la Macta in Algeria. Table 4 shows the number and percentage of replies and of wetland sites per categories of area.

Regarding the number of sites (table 4 and figure 4a), a quarter of the wetland sites (37) are smaller than 10 ha and almost another quarter (32) are between 10 and 50 ha. Together, 48% of the wetland represented in the survey (69) have an area of less than 50 ha. Another 12% are between 50 and 100 hectares. This means that the majority (86, 60%) of the wetlands that have been identified in the survey as in need of restoration are under 100 ha. Only 26 wetlands (18%) are over 1,000 ha.

Instead, looking at the hectares of wetland per each area range (table 4 and figure 4b), it is obvious that the large sites afford for most of the area: the six sites larger than 4,000 hectares afford for 52% of the total wetland area; a further 20% (9 sites) are wetlands between 2,000 and 4,000 ha. Together 15 sites suppose almost three quarters (72%) of the wetland area covered in this survey.

This is an important factor since the restoration effort and investment is not the same if it is concentrated in a small number of large wetlands or in a large number of small ones. The question

is: *Is it better to concentrate the restoration efforts in a few large wetlands rather than many in small ones?*

There are no rules regarding this although starting by small actions that could be scaled-up seems as a cost/efficient practice; large wetlands are much more complex systems from all sides (ecological, social, economic, administration, politics...) and a restoration project will need a stronger effort, very large funding and investment, a high level of coordination between actors concerned; also, the external factors and uncertainties are greater and for this is likely to have higher risks. On the other hand, restoring small wetlands is certainly easier to undertake and to achieve, but its contribution to the total area restored will be much smaller.

Area (ha)	No. sites	Percentage	No. hectares	Percentage
< 10	37	25,7%	151,53	0,1%
10-50	32	22,2%	877,60	0,7%
50-100	17	11,8%	1.418,00	1,1%
100-500	22	15,3%	6.004,00	4,8%
500-1,000	10	6,9%	8.334,00	6,7%
1,000-2,000	11	7,6%	17.340,00	14,0%
2,000-4,000	9	6,3%	24.894,00	20,0%
4,000-10,000	3	2,1%	22.000,00	17,7%
10,000-20,000	2	1,4%	20.168,00	16,2%
> 20,000	1	0,7%	23.000,00	18,5%
TOTAL	144		124.187,13	

Table 4. Number and percentage of sites and of hectares per area range

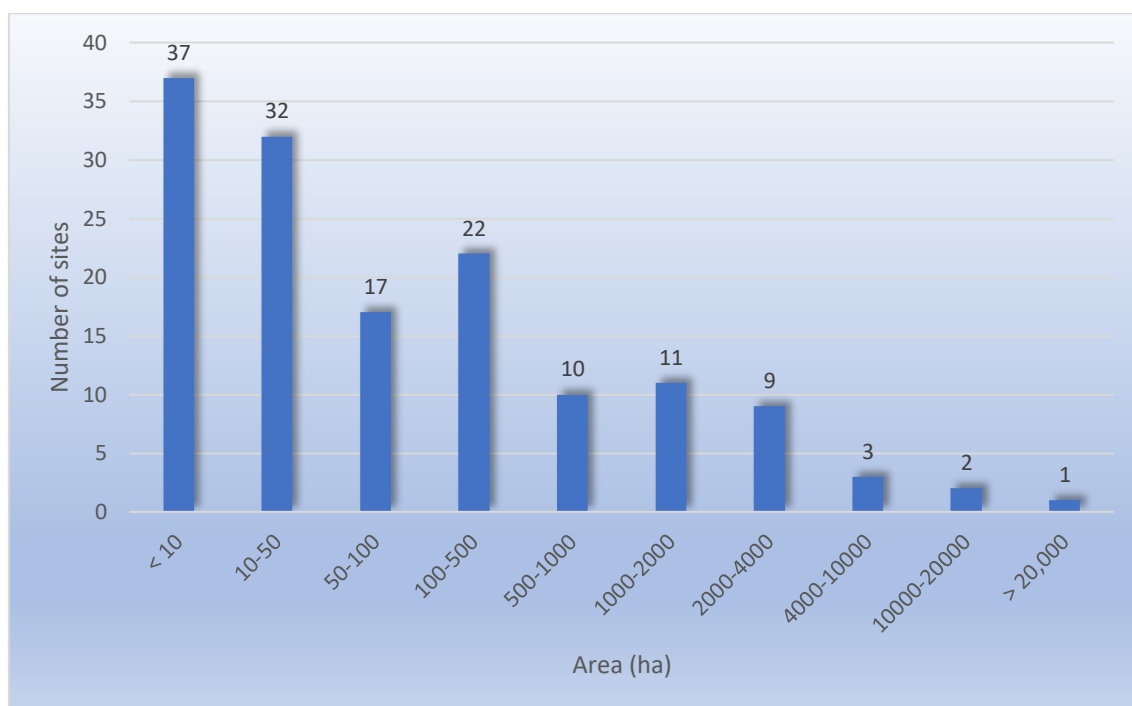


Figure 4a. Number of wetland sites per area range

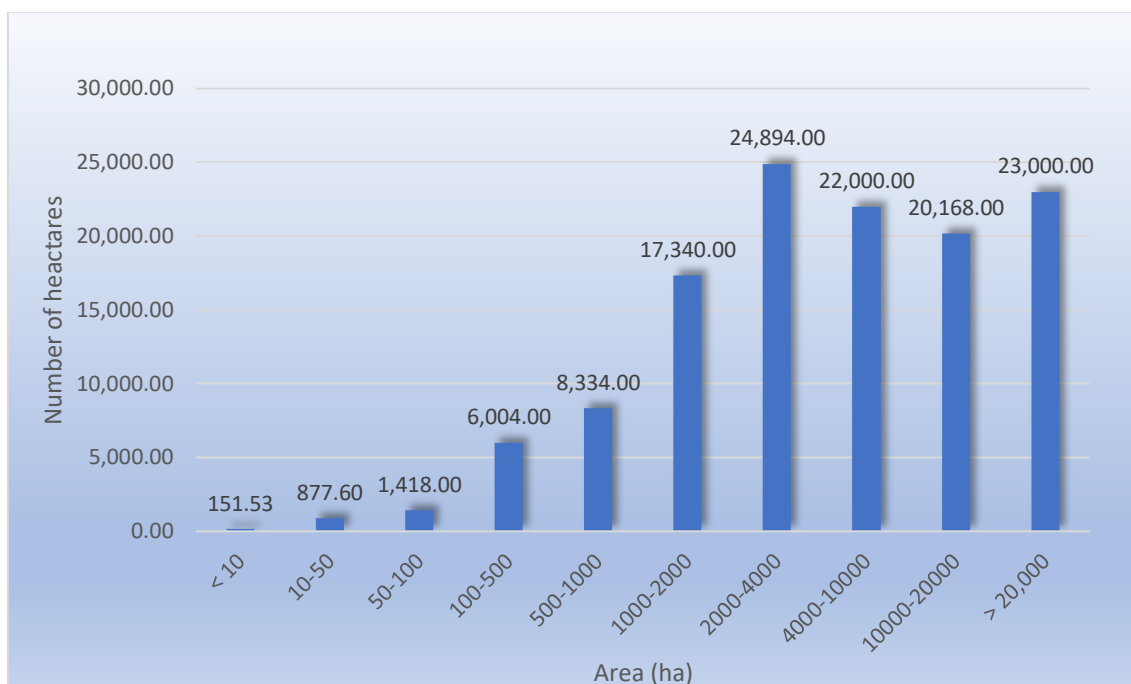


Figure 4b. Total number of hectares per area range

Project phase

The stage of the restoration project based on the following categories:

- Proposed: need for restoration identified and restoration proposed or requested.
- Planned: restoration project still under development.
- Starting: restoration actions in an initial phase.
- Ongoing: restoration actions under way.
- Completed: restoration terminated.

Almost 40% of the replies (105) referred to proposals and one forth (67) are projects in a planning stage. 14.3% of the questionnaires (38) refer to projects currently being implemented and 7.5% (20) are starting. Only 6% of the responses (16) refer to projects that are completed. Nineteen respondents did not answer this question.

Altogether, two thirds of the responses (65%) refer to sites where restoration are required but have not started (they are at the proposal or planning stage) and 22% to sites where actions are in an early stage or underway. This shows that there is a large majority of wetlands that need to be restored and that require support for the development of the projects. This reflect the restoration potential for wetlands in the Mediterranean and highlights the need of investing resources for this.

Project phase	Number	Percentage	Number	Percentage
Proposed	105	39.6%	172	64.9%
Planned	67	25.3%		
Starting	20	7.5%	58	21.8%
Ongoing	38	14.3%		
Completed	16	6.0%	16	6.0%
N/A	19	7.2%	19	7.2%
TOTAL	265			

Table 5. Number and percentage of replies: project phase

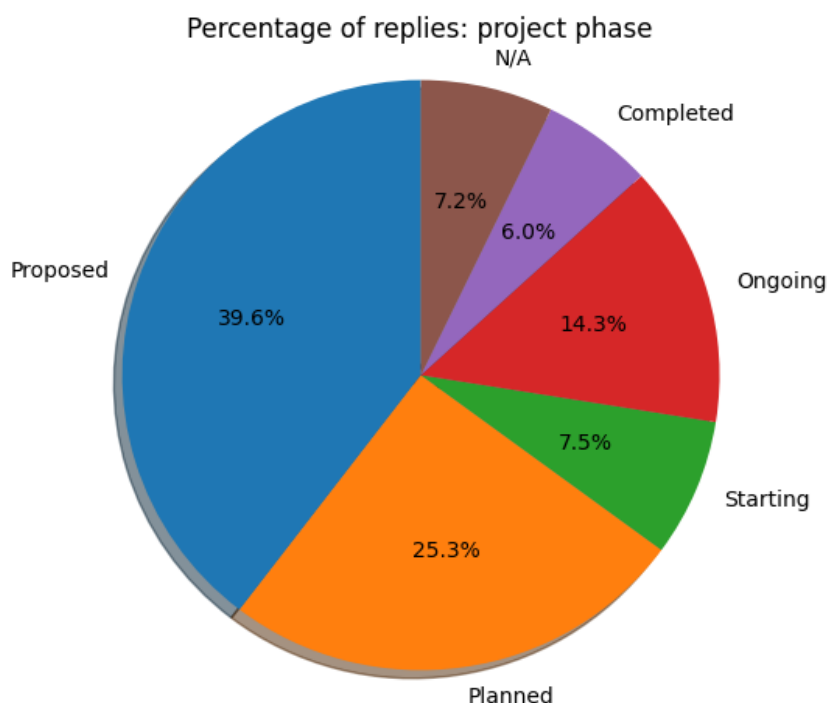


Figure 5. Percentage of replies in each project phase

Wetland area in each phase of the project

Out of the total area of wetlands identified by the respondents (399,769.59 hectares), restoration is in a very early stage (proposed) for over one quarter of the area (ca. 105,400 ha) while 17.6% (over 70,000 ha) have projects that are in the planning phase. Only in 1.2% (5,000 ha) restoration actions have been initiated and in 40.7% (over 162,000 ha) they are currently being implemented. Only 2,417,10 ha of wetlands (0.6%) are identified as already restored. No answers were given for 13.5% of the area.

In summary, 44% of the surface area (ca. 176,000 ha) is in the proposal or planning stage and restoration actions are being implemented in a similar wetland surface (167,000 ha, representing 42%).

Project phase	Surface area (ha)	Percentage	Surface area (ha)	Percentage
Proposed	105,388.75	26.4%	175,760.45	44.0%
Planned	70.371,70	17.6%		
Starting	4.991,70	1.2%	167,669.64	41.9%
Ongoing	162.677,94	40.7%		
Completed	2.417,10	0.6%	2.417,10	0.6%
N/A	53.922,39	13.5%	53.922,39	13.5%
TOTAL	399.769,59		399.769,59	

Table 6. Number of hectares and percentage of wetland area in each phase

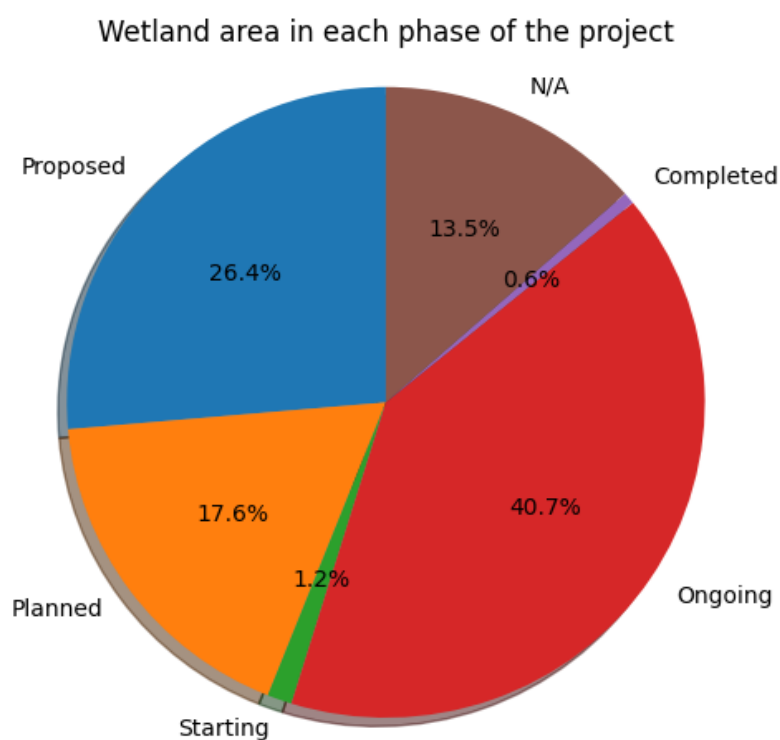


Figure 6. Percentage of wetland area in each phase

Priority for restoration

Of the 229 responses obtained in which restoration is considered necessary, a large majority (78%) consider that restoration is a high priority. Among the remaining replies, restoration is considered a medium (20%) or low priority (2.6%). These results clearly show that the vast majority of the wetlands included in the survey require urgent restoration actions.

Priority for restoration	Number	Percentage
High	179	78,2%
Medium	44	19,2%
Low	6	2,6%
TOTAL	229	

Table 7. Number and percentage of replies: priority for restoration

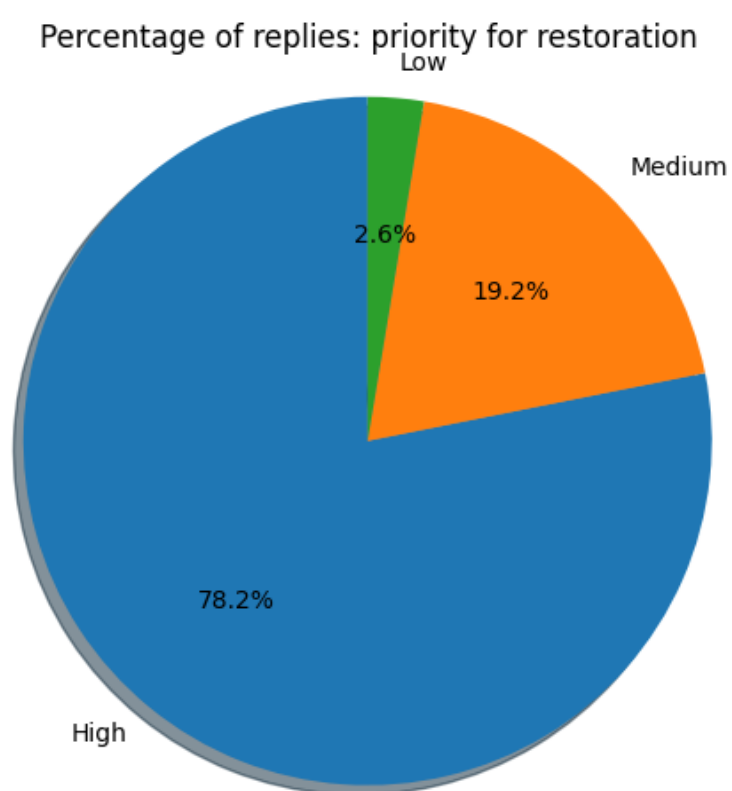


Table 7. Percentage of replies: priority for restoration

ADDITIONAL INFORMATION

These questions below were not mandatory but were generally answered by most of the contributors to the questionnaire.

Wetland habitats in need of restoration

This question is assessed in relation to the total number of responses since more than one answer were accepted. So, percentages are calculated over the total number of questionnaires completed (265). The results allow to group the habitat types in four categories:

- Wetland habitats considered most in need of restoration: salt marshes (almost 40% of the questionnaires), freshwater marshes (near 30%), coastal lagoons (26%) and seasonal/temporary ponds and marshes (22%).
- Habitats found in moderate need of restoration are water courses and inland lakes (15% each), followed by sand bars and spits, permanent ponds (11% each) and springs and cave wetlands (ca 9%)
- Habitats that receive small attention from the respondents (5-6.5%) are riparian forests, mud flats, peatlands and wet grasslands; this could be explained because, with the exception of riparian forests, none of them is abundant in the Mediterranean.
- Finally, the habitats that respondents believe are least in need of restoration are man-made habitats, including cultivated wetlands (rice fields, etc.), artificial ponds, and salt pans.

We can conclude that the habitats that must receive most attention and should be given the highest priority when allocating funds for restoration are salt marshes, freshwater marshes and coastal lagoons, followed by seasonal/temporary ponds and marshes.

Category	Type of wetland	Number of responses	Percentage
a	Salt marsh	104	39,2%
	Freshwater marsh	78	29,4%
	Coastal lagoon	70	26,4%
	Seasonal or temporary pond/marsh	60	22,6%
b	Water course	39	14,7%
	Inland lake	39	14,7%
	Sand bar/spit	29	10,9%
	Permanent pond	28	10,6%
	Spring/cave wetland	23	8,7%
c	Riparian forest or swamp forest	17	6,4%
	Wet grassland	15	5,7%
	Peatland	14	5,3%
	Mud flat	13	4,9%
d	Salt pans	6	2,3%
	Artificial pond/tank	2	0,8%
	Cultivated wetlands (rice field, etc.)	1	0,4%
	N/A	3	1,1%

Table 8. Type of wetland habitats in need of the restoration

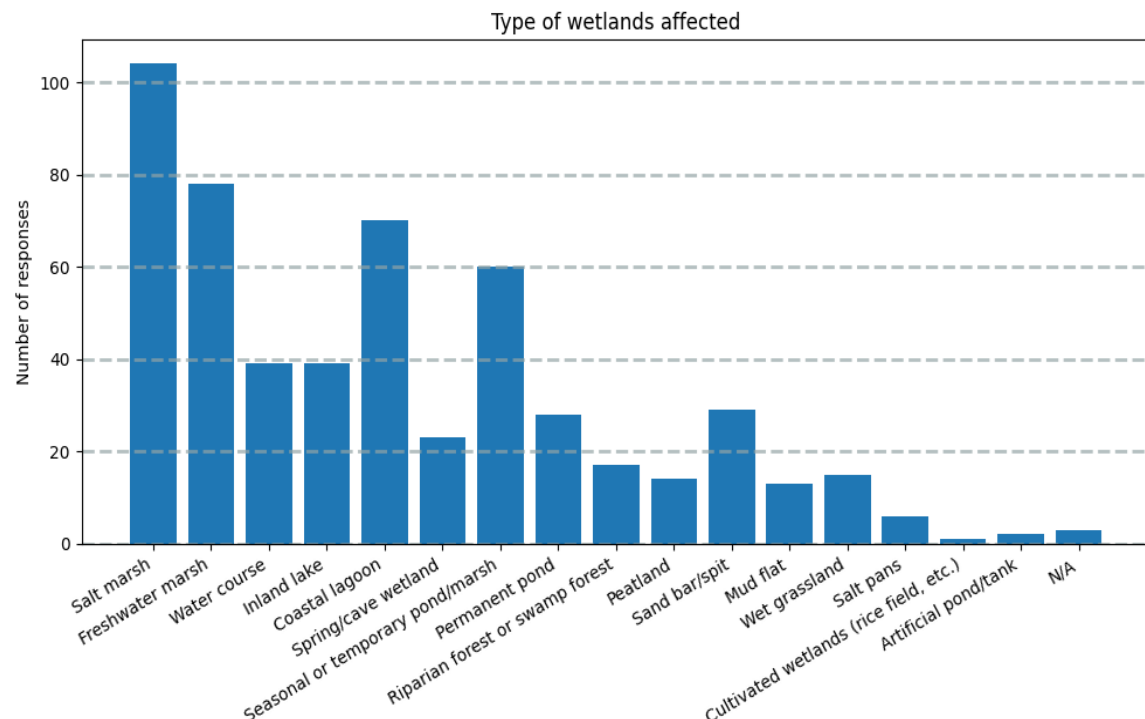


Figure 8. Type of wetland habitats in need of the restoration

Types of degradation

According to the participants in the survey, the most frequent types of degradation in Mediterranean wetlands are changes and degradation of the habitat (61% of the responses) and the water regime (52%).

Habitat destruction and disturbance of fauna have been identified as important and both have been indicated in around 40% of the cases, while negative effects on rare or endangered species in 30%.

Water and soil pollution are also very important types of degradation: both eutrophication and soil degradation, pollution and erosion are highlighted by one quarter of the participants and chemical pollution of the water by 18%.

Less importance is given to changes in the water salinity, although increase of salinity (12%) is considered more frequent than decrease (4%). Finally, airborne pollution is deemed not to be a frequent cause of degradation and has only been reported by 2.3% of respondents.

In short, data show that the main types of degradation affecting Mediterranean wetlands are degradation and destruction of habitat, changes in the water regime, disturbance of the fauna and the different forms of water and soil pollution. Major efforts should be devoted to tackle and prevent these changes from happening.

Type of degradation	Number of responses	Percentage
Habitat degradation/change	161	60,8%
Changes in water regime	138	52,1%
Habitat destruction	110	41,5%
Disturbance of fauna	99	37,4%
Negative effects on rare or endangered species	80	30,2%
Eutrophication	68	25,7%
Soil degradation/pollution/erosion	64	24,2%
Chemical pollution of water	48	18,1%
Salinization	33	12,5%
Decrease of salinity	11	4,2%
Airborne pollution	6	2,3%
N/A	30	11,3%

Table 9. Types of degradation of Mediterranean wetlands

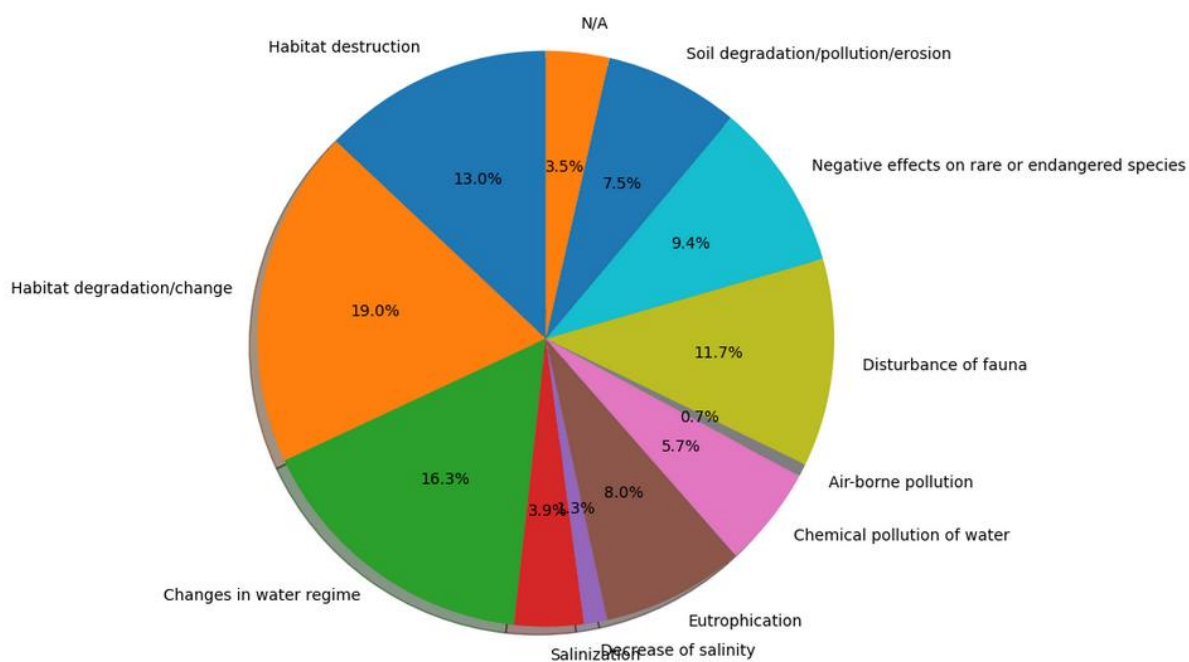


Figure 9. Types of degradation of Mediterranean wetlands

Causes of degradation

Deficient or inadequate management has been identified as the main cause of degradation by 41% of the participants in the survey. This can refer to mismanagement by those responsible for managing wetlands (owners, conservationists, etc.) in the field, but also to policy and decision makers who take actions that are detrimental to wetlands.

Urban and tourist development and farming are considered to be the next leading causes of degradation, with 30% of the responses pointing to each of them. Almost 25% of the questionnaires find equally important dumping of non-toxic waste (domestic waste, debris, etc.), groundwater abstraction or reduced water inflow to the wetland, and introduced and/or invasive species.

Leisure (including tourism and sport) and dumping of toxic waste (chemical, industrial, agriculture, etc.) have been highlighted by just under 20% of the respondents, while climate change is considered a cause of degradation by 17%. It is interesting to note that climate change is not yet perceived by many as one of the overriding causes of degradation.

Hunting, industry, grazing and human-induced fires are rated as a cause of degradation by 8-11%, with the rest of the causes proposed have been indicated by only 4% or less of the participants.

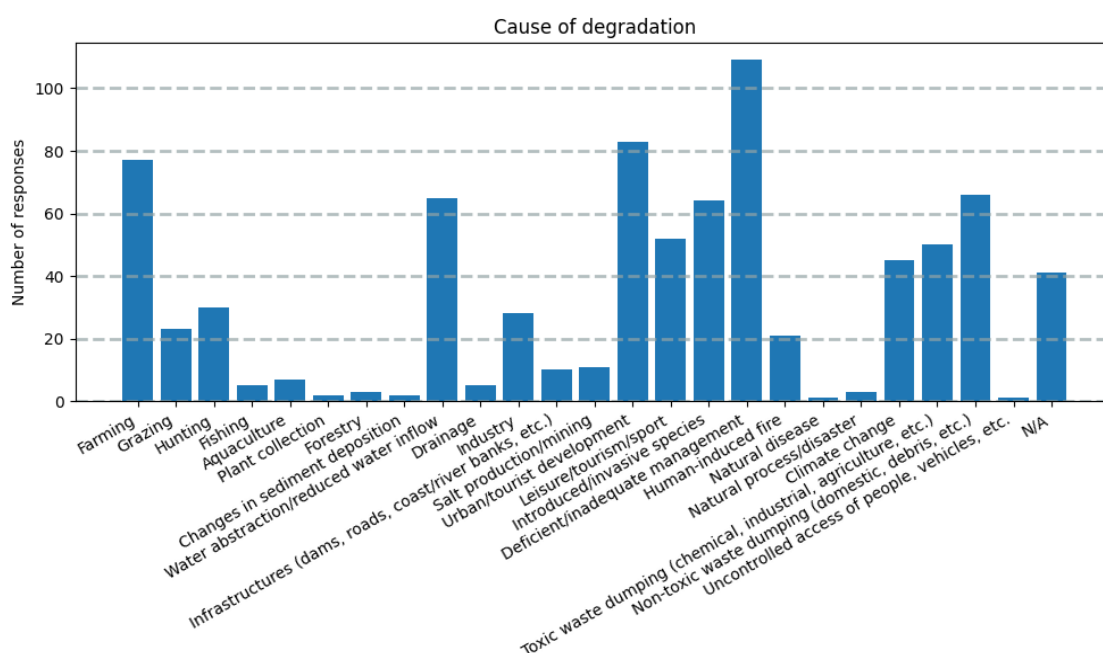


Figure 10. Causes of degradation of Mediterranean wetlands

Cause of degradation	Number of responses	Percentage
Deficient/inadequate management	109	41,1%
Urban/tourist development	83	31,3%
Farming	77	29,1%
Non-toxic waste dumping (domestic, debris, etc.)	66	24,9%
Groundwater abstraction/reduced water inflow	65	24,5%
Introduced/invasive species	64	24,2%
Leisure/tourism/sport	52	19,6%
Toxic waste dumping (chemical, industrial, agriculture, etc.)	50	18,9%
Climate change	45	17,0%
Hunting	30	11,3%
Industry	28	10,6%
Grazing	23	8,7%
Human-induced fire	21	7,9%
Salt production/mining	11	4,2%
Infrastructures (dams, roads, coast/river banks, etc.)	10	3,8%
Aquaculture	7	2,6%
Fishing	5	1,9%
Drainage	5	1,9%
Forestry	3	1,1%
Natural process/disaster	3	1,1%
Plant collection	2	0,8%
Changes in sediment deposition	2	0,8%
Natural disease	1	0,4%
Uncontrolled access of people, vehicles, etc.	1	0,4%
N/A	41	15,5%

Table 10. Causes of degradation of Mediterranean wetlands

Restoration actions and techniques

Among the numerous techniques used for restoring wetlands, the most commonly applied are regulation of the access to the wetland or to certain parts of it (reported in 35% of the questionnaires), afforestation (33%), regulation or banning of human activities (32%), mechanical excavation and dredging (31%), control of water flows (with gates, sluices...) (29%), landscaping and eradication or control of invasive species (28% each). This is fully consistent with the main types of degradation mentioned above: habitat destruction and degradation, changes in the water regime, disturbance of fauna and negative effects on rare or endangered species.

Respondents indicate that a large number of other techniques are used in similar proportions (15-20%); this includes control of water abstraction, changes in the topography, artificial channels or pipes to supply water to the wetland, waste removal (both toxic and non-toxic), demolition (of infrastructures, buildings), soil restoration, ban pesticides and fertilizers and vegetation control.

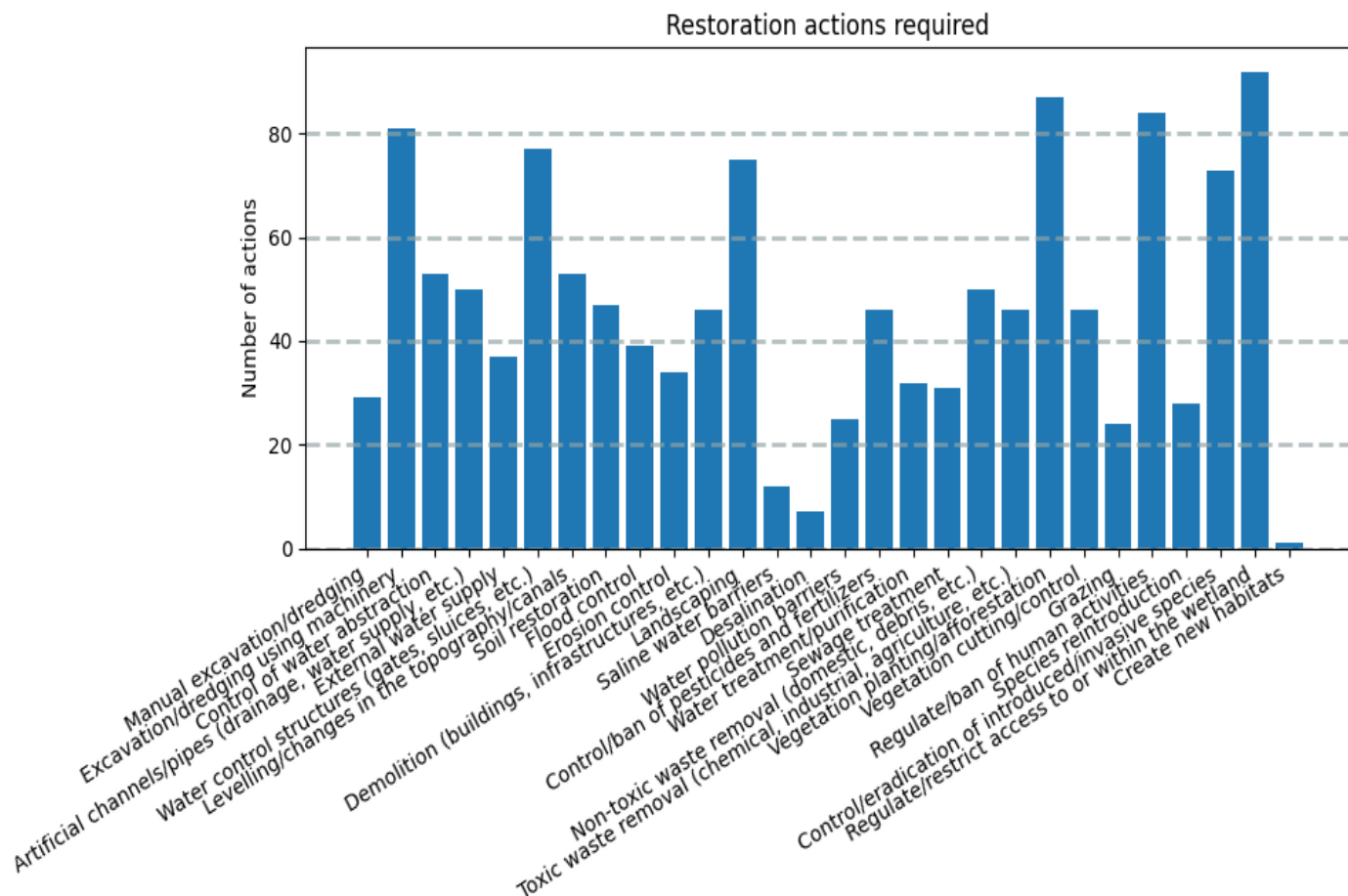


Figure 11. Actions and techniques used for restoring Mediterranean wetlands

Restoration actions and techniques	Number of responses	Percentage
Regulate/restrict access to or within the wetland	92	34,7%
Vegetation planting/afforestation	87	32,8%
Regulate/ban of human activities	84	31,7%
Excavation/dredging using machinery	81	30,6%
Water control structures (gates, sluices, etc.)	77	29,1%
Landscaping	75	28,3%
Control/eradication of introduced/invasive species	73	27,5%
Control of water abstraction	53	20,0%
Levelling/changes in the topography/canals	53	20,0%
Artificial channels/pipes (drainage, water supply, etc.)	50	18,9%
Non-toxic waste removal (domestic, debris, etc.)	50	18,9%
Soil restoration	47	17,7%
Demolition (buildings, infrastructures, etc.)	46	17,4%
Control/ban of pesticides and fertilizers	46	17,4%
Toxic waste removal (chemical, industrial, agriculture, etc.)	46	17,4%
Vegetation cutting/control	46	17,4%
Flood control	39	14,7%
External water supply	37	14,0%
Erosion control	34	12,8%
Water treatment/purification	32	12,1%
Sewage treatment	31	11,7%
Manual excavation/dredging	29	10,9%
Species reintroduction	28	10,6%
Water pollution barriers	25	9,4%
Grazing	24	9,1%
Saline water barriers	12	4,5%
Desalination	7	2,6%
Create new habitats	1	0,4%

Table 11. Actions and techniques used for restoring Mediterranean wetlands

Type of organisations and stakeholders

Among the different types of organisations and stakeholders concerned in the restoration of wetlands in the Mediterranean countries, the most frequently involved are regional and local governments (29% and 27% of respondents, respectively) and NGOs (also 27%). 18% of the participants in the survey have indicated that site managers and national governments are involved, while universities or scientific bodies have been mentioned in 11% of the cases.

In most cases, wetlands are being restored by the administration (either regional, local or national) or by the manager of the site when it exists; note that in many cases, the site manager is directly or indirectly dependent on the administration. It is important to highlight that a significant proportion of respondents, point out that NGO, foundations and scientific or academic organisations are involved in wetland restoration projects.

In few cases, other stakeholders are reported to be involved in wetland restoration actions: local communities (6,4%), private owners (5.7%), wetland users (farmers, hunters, fishermen: 1.5-4.2%) and businesses (salt production, industry: 1.5% each) are reported to be involved in wetland restoration actions. In only two cases (0.8%) the involvement of the education community has been reported.

Type of organisation	Number of responses	Percentage
Regional government	78	29.4%
Local government	71	26.8%
NGO/foundation	71	26.8%
Site manager	49	18.5%
National government	48	18.1%
University/scientific	28	10.6%
Local community	17	6.4%
Private company/owner	15	5.7%
Farmers	11	4.2%
Tourist sector	10	3.8%
Experts	10	3.8%
Hunters	6	2.3%
Fishermen	4	1.5%
Salt production	4	1.5%
Industry	4	1.5%
Education community	2	0.8%
Sport related	1	0.4%
Culture related	1	0.4%
Mining sector	0	0.0%
Religious community	0	0.0%

Table 12. Type of organisation / stakeholder concerned

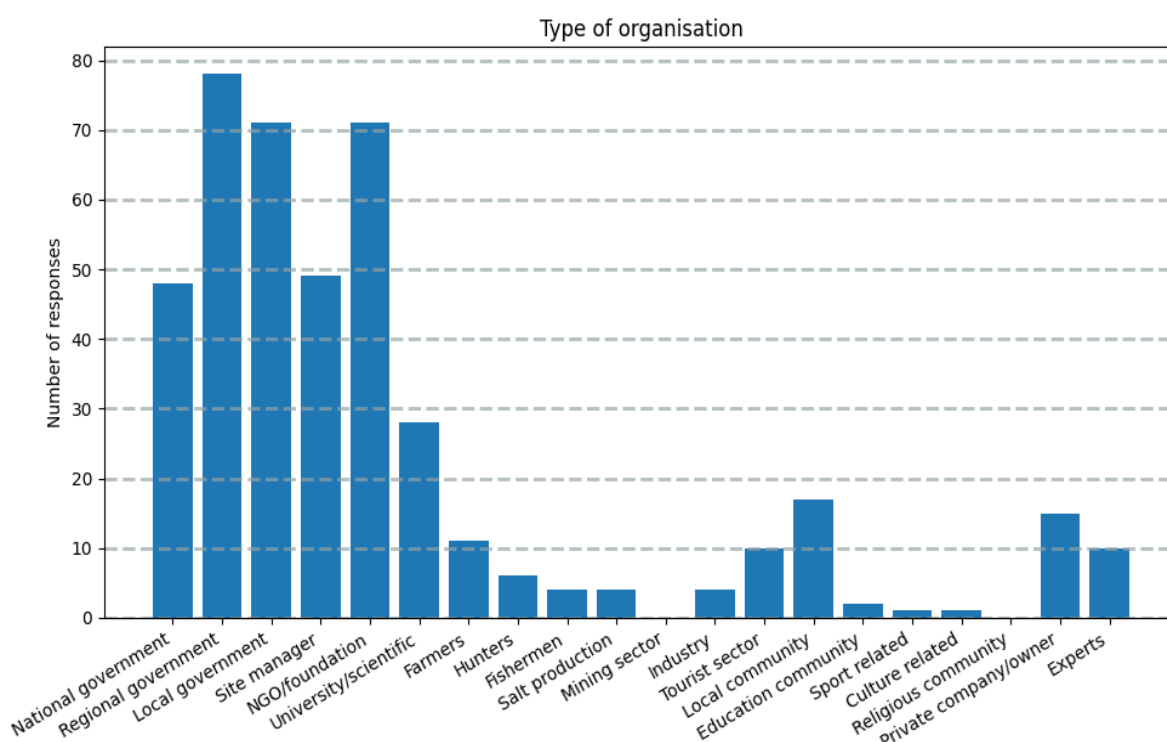


Figure 12. Type of organisations / stakeholders concerned

Level of protection

A large majority of participants (68%) indicate that wetlands benefit from international protection, while only a third of them point to sites that have a national designation and 20% to sites with a regional designation. 43 respondents (16%) indicate that the wetland in question is not protected.

This shows that despite that 84% of the respondents refer to wetlands that are protected, many of them are suffering degradation and are in need of restoration. Far too often, legal protection does not guarantee the conservation of a wetland in the long-term. It is absolutely essential that all legally protected wetlands are adequately managed and that any type of degradation is addressed, stopped and reversed.

Type of protected area	Number of responses	Percentage
International	181	68,3%
National	94	35,5%
Subnational (regional, provincial, local...)	53	20,0%
Not protected	43	16,2%

Table 13. Level of protection

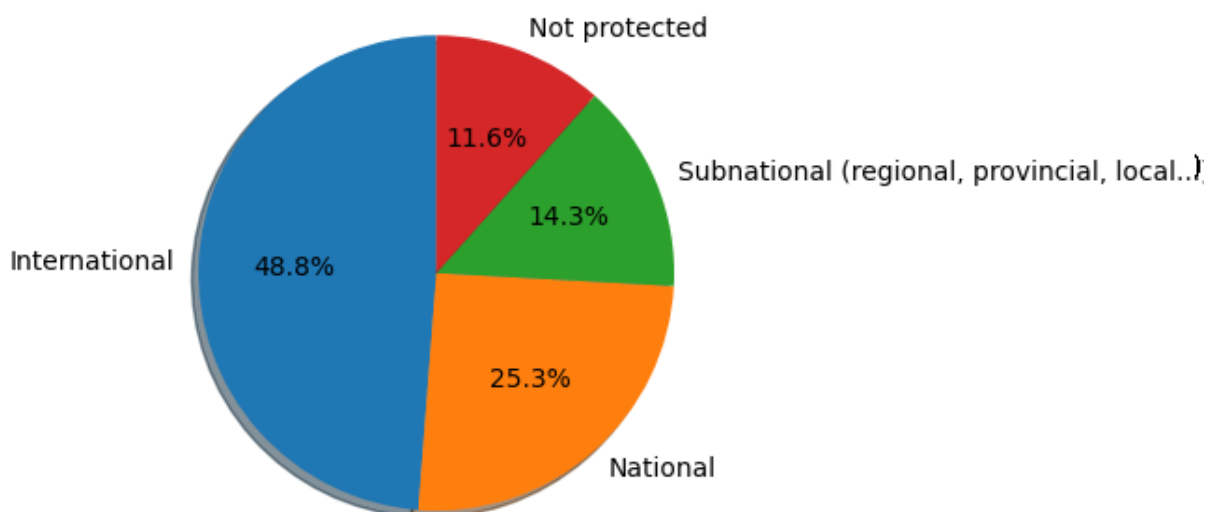


Figure 13. Level of protection

International protection

The majority of the Mediterranean wetlands reported receive some international designation (61% or the replies). Almost two thirds are in the EU Natura 2000 network, either as SPA (Special Protected Area under the Birds Directive) or SAC (Special Area of Conservation under the Habitats Directive). The high percentage of wetlands in need of restoration in Natura 2000 is noteworthy, considering that these are priority areas for LIFE funds. One third of the respondents indicate that the wetlands they covered are Ramsar sites and only a few refer to sites that are Biosphere Reserves, SPAMI or World Heritage Site.

Once again, legal protection, in this case at the international level, does not guarantee actual preservation of a wetland. The fact that so many wetlands in need of restoration are Natura 2000 sites and/or Ramsar sites, shows that there is a strong need to urgently implement the provisions of both the EU directives and the Ramsar Convention.

International protection	Number of responses	Percentage
Natura 2000 site	163	61,5%
Ramsar site	82	30,9%
UNESCO Biosphere Reserve	12	4,5%
SPAMI, Specially Protected Areas of Mediterranean Importance (Barcelona Convention)	6	2,3%
UNESCO World Heritage site	4	1,5%

Table 14. International protection

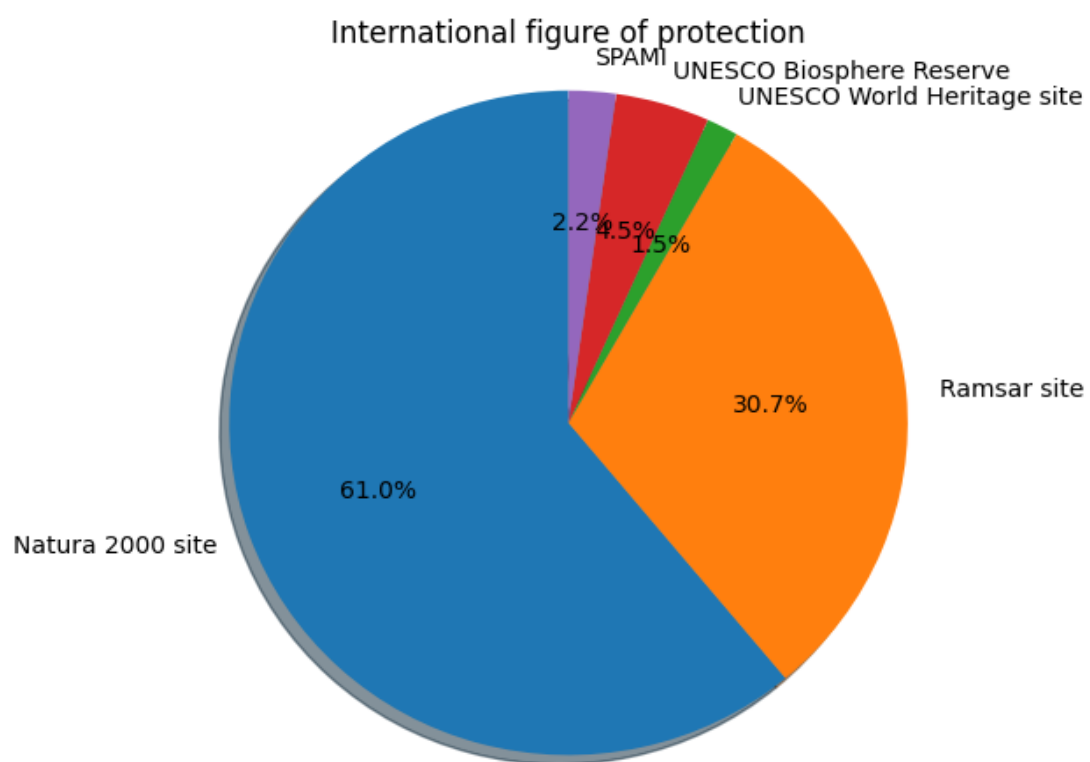


Figure 14. International protection

CONCLUSIONS

The main conclusions of the report are:

- The highest priority for restoration in the Mediterranean region is natural coastal wetlands (47,2%).
- The total area of wetlands identified as needing restoration or being restored is near 400,000 hectares, with sites ranging from 0,06 to 46,000 ha.
- There is a large number of small wetlands in need of restoration: 37 sites are under 10 hectares and 32 sites are between 10 and 50 ha.
- Two thirds of the responses (65%) refer to projects that have not started (proposed or planned). This shows that there is a strong need for implementing wetland restoration actions in the region.
- Near 55% of the wetland area (some 97,900 ha) are considered in need of restoration, and are either proposed or are currently in the planning stage.
- For one forth (45,600 ha), restoration has started or is currently carried out, but a minimal number of hectares (373) are reported as having already been restored.
- A large majority of the respondents (78%) consider that the wetlands they have covered have high priority for restoration and 20% consider that they have medium priority.
- Wetland habitats considered most in need of restoration: salt marshes (almost 40% of the questionnaires), freshwater marshes (near 30%), coastal lagoons (26%) and seasonal/temporary ponds and marshes (22%).
- Data show that the main types of degradation affecting Mediterranean wetlands are degradation and destruction of habitat (61% of the responses), changes in the water regime (52%), disturbance of the fauna (40%) and the different forms of water and soil pollution (18%). Major efforts should be devoted to tackle and prevent these changes from happening.
- Main causes of degradation are deficient or inadequate management (41%), followed by urban and tourist development and farming (30% each), while dumping of non-toxic waste, groundwater abstraction or reduced water inflow to the wetland, and introduced and/or invasive species is highlighted by a 25% of the respondents, followed by other less relevant causes (leisure, dumping of toxic waste, hunting, industry, grazing, human-induced fires). It is interesting to note that climate change is not yet perceived by many as one of the overriding causes of degradation.
- Among the numerous techniques used for restoring wetlands, the most commonly applied are regulation of the access to the wetland or to certain parts of it (reported in 35% of the questionnaires), afforestation (33%), regulation or banning of human activities (32%), mechanical excavation and dredging (31%), control of water flows (with gates, sluices...) (29%), landscaping and eradication or control of invasive species (28% each). This is fully consistent with the main types of degradation mentioned above: habitat destruction and degradation, changes in the water regime, disturbance of fauna and negative effects on rare or endangered species.
- Among the different types of organisations and stakeholders concerned in the restoration of wetlands in the Mediterranean countries, the most frequently involved are regional and local governments (29% and 27% of respondents, respectively) and NGOs (also 27%).
- Despite that 84% of the respondents refer to wetlands that are protected, many of them are suffering degradation and are in need of restoration. Far too often, legal protection does not guarantee the conservation of a wetland in the long-term. It is absolutely essential that all legally protected wetlands are adequately managed and that any type of degradation is addressed, stopped and reversed.
- 61% of the wetlands identified are within Natura 2000 and 30% are RAMSAR sites. This is important as Natura 2000 sites management plans could should include restoration actions in improve the conservation status of aquatic habitats and related species. On the other hand RAMSAR sites that are not in good conservation status could enter in Montreux list.

Based on the total surface identified as needing restoration, 400,000 ha, it seems reasonable to consider this when target for aquatic ecosystems will be set up in the coming EU Restoration law and national legislation in Mediterranean countries within and outside EU. The restoration of the identified wetlands could contribute to the target area to be restored between 2021-2030,

coinciding with the UN decade of restoration and the 2020-2030 EU Biodiversity Strategy. Obviously, in order to achieve this there is a lot of work previous to starting each restoration project: project development and design, fundraising, organisation, public participation, etc.

ACKNOWLEDGMENTS

First of all, many thanks to all the people who took their time to complete the online survey and who shared with us their knowledge and concern about the need to restore wetlands in the Mediterranean countries.

Special thanks to the project partners: MedSea Foundation, PIM Initiative, MedWet and Tour du Valat who provided comments to the draft questionnaire and circulated it to their networks in the region. MedSea and Tour du Valat also translated the questionnaire to Italian and French respectively. Jason Moss revised the English version.

The authors are also grateful to the MedIsWet partners, IUCN-Med, BirdLife International, the Spanish Ministry of Environment, SEO/BirdLife and all other organisation that have circulated the online survey through their networks.

Marta Donlo (WWF-Spain) was essential to create the online template of the questionnaire, revise it every time we requested it and making it appear readily online. Pablo Flores has undertaken the treatment and analysis of the data.

ANNEX 1. QUESTIONNAIRE

The online questionnaire can be found in four languages in the following links:

English

https://www.wwf.es/nuestro_trabajo/agua/humedales/medwetlands_restoration_survey/

Spanish

[https://www.wwf.es/nuestro_trabajo/agua/humedales/encuesta_restauracion_humedales /](https://www.wwf.es/nuestro_trabajo/agua/humedales/encuesta_restauracion_humedales/)

Italian

https://www.wwf.es/nuestro_trabajo/agua/humedales/questionario_ripristino_zone_umide/

French

https://www.wwf.es/nuestro_trabajo/agua/humedales/enquete_restoration_zh/

ANNEX 2. LIST OF WETLAND SITES

NOTE: area range is due to variation in figures given by different respondents for the same site.

Country	Wetland site	Area (ha)
Albania (1)	- Narta Lagoon	7-50
Algeria (4)	- Marais de la Macta	23,000
	- Réserve Naturelle du Lac de Béni-Bélaïd	600
	- Tourbière du Lac Noir	5
	- Walid Nemer	10,000
Bosnia & Herzegovina (2)	- Hutovo blato	1,000-8,000
	- Livanjsko polje	6,000-46,000
Croatia (35)	- Baćinska jezera	138
	- Blatine	62
	- Blato – polje	12
	- Delta	23,676
	- Dinjiška saltpans	65-233
	- Jezero	5,748
	- Konavosko polje	42
	- Ljubački zaljev	785
	- Malo blato i Velo blato	461.69
	- Močvara	850
	- Nature Park Vransko jezero	100
	- Njivice	0.1
	- Palud	210
	- Pantan	45
	- Paška solana	402.75
	- Plaža Sabunike (privlaka - Ninski zaljev -Ljubači zaljev)	2,002
	- Prološko blato	765
	- Slanuše kod mosta	0.1
	- Slanuše oko Osora	0.1
	- Solana Ston	46
	- Special ornithological reserve Kolan Mud – Mud Rogoza (Kolansko blato – Blato Rogoza)	60-174.91
	- Supetarska draga	423
	- Uvala Plemći	212
	- Uvala sv. Eufemije	110
	- Ušće Bašćice	0.1
	- Ušće Karišnice	300
	- Ušće Mirne i Tarska vala	115
	- Ušće Raše	44
	- Velika Solina and Mala Solina near Zablaće	0.1
	- Vlažne livade PP Vransko jezero i Jasen	164
	- Vlažne livade i okolno područje Jasen	164
	- Vlažne livade uz Cetinu	0.1-1,000
	- Vrgoračko polje (Polje Jezero)	2,963
	- Zaljev Morinje	204
	- Čepičko polje	860
Cyprus (4)	- Lady's Mile	1,500
	- Akrotiri Wetlands	3,819

Country	Wetland site	Area (ha)
	- Larnaca Salt Lake	1,000-1,560
	- Paralimni Lake	270-5,000
Egypt (1)	- Lake Mariout	5,000
France (21)	- Bout du lac d'Annecy	1.1
	- Cala rossa	1
	- Delta de la Dranse	40
	- Etang de la Bomborinette	33.6
	- Etangs du Narbonnais	120
	- Etangs et marais des salins de Camargue	5,300
	- Grand Clos (espace naturel de la couronne du Grand Port Maritime de Marseille)	89
	- Le marais de la Grande Palun	117
	- Les confins (Monteux, 84170)	3
	- Marais de Sacy Le Grand	1,000
	- Marais littoraux d'Hyères	1,000
	- Mare temporaire de Padulellu	1
	- Mares du Centre Var	100
	- Petit Badon (Camargue)	14
	- Ponteau-Baume longue	15
	- Sagnes d'Opoul	160
	- Site Ramsar des Marais et tourbières des vallées de la Somme et de l'Avre	13,140
	- Vallées de la Scarpe et de l'Escaut	85
	- Zone RAMSAR Etang de Lindre, forêt du Romersberg et zones voisines	622
	- Les tourbières du site Ramsar "tourbières et lacs de la montagne jurassienne"	500
	- Marais de Chizé	10
Greece (15)	- Alikes Lefkimmis	30
	- Alyki Kitros lagoon	1,700
	- Axios, Loudias, Aliakmon Delta	88
	- Karla reservoir	8,000
	- Kios Erasinou	100
	- Kopana Salinas (Evoia)	22
	- Korinos wetland in Alyki Kitrous	1,500
	- Lake Lesser Prespa (Mikri Prespa)	1,450
	- Limni Alyki	630
	- Nafplio - Nea Kios wetland	300
	- Nestos Delta	40
	- Schinias	400
	- Vdellaria Marsh	14
	- Vourkari coastal marsh	300
	- Vravrona wetland	35
Israel (2)	- Hula valley	200
	- Kfar Ruppin fishponds	100
Italy (42)	- Bosco Pantano di Policoro e Costa Ionica foce Sinni (It 9220055)	600
	- Bosco di Palo Laziale	40
	- Campo Regio	20
	- Canale del Diversivo di sant'Anna	50
	- Costa di Licola	1,540

Country	Wetland site	Area (ha)
	- Foce Agri - Zona umida in corrispondenza dell'impianto Marinagri	500
	- Foce del Fiume Tordino e Torrente Borsacchio	300
	- Foce del Padrongiano	100
	- Fortore mouth and Arenaria Quaranta	100
	- Geloi Wetland	70
	- Golfo di Oristano	55
	- Invaso di Villa Vomano	200
	- Laghetto di San Rocco	0.3
	- Lago Turchino	0.06-1
	- Lago di Massaciuccoli	2000
	- Laguna di Nora	20
	- Laguna di S. Gilla - Stagno di Cagliari	500
	- Laguna di Venezia	1,250
	- Margi Spanò, Milo e Nespolilla	80
	- Margio di contrada Critazzu	2
	- Oasi del Nervia	6
	- Padule Pian d'Alma	68
	- Padule di Scarlino	155
	- Palude di Torre Flavia (ZPS e Monumento naturale)	10
	- Pantano Leone	16
	- Paule Sagapas	9
	- Punte Alberete e Valle Mandriole	972
	- Rio Posada	841
	- S'ena Arrubia	194
	- Saline di Priolo	30
	- Saline di Punta della Contessa, Brindisi	1,000
	- Sentina	5
	- Stagno Urbani- Lago Vicini- Vasche zuccherificio- Campo d'aviazione di Fano	6
	- Stagno del Grande Pevero	15
	- Stagno di Cabras	4,795
	- Stagno di Corru S'Ittiri, Marceddi, San Giovanni	1,600
	- Area di Torrevecchia all'interno della Zona Ramsar Corru s'Ittiri	3
	- Stagno di Mistras	1,621
	- Stagno di Pauli 'e Sali	18
	- Su Stani Saliu di Serdiana e Su Staini Saliu di Sestu	10
	- Stagni temporanei nella Piana di Ferretto (bagnolo, Perugia) IT5210020	2,527
	- Stagno di Molentargius	1,401
Jordan (1)	- Azraq wetland reserve	12
Lebanon (4)	- Litani lac	2
	- Anjar Kfar Zabad wetlands	326
	- Hima Anfeh (marine protected area)	300
	- Qaroun Lake	306-1,190
Libya (1)	- Al-Tamimi (Sabkha)	532
Malta (1)	- Il-Maghluq ta' Marsaskala	0,5
Montenegro (2)	- Special nature reserve "Tivatska solila"	150
	- Ulcinj salina	1,500-14,500

Country	Wetland site	Area (ha)
Morocco (2)	- Aoua Lake	2,215
	- Lake Afourgah	24
Palestine (1)	- Wad Qana, Almalih and Wad Ezarqa (Beit Illo)	25
Portugal (2)	- Estuario del Guadiana	2
	- Rio Vascão	7
Serbia (1)	- Peštersko Polje, Rusanda, Okanj, Slano Kopovo	100
Slovenia (2)	- Intermittent lake Cerkniško jezero (Ramsar site: Cerknica lake and its environs)	500
	- Landscape Park Strunjan (salinas, lagoon)	34
Spain (70)	- Aiguamolls de l'Empordà	50-500
	- Albufera de Valencia	21,120-2,400
	- Azul del Infierno	6
	- Bassa des Regueró (Eivissa)	0.1
	- Bassa temporal Ses Planes de Son Arro (Menorca)	5
	- Can Cuarassa (Reserva Natural de l'Albufera)	10
	- Carrizales de Los Albardales y Las Minas (Madrid)	500
	- Charcas ganaderas (Murcia)	1
	- Complejo lagunar de Lastras de Cuéllar y Hontalbilla (Segovia)	100
	- Complexo Ons O Grove (Pontevedra)	600
	- Desembocadura de la Tordera	50-100
	- Desembocadura del Saja-Besaya (Cantabria)	400
	- Desembocadura del río Guadalhorce	67
	- El Hondo (Alicante)	2,300
	- Es Saluet - Prat del Port d'Andratx (Mallorca)	35-18.5
	- Espacios Naturales del Delta del Llobregat	250
	- Estany Pudent	3
	- Estany des Ponts, Estany Gran (Lago Esperanza)	40-25
	- Estanys de Aila	50
	- Estanys de Canadal	7
	- Estanys del Parc natural de Mondragó (s'Amarador i Ses Fonts de n'Alis)	4
	- La Gola (Mallorca)	2
	- La Pletera	60-75
	- Laguna Rodrigo (Segovia)	30
	- Laguna de Antela (Ourense)	3,000
	- Laguna de Argamasilla	4.89
	- Laguna de Bonanza	2
	- Laguna de Jarambel	8
	- Laguna de La Nava o "Mar de Campos"	3
	- Laguna de Meco	70
	- Laguna de la Janda (Cádiz)	9,000-6.3
	- Laguna del Espadañar (Cuéllar)	80
	- Lagunas de Camino de Villafranca, las Yegüas y de Quero (Ciudad Real)	3,000
	- Lagunas de Laguardia	42
	- Lavajos de Sinarcas	2
	- Mar Menor	18,000
	- Marisma de Trebujena	295
	- Marisma del Conde en Rubayo y otras concesiones de dominio público por toda la bahía de Santander	200

Country	Wetland site	Area (ha)
	- Marismas de Santoña (Cantabria)	2,000
	- Marismas del río Tinto (Huelva)	3,000
	- Marja de Rafalell i Vistabella	103
	- Marjal de Almenara	1,497
	- Marjal dels Moros	620-250
	- Marjales de La Safor (Valencia)	6-1,200
	- Mines de Sineu	6
	- Muntanyans II	14
	- Not indicated (Menorca)	75
	- Olla del Rei (Castelldefels)	10
	- Pedreres d'Argila de Petra	2
	- Plaiaundi (Guipuzkoa)	24
	- Platja Llarga i la Millera de Vilanova i la Geltrú	5
	- Platja de Torredembarra i Creixell	26
	- Prat d'en Fita (Ibiza)	13.5
	- Prat de Alcúdia, Maristany	2
	- Prat de l'Ullal	11
	- Riu de s'Illot	2
	- Riu de s'Ullal	2.5
	- Riu de Guernica, Marismas de Urdaibai (Bizkaia)	200
	- S'Albufera de Mallorca	1,688-2,000
	- Sa Porrassa-Prat de Magaluf (Mallorca)	41
	- Sa Sal Rossa	20
	- Saladas de Sastago-Bujaraloz	8,000
	- Salinas de Formentera	453.94
	- Salinas de Marchamalo (Cartagena)	200
	- Salinas de la Concepció (Fornells, Menorca)	18,1
	- Salines de Formentera	1
	- Ses Feixes (Ibiza)	40-90
	- Ses Feixes de Talamanca o Prat de ses Monges	51
	- Ses Fontanelles (Mallorca)	15
	- Torrent de Sant Joan	3
Syrian Arab Republic (4)	- Heyjaneh	100
	- Jabboul	10,000
	- Lake Qatineh (Bahrat Home)	200
	- Um Toyyor	1,000
Tunisia (4)	- Al Amra	3
	- Ghar el Melh lagoon	10,168
	- Garaet El Hawaria	300
	- Sebkhet Sejoumi	2,979
Turkey (2)	- Gediz Delta	3,000
	- Lake Yeniçağa (Bolu)	400