Review of wetland inventory information in the Middle East

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1 Introduction

This report summarises the findings of a preliminary review of wetland inventory information from the 'Middle East'. Asia was the only Ramsar region within the Global Review of Wetland Resources and Priorities for Wetland Inventory (GRoWI) that was divided for assessment. As 'Middle East' is a term with differing interpretations, we have used the 13 countries covered in our primary reference, Scott (1995), namely Afghanistan, Bahrain, Iraq, Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen, and added Israel, to constitute the 'Middle East'. These are shown in Map 1.

The Middle East, defined another way, occupies extreme southwestern Asia (excluding Turkey and the Sinai Peninsula) and for the purposes of this study, also includes Afghanistan. In it widest extent it reaches from Rafah, Gaza, at 34°15'E along the Mediterranean Sea in the west to approximately 74°55'E where the tip of the narrow Wakhan Corridor reaches the border with China in the east. From the west, the region extends southward along the Gulf of Aqaba and Red Sea, and eastward along the Gulf of Aden, circumscribing the Arabian peninsula and reaching its southernmost extent at Darsa Island, Yemen at 12°05'N in the Arabian Sea. The northernmost point of the Middle East is approximately 39°40'N, north of Mākū in extreme northwestern Iran along the border with Turkey. The southern shore of the Caspian Sea forms a significant part of the northern boundary of the study area. Other major Middle East seas include the Persian Gulf and the Gulf of Oman. Afghanistan, centered on the world's second highest mountain range, the Hindu Kush, is the only country in the region without a connection to the sea. Inland, the Middle East is largely semi-arid to arid. There are vast expanses of desert. Some coastal or lowland areas receive greater rainfall. Severe extremes of both hot and cold temperatures have been recorded within the region. The Tigris and Euphrates Rivers are the major riverine arteries.

2 Information sources

Only four wetland inventory sources were included in the Middle East dataset. The countries and the respective number of applicable wetland inventory references appear in tabular form in table 1 and graphically in figure 1.

Though there were a total of four references for the region, the bulk of the information evaluated and reported in this study came from only one – Scott (1995). This single source might sufficiently characterise the wetland inventory in certain countries, but for other countries it may not have been comprehensive and detailed enough to yield an accurate estimate of wetland coverage. Therefore, table 1 and figure 1 cannot be taken for granted as representative of all the material available or existing per country. The companion study covering the bulk of Asia (Watkins & Parish 1999) must also be consulted to enable a more comprehensive view of the state of wetland inventory information across Asia.

2.1 General information

In any kind of compilation it is a logical imperative to consider previous similar efforts. Perhaps there are lessons that have been, or should have been, learned. Similar previous studies include Matthews (1993), Scott (1993), Hughes (1995) and Hecker and Tomàs Vives (1995). Of these, the latter is the most comprehensive review of wetland inventories (within its respective scope)

and the one with the closest affinity to the Middle East (although treating only four of the countries included in the present study).

Boundaries are not authoritative

Map 1 Map of the Middle East region

Table 1 Numbers of wetland inventory references evaluated for the countries of the Middle East

Middle East	No. of References
Afghanistan	2
Bahrain	4
Iran	4
Iraq	2
Israel	2
Jordan	3
Kuwait	2
Lebanon	2
Oman	3
Qatar	2
Saudi Arabia	3
Syria	2
United Arab Emirates	2

Yemen	3

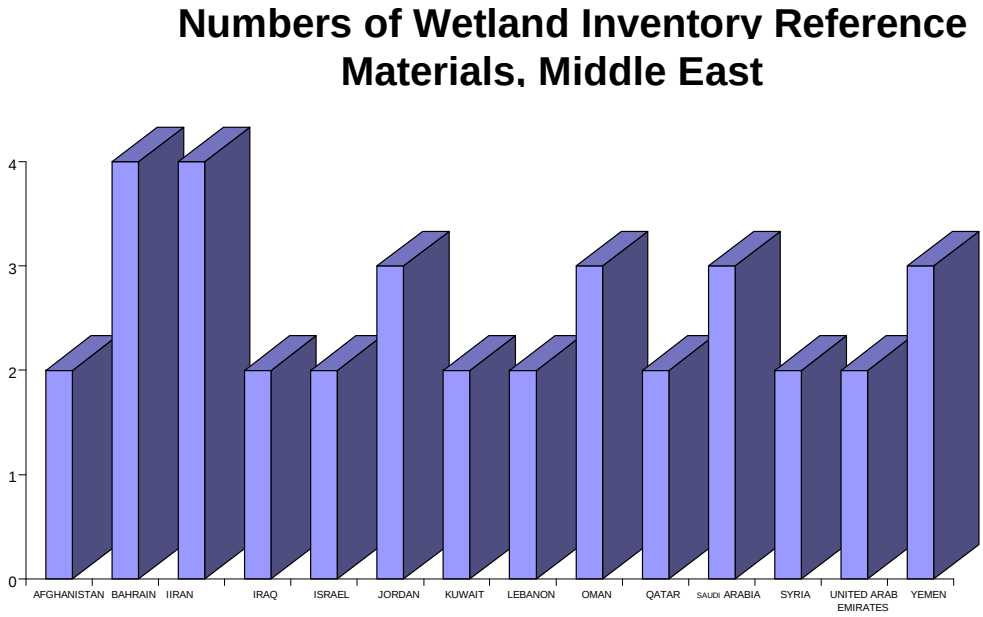

Figure 1 Graphical depiction of the wetland inventory references evaluated for the countries of the Middle East

In fact, this latter work examined some sources that were omitted by the present study (and should be included in a subsequent phase). All of these studies gave predominant emphasis to describing the wetland inventory attributes of each reference, on a case by case basis. By virtue of the near total reliance on Scott (1995), this review of the Middle East is, by default, much the same. Had more sources been identified and utilised during the assessment phase, a different character to the result would have been apparent. Ideally, the emphasis of such a review should be a 'global' analysis of a complete dataset, rather than providing a list of specific characteristics of individual wetland inventories.

Assessments were based on national datasets (including the possibility that a composite national dataset could be amalgamated from equivalent, eg 'provincial', data subsets). From the beginning there was an assumption that significant (national) information on wetland extent, health, attributes and values might be found in many other information sources besides conventional wetland inventory directories. Unfortunately for the Middle East dataset, we did not uncover any particularly useful unconventional wetland inventory information sources.

2.2 Evaluation of the Middle East dataset

The methodology used to identify and evaluate material for regional datasets within this project, including the Middle East, follows.

2.2.1 Evaluation of Inventory Material

Potential sources of wetland inventory data were identified using the World Wide Web, external and in-house libraries, and through communications with an extensive network of contacts. Many potential information sources were obtained, and their suitability for inclusion

in the database was assessed. Those deemed useful were included in this review (Convention on Wetlands 1998, Evans 1994, Scott 1995, Spalding et al 1997).

The decision whether to include or exclude certain sources depended on several factors. Material tangential to bona fide wetland inventory was not usually included except where no alternative data for a country could be obtained. Sub-national data were to be excluded except where no national information existed. In cases where material would be encountered which contained no areal data but did contain other useful information, it might be considered if no other information for that country had been identified. Some countries had two (or more) 'inventories', but these varied in scope and coverage. Scott (1995) usually provided the most comprehensive wetland account for the Middle East dataset, and often the other source was not included because it did not effectively supplement the information presented in Scott (1995).

2.2.2 Meta-data recording

Each assessed information source was evaluated using a *Wetland Inventory Assessment Sheet* (WIAS), designed to permit rapid assessment and compilation of information about each identified inventory, and to compile summary information about the wetland resource reported in each inventory. A set of guidelines for completing the sheet was also developed to facilitate handling and coding of relevant information. Derivation of wetland coverage estimates and other wetland parameters are discussed below.

2.2.3 Meta-data entry

A database was created in FoxPro® (version 2.6) to include information about each information source that was assessed, and recorded on a WIAS datasheet. Another database was also created to serve as a data dictionary of the codes (and their descriptions) that were used to represent various categories of information in the primary database.

2.2.4 Analysis of meta-data

Six computer programs were written to analyse the majority of coded fields in the database. Three of these programs were adapted to allow single-country analyses.

The programmed analyses report on the presence or absence of codes or logical values (by use of a filtering system), and derived outputs issue as quickly as a printer can process them. These outputs provide the meta-data breakdowns reported herein.

2. 3 Results of meta-data review

There were, ultimately, only (the aforementioned) four references evaluated for the Middle East dataset. Of these, only Evans (1994) and Scott (1995) offered Pan-Middle East coverage. Evans (1994), as its title indicates (ie *Important Bird Areas of the Middle East*), was concerned with avian (IBA) sites, however, 'Wetlands dominate[d] the inventory, comprising half of all IBAs…'. Wetland descriptions in this work were, however, sparse, and since Scott (1995) indicated which wetland sites in his directory also had IBA status, this more recent reference was used in lieu of Evans (1994). There were some IBAs with wetland components in Evans (1994) which were not listed in Scott (1995). However, these wetlands seemed to represent only a small part of the IBAs in question, and discrete wetland area was usually not specified. Evans (1994) was only used to provide an estimate wetland extent for one country (Israel) which was not covered in Scott (1995).

Ultimately Scott (1995), a conventional wetland directory composed of separately compiled national accounts, proved to be the only or predominant source of information used in the

evaluation of 13 of the 14 (or ~93%) countries in this dataset. Scott (1995) stated '*A Directory of the Wetlands in the Middle East* seeks to [provide] a comprehensive review of existing knowledge of the *most important* [emphasis added] wetlands in thirteen nations in the Middle East'. While accepting the Ramsar definition of wetlands, some 'exclusively marine systems' including (some) coral reefs (a Ramsar wetland type) were not included in this reference. Several country datasets may have been incomplete, or reflect situations which are now drastically altered (eg in Afghanistan and Iraq), owing in part to recent conflicts. For these reasons we did not consider any of the country datasets as *necessarily* comprehensive in coverage (see fig 3.1), although Scott (1995) is clearly the most comprehensive source of wetland site information for the Middle East as a whole.

A standard set of meta-data analyses was conducted on this dataset and summaries from the Middle East outputs appear in Annex 1. The small number of only four assessable references makes individual topic discussion here moot.

3 Extent and distribution of wetlands

3.1 Methodology for derivation of wetland extent estimates

The estimates of wetland coverage cited in or derived from the material included in the Middle East dataset were entered into a system of country coverage files. An individual wetland coverage file was created for each country in order to summarise any multiple estimates given in the material examined, and to facilitate the generation of national 'best estimates' of wetland area.

Each coverage file incorporated areal data columns for Ramsar 'wetland type' (see Annex 4) and broad wetland category (marine/coastal, inland and artificial). Where possible, approximate estimates per Ramsar wetland type were entered in the appropriate columns; where this was not feasible, approximate values for broad wetland type were entered, and where this was not feasible, only a provisional total wetland value was entered. These coverage files provided a clear overview of the quality and quantity of wetland extent information per country.

Each file provided wetland estimates, along with brief notes as to scope, and in particular, exclusions in coverage (eg open water bodies). This provided a convenient means of auditing all the material included in the dataset, and provides an 'at a glance' summary of the material examined.

Once all the values had been entered into a coverage file for each country, along with the appropriate notes, a subjective assessment of the material was made. Best estimates were composed according to broad wetland category (marine/coastal, inland and artificial), and a justification of the rationale entered into the file. Once the coverage files were completed for all the countries within a region, the estimates were compiled into a summary document.

The directory reference Scott (1995) included information on 13 of 14 countries examined herein, and therefore features predominantly in these country coverage files. The total number of national datasets examined per country was also entered into the each regional summary document.

3.2 Estimate of the extent of wetlands in the Middle East

A summary of wetland coverage in the Middle East is presented in tables 2 and 3 (below). The total area calculated from the Middle East dataset amounted to some 7 434 790 ha,

covering approximately 1.3% of the land surface of the 'Middle East' (as it is defined by the 14 countries of this dataset). Only a small percentage (~3%) of the wetlands included in this estimate could not be categorised as 'marine/coastal', 'inland' or 'artificial' wetlands, based on the evaluated inventory materials.

Scott (1995), the main reference for this dataset, does mention applicable Ramsar Site status for site entries (for those Ramsar Sites designated prior the compilation of his directory). However, it must be remembered that Ramsar site area figures typically refer to 'site' extent and not necessarily 'wetland' area.

Table 2 Combined wetland extent in the Middle East dataset

Asia	**Estimate of area (ha)**
Marine/coastal wetlands	3 849 076
Inland wetlands	3 331 101
Manmade wetlands	40 653
Area of unspecified types of wetland	213 960
Total area of wetlands identified in this study	7 434 790
# of national datasets per region	20
# of national datasets which can be regarded as comprehensive in cover	0

Table 3 Wetland extent in the Middle East dataset as a percentage of land cover; plus Ramsar site information

Asia	
# of countries	14
Total land area of region (ha)	587 416 800
Total area of wetlands identified in this study (ha)	7 434 790
% of land area covered by these wetlands	1.27%
Total area of Ramsar sites (ha)	1 364 890
# of Ramsar sites	24

(Source of Ramsar site information: Ramsar database, date of data extraction 17/8/98)

Best estimates of wetland area for countries in the Middle East are provided in table 4. The summaries of wetland coverage for each of the 14 Middle East countries listing the sources used to generate a 'best estimate' of wetland coverage either in total or by category type (inland, marine/coastal, artificial) can be found in Annex 2. Notes on the reliability of the assessment are included with each summary.

4 Rate and extent of wetland loss and degradation

Wetland loss, degradation and threats information for the Middle East dataset derives almost exclusively from Scott (1995). Most country summaries included such information, but it was almost always descriptive, with few quantitative data. Relevant excerpts from these accounts follow.

Afghanistan: Extensive floodplain wetlands have been lost. Most serious threats include drainage for agriculture and urban development, and diversion of water for irrigation.

Bahrain: Depletion of aquifer has occurred, lowering the water table. Wetlands are under threat from various human activities, including oil spills, but mostly from the reclamation of land for development, which has destroyed many biologically rich areas such as muddy shores and mangroves.

Table 4 Best estimates of wetland coverage per broad wetland category for countries in the Middle East

ASIA REGION: Middle East	BEST ESTIMATES					COVERAGE INFO		RAMSAR INFO	
	Marine/Coastal (ha)	**Inland (ha)**	**Artificial (ha)**	**Unspecified Wetland Type (ha)**	**Total (ha)**	# of datasets accessed per country*	# of datasets which can be regarded as comprehensive in cover	Total area of Ramsar sites (ha)	# of Ramsar sites
AFGHANISTAN	None	100 291	200		**100 491**	1	0	0	0
BAHRAIN	8 500	Unknown	240		**8 740**	2	0	2	2
IRAN, ISLAMIC REPUBLIC	861 627	997 535	4 600		**1 863 762**	2	0	1 357 150	18
IRAQ	56 000	1 936 500	32 500		**2 025 000**	1	0	0	0
ISRAEL	1 363	17 000	512		**18 875**	2	0	366	2
JORDAN	Unknown	110 550	1 800		**112 350**	1	0	7 372	1
KUWAIT	6 523	Unknown	unknown	2 700	**9 223**	1	0	0	0
LEBANON	Unknown	Unknown	unknown	780	**780**	1	0	0	0
OMAN	325 650	Unknown	unknown		**325 650**	2	0	0	0
QATAR	Unknown	Unknown	51	15 065	**15 116**	1	0	0	0
SAUDI ARABIA	796 273	168 525	750	17 050	**982 598**	2	1?	0	0
SYRIA	Unknown	Unknown	unknown	154 900	**154 900**	1	0	unknown	1
UNITED ARAB EMIRATES	1 715 740	700	unknown		**1 716 440**	1	0	0	0
YEMEN	77 400	Unknown	unknown	23 465	**100 865**	2	0	0	0
Total estimated wetland cover	**3 849 076**	**3 331 101**	**40 653**	**213 960**	**7 434 790**	20	0	1 364 890	24

*Excluding the Ramsar Database

Iran (Islamic Republic of): The level of exploitation of wetlands is high in Iran. Undoubtedly the most serious threats to wetlands have been the drainage and 'reclamation' of wetlands for agriculture, industry and urban development, and diversion of water supplies for irrigation purposes. One of the major environmental threats to wetlands came from the prolonged military conflict between Iran and Iraq in the 1980s.

Iraq: The destruction of the wetlands of Lower Mesopotamia continues at an accelerating pace, and their continued survival as one of the finest and most extensive natural wetland ecosystems in western Eurasia is now in grave doubt.

Israel: By 1948, the main wetlands of the country were partially or completely drained. Some flooding restoration has been undertaken (Ortal, chapter 4.16 *Israel*, Hecker & Tomàs Vives 1995).

Jordan: The water resources situation is now precarious. All water bodies are looked upon as a source of exploitation for urban, agricultural and industrial uses, and many are affected by increasing salinity, pollution and eutrophication due to intensive agricultural practices.

Kuwait: Continuous human activities along the coastline have resulted in considerable disturbance to marine ecosystems. Dredging and landfill, sand removal, disposal of untreated sewage and industrial effluents, as well as the perennial threat of oil spills adversely affect Kuwait's coastal wetlands.

Lebanon: During the early part of the 20th century lakes, swamps and seasonally flooded marshes of the central Beka'a Valley were drained for agriculture. The once extensive swamps on the coastal plain were also drained at this time. The only large natural wetland which survives in Lebanon is Ammiq Swamp, and it is unprotected and under threat from drainage schemes.

Oman: No summary loss or threat data available from the Middle East dataset.

Qatar: While almost all of the interior of the peninsula has been modified or degraded by human activity, Qatar's wetlands are predominantly marine and coastal. No summary loss or threat data available from the dataset.

Saudi Arabia: With the exception of artificial water bodies, wetlands are under severe threat in Saudi Arabia. Coastal zones are now subject to high pressure from expanding commercial and industrial fisheries, and many former fish nurseries have been lost to coastal reclamation from industrial, residential and recreational facilities. The Gulf has lost over 40% of its inter-tidal area to development, and the Red Sea 8% (Sambas & Symens 1993 *cited in* Scott 1995).

Syria: Most of those wetlands that did exist have been degraded or destroyed by drainage for agriculture and diversion of water supplies for irrigation purposes.

United Arab Emirates: Large-scale losses of intertidal area have been brought about either by dredging or by burial ie reclamation. It is mostly *sabkha* that has suffered from alteration, although various *khors* have been lost, or reduced to some extent. Possibly no site exists that has not already been altered or presently receives no form of adverse human activity or development.

Yemen: *Wadi* systems throughout Yemen are being adversely affected by severe degradation of the catchments as a result of deforestation for fuelwood and the charcoal industry, and overgrazing by domestic livestock. The Ta'izz marshes are critically threatened by excessive extraction of groundwater and conversion to agriculture.

5 Wetland benefits and values

Again, the present study relied heavily on *A Directory of Wetlands of the Middle East* (Scott 1995). This reference contained only two appreciable *national* summaries of wetland value information (described below). Otherwise, wetland values (if reported) were listed descriptively, on a site-by-site basis in the accounts. No other references with national summaries of wetland values were found in this study.

In the United Arab Emirates values were summarised, but pelagic and demersal fishing were noted to be most important, and these are marine rather than wetland values *per se*.

The account for Iraq noted that a report by the Wetland Ecosystems Research Group at the University of Exeter, United Kingdom, had summarised available information on the faunal, floral, ecological, economic and cultural values of the recent environmental and ecological study of the (formerly extensive) marshlands of Mesopotamia. It also had provided an environmental impact assessment of past, ongoing and proposed developments on the system (*citing* Maltby 1994). While values of this large *complex* were discussed, national wetland values were not summarised.

6 Land tenure and management structures

Information on land tenure and management structures are derivable for some sites on a site-by-site basis (per country chapter) from Scott (1995), but the worth of this information is questionable given the age of many of the data and the conflicts that prevail in some countries.

7 Extent and adequacy of updating programs

According to Motalebbi-Pour (1993, *cited in* Scott 1995), Iran was the first country in the Middle East to carry out a national wetland inventory. This was undertaken during the early 1970s. The inventory identified a total of 286 wetlands of which 33 were considered to be of international importance (*citing* Scott 1976a, 1976b). In 1990, Iran's Department of the Environment launched a major update of the wetland inventory. The purpose of this was to describe the key wetlands in Iran, giving emphasis to aquatic plants, waterbirds and mammals. During the initial phase of the project (1990–1994), some 58 of the most important wetlands were investigated.

As far as we have been able to ascertain, Iran is the only Middle Eastern country to have undertaken or to possess a conventional national inventory of its wetlands. Hecker and Tomàs Vives (1995) also found an absence of *bona fide* national wetland inventories for the four countries of the Middle East (ie Israel, Jordan, Lebanon and Syria) which were included in their study. Certain wetland types (eg corals, UNEP/IUCN 1988) and wetland biota (eg in Saudi Arabia, Newton, chapter in Scott 1995) have been either widely or well covered in the region, but these do not constitute national wetland inventories *per se*. Nor does Evans (1994) which includes important bird areas that correspond to many wetlands listed in every Middle East country chapter covered in Scott (1995). So the most relevant issue for the region is not one of the extent and adequacy of inventory updating, but rather the dearth of initial national scale, wetland inventory work.

Thus *A Directory of the Wetlands of the Middle East* (Scott 1995) for many countries represents the sole national wetland inventory (compilation), and its coverage extends only to 'the most important wetlands'. There are no formal plans to update the inventory at present.

8 Standardising of inventory approaches

Scott (1995) describes his study as follows:

> The Directory consists of a series of national chapters describing the principal wetlands in thirteen countries … Over fifty individuals and organizations have contributed to the Directory, many of them providing hitherto unpublished information on wetlands in the Middle East. Two hundred and twenty-three sites of international importance are described. These have been selected on the basis of criteria developed in relation to the Ramsar Convention. Although special attention is paid to the importance of the wetlands for wildlife, all wetland values, including water storage, flood control, coastal protection and fisheries production, have been taken into consideration.

From this characterisation it is evident that our primary source in this present review of Middle East wetland inventory is taken from a multiplicity of disparate sources, but with a strong bias towards 'important' wetlands, based on a standard set of selection criteria (the Ramsar Criteria). However, these accounts do not reveal, collectively or singly, a recommended standard approach to wetland inventory in general. This, coupled with the fact of having such a small number of collateral information sources in this review, precludes an in depth analysis of the standard approach issue.

However, if we can look across to an adjacent and partly overlapping region – the Mediterranean – then there already is a well-developed standard approach to wetland inventory to examine. The 'MedWet' project (phase I) was launched in late 1992 for the purpose of developing tools and methodologies for the conservation of Mediterranean wetlands. In a unique arrangement, governments of the five EU Mediterranean countries, international NGOs, and the Ramsar Convention cooperated in the initiative that comprised five sub-projects. The sub-project on inventory and monitoring developed a suite of tools for an inventory methodology that today is seen as providing an example that could be emulated in other regions to facilitate national wetland inventories. See Costa et al (1996), Hecker et al (1996), Farinha et al (1996), Zalidis et al (1996) and Tomàs Vives et al (1996) for the five volume set describing the tools and wetland inventory methodology.

9 Priority areas for wetland inventory

Certain specific types of wetlands may be bypassed during wetland inventory activities. In the case of the Middle East dataset, some coral formations were not included (eg Bahrain), although the reference (ie Scott 1995) cites use of the Ramsar definition of wetlands (a 'Ramsar wetland type'). Hughes and Hughes (1992), in their treatment of African wetlands, noted that the area of wetlands (especially water bodies) can be difficult to assess since the size can vary seasonally, annually and intra-annually. Ephemeral wetlands (eg *sabkha*) are certainly a phenomenon common to large areas of the Middle East. Some smaller or more remote *wadi* systems may be very important in the context of arid landscapes, but may not have been comprehensively inventoried. These potential gaps should receive more attention in future wetlands inventory activities in the Region.

Although it was possible to calculate estimates of the national important wetland resource in all of the Middle Eastern states, many of the data are 'old' and therefore suspect in a number of countries. This is particularly true for several countries in the region that have recently undergone, or are currently experiencing civil conflict or war. In these countries there may have been older wetland inventory data, or virtually none at all. Whatever the previous situation, conflict and its long-lasting effects present formidable constraints to the acquisition of additional data on the current state of wetlands. Middle East countries where such conflict has had the most direct negative impact on wetlands and the acquisition of current wetland inventory information include Afghanistan and Iraq, and perhaps Lebanon. Information on Iran's wetlands, on the other hand, seems to be more current and more comprehensive, despite recent conflicts, according to Mansoori's chapter 'Islamic Republic of Iran' in Scott

(1995). Besides the detrimental effect that strife has on collection of wetland information, it also obviously contributes directly to the loss and degradation of wetlands. However, the most significant changes to wetlands in the region have been land use changes. In several countries drainage, reclamation and over-abstraction are known to have occurred on a large scale, resulting in what appears to be major losses of wetland area. Quantification of this loss has not usually been possible, either logistically and/or politically, especially in the aforementioned strife-torn areas.

The wetland area estimates for the Middle East were, for the most part, painstakingly calculated from individual wetland site areal figures supplied in Scott (1995). Oftentimes area data were ambiguous between 'sites' and 'wetlands', and between wetland types. In this latter instance, some area figures could be definitely attributed to a single wetland type (at a site) while other figures (for the same site) were split in an unknown proportion between other wetland types; some wetland types (and wetlands) had no area data. The resulting best estimates must be tempered with this in mind. In most cases, the only information identified in this review was that provided by Scott (1995). (Additionally, Hecker and Tomàs Vives (1995) provide a general overview of wetland inventory in four Mediterranean Middle East countries.)

Middle Eastern countries with the apparent gravest shortage of current and/or comprehensive wetland information are Afghanistan, Iraq, Lebanon and Syria. Scott (1995) reported that information on Afghanistan and Syria (as well as Yemen) presented in the *Directory* is based entirely on expatriate sources and the literature, because no local contact could be established during the compilation period. Additionally, Jordan's acute water shortage problems exacerbate the effects of a relative paucity of information. A number of countries have marginally more information, and are tentatively regarded as having an intermediate level of wetland inventory information, though the scope and coverage greatly varies. In these cases, there are generally *significant* gaps in either information about specific wetland types or in national coverage; examples include Israel, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates and Yemen.

Out of the 14 countries of this Middle East dataset, only two might be said to have partially-adequate inventory data on (important) wetlands, but this is tentative. These are Bahrain and the Islamic Republic of Iran. Table 5 presents the general state of wetland inventory information as derived from the Middle East dataset.

Table 5 Status of national wetland inventory information in Middle Eastern countries based on this study

Little or no recent national wetland inventory information	Some, but inadequate national wetland inventory information	Adequate information available, but requires updating and more detailed surveys
Afghanistan	Israel[1]	Bahrain[2]
Iraq	Kuwait	Iran[3]
Jordan	Oman	
Lebanon	Qatar	
Syria	Saudi Arabia[4]	
	United Arab Emirates	
	Yemen	

Note: these are preliminary assessments only.

1 Significant information on wetlands included for protected areas exists, but not inventories of wetlands as a habitat type (Ortal, *Israel*, chapter *in* Hecker & Tomàs Vives (1995)).

2 The principal wetlands in Bahrain are coastal mudflats which cover a large area in relation to the size of the country. In 1985, detailed surveys of all critical habitats in the intertidal and sub-littoral zones around the major islands of the Bahrain and Hawar archipelagos were conducted (Vousden (1986) *cited in* Scott (1995)).

3 A great deal of information is available on the wetlands of Iran (particularly their importance for birds). Iran carried out a national wetlands inventory (during the early 1970s) and began an update in 1990. During the first phase of the project (1990-1994), some 58 of the most important wetlands were investigated (Motalebbi-Pour (1993) cited in Scott (1995)).

4 Eight wetland systems were identified in the Kingdom by Tinley (1994) (*cited in* Scott (1995)). With the exception of artificial water bodies, wetlands are under severe threat in Saudi Arabia.

The area figures included in this assessment of the Middle Eastern part of Asia, are based predominantly on calculations of area figures extracted from Scott 1995 (see Annex 3). No other studies including detailed areal figures for wetland extent in the Middle East were assessed or identified thus far.

10 Specific recommendations

The first part of this section provides brief recommendations pertaining to wetland inventory activities as a whole. It proved beyond the scope of this limited Middle East study to recommend particular field survey methods, or to provide instructions for wetland inventory activities. The relative merits and disadvantages of wetland inventory methods used in southern Africa are covered by Taylor et al (1995) and these are equally applicable to other regions, including this one.

Similarly, it would not be appropriate to enter the debate on traditional field survey techniques versus remote sensing techniques (again these are discussed admirably by Taylor et al 1995 and Grainger 1993, from analogous forestry studies). However, in the course of extracting and analysing data from the disparate inventory sources covered in this and companion reviews, common problems have been revealed which could be easily avoided. Certain core or key data need to be recorded during wetland inventory so as to benefit the data user. These would include, for example, the date of survey, the study objectives and the wetland definition and coverage employed. Furthermore, data must be presented to maximise their utility. Accessibility goes to the heart of this.

The second part of this section contains recommendations pertaining to any future updates of the Middle East dataset. Whilst evaluation of the methods used and the analyses developed were carried out regularly throughout the duration of this project, there still remain some areas which could be improved upon in future updates.

Finally, recommendations are provided which stem from and pertain to the review of Middle East wetland inventory materials.

10.1 Wetland Inventory recommendations

10.1.1 Preparatory and background research

- Undertake a thorough review of previous studies and surveys prior to any wetland inventory activity, to delineate gaps and to benefit from lessons learned or mistakes made. This should also include less obvious sources such as academic material and conference material, as well as conventional wetland inventories.
- Record information such as the history, development and rationale of wetland inventories. These are crucial elements for understanding the context of these studies, and this information should be described briefly within reports. Also record details of contact persons and addresses to assist successive workers. Note any plans for future inventory activities, especially if the surveys are part of a longer-term study.

10.1.2 Objectives

- Delineate the objectives of wetland inventories prior to the commencement of wetland inventory activities (particularly those involving fieldwork). The objectives of wetland inventory activities should play a key role in choice of the most suitable wetland inventory methodology to be used in any given particular inventory program.

- Include updating provisions when planning wetland inventory activities. Where feasible and appropriate, include monitoring for changes in extent, distribution and loss of wetlands.
- Include clearly stated objectives in wetland inventory reporting and published material.
- Widely disseminate wetland inventory material in accessible formats.

10.1.3 Data management

- Design and employ well structured data recording sheets to facilitate data entry into an electronic database.
- Store and update inventory information in a modern easy to use computerised database, thereby ensuring the longevity of the data.

10.1.4 Wetland coverage

- Don't overlook wetland types which are often commonly excluded from wetland assessments (including such artificial wetlands as fish ponds, rice paddy, reservoirs and dams, and natural wetlands including dune slacks, humid sands, dambos, wet mesotrophic grasslands, seagrass beds, maerl beds, coral reefs and alpine wetlands).

10.1.5 Wetland definitions and classification of wetlands

- Incorporate in any inventory work unequivocal descriptions of what is meant by 'marine wetlands' and 'coastal wetlands', and 'inland wetlands'. Imprecise definition hampers interpretation by others.
- Always include a definition of wetlands in inventory documentation. It should expressly address whether habitats such as floodplains, and open water bodies have been included in the definition, and whether they have been included in a wetland survey.
- Adequately describe and cite any wetland classification system that is used.

10.1.6 Wetland values and benefits

- Record information on wetland values and benefits as part of wetland inventories. As a minimum this should constitute a textual description of benefits, but preferably should indicate the economic values for wetland goods and services.
- Employ a simple structure to aid the assessment of wetland benefits and values. Take advantage of local knowledge. This could take the form of a well-organised key or questionnaire.
- Disseminate the findings of wetland inventory assessments of the values and benefits of a particular wetland site widely to demonstrate the values and benefits to policy makers and management authorities.

10.1.7 Inventory frequency

- Prioritise the advantages offered by low resolution comprehensive national surveys (to identify wetland locations for more detailed study later) versus the implementation of replicate detailed surveys at sites thought to be at risk. Assess first time reconnaissance of new sites against periodic surveillance of known sites. Few first-time surveys examined in this (project-wide) review were found to be part of a long-term assessment and monitoring program. If wetland loss and degradation is to be addressed, it must first be quantified. This necessitates longer-term study.
- Update the wetland inventory lest the data are likely to become lost or dated.

10.1.8 Presentation of data

- Summarise results in any presentation of the coverage and characteristics of the wetland resource. It is exceedingly difficult to construct a useful overview of an inventory reference by extracting values and statistics from reams of text entries.
- Record and list local names and variants of wetlands or their locations, along with any translations. Also include a guide to pronunciation.
- Record and present geographical coordinates and general location of wetlands so that discrepancies involving the names of wetlands can be resolved by accurate location.
- Always include dates of field observations, collations, and compilations of wetlands/wetland information.
- Include contact points for data custodians or publishers, and institutional details. 'Date stamp' this information so that its apparent relevance can be assessed by others.
- Fully reference all primary information.

10.1.9 Availability, accessibility and dissemination of wetland inventory material

- Publish results and reports of wetland inventory work; also present them on the World Wide Web. Much material that is currently available in draft format remains unpublished or has a limited distribution.
- Include provision for the sustainability of bibliographic and meta- wetland inventory databases, before they are developed, otherwise their usefulness is transient.
- Ensure that wetland habitat maps are adequately keyed, and impart clear and adequate information. Summary texts are quite useful. Include fundamental cartographic elements such as scale and geographic coordinates.

10.2 Recommendation for updating this study

- The Review of Middle East wetland inventory information base should be updated since it relied on only a couple of information sources.
- The tools used in this review, namely the WIAS (wetland inventory assessment datasheet), the meta-database and the analysis programs should be refined in any updating scenario.

10.3 Recommendations relevant to the Middle East

- In several countries of the Middle East wetland inventory data are obsolete, but updating of information has been delayed or precluded by hostilities or civil strife. In the meantime, land use changes have added to substantial wetland loss and degradation. At the earliest reasonable opportunity, countries in the region should update or undertake wetland inventories in order to assess changes (especially loss or gain), or establish a baseline for measuring future changes in wetland area, function and values.
- National wetland policies should be established which include national wetland inventory and monitoring programs. In a region with an underlying dearth of baseline wetland information, where acquisition of field information can be difficult or impossible (eg due to conflicts), where water is typically scare and/or ephemeral, and where competition for water is increasing, this must be seen as a priority.

- Wetland inventories should be conducted and documented in such a way (eg stored in a database) so as to promote and enable easy updating and review.
- Efforts to increase membership of the Middle East in the Convention on Wetlands (Ramsar, 1971) should be emphasised. Only five of the 14 states of the Middle East are Contracting Parties (these are mostly recent accessions). Membership would help to increase general knowledge of the importance of wetlands and would provide access to a common forum to address wetland issues.
- Sabkhas, wadis, coral reefs, karst wetlands and other specific types that may be currently under-represented should be emphasised in future wetland inventories.
- More efforts to integrate wetland surveys with faunal surveys should be made, and basic wetland characteristics and functions should be recorded. A major inventory of Important Bird Areas of the Middle East (Evans 1994) highlighted wetlands as the dominant IBA habitat, yet little useful wetland information was provided. If additional wetland data exist from the IBA study, but were not published or incorporated in other studies, they should be made available as a published or unpublished report. For countries known to have few wetland assessment or management initiatives, it is especially important that ornithologists, mammalogists and other faunal specialists examine, collect and provide basic wetland inventory information.
- Bibliographic databases set up to list information sources of wetlands within a given country should also provide details of where to obtain reference material, and provide contact details. Ideally, a system should be established where persons requiring particular information could contact one source for this information. A clearing house or document supply centre would be very useful, and would improve information accessibility in the Middle East enormously. Information availability should not have to depend on the goodwill and resources of those in possession of particular material.
- Tomàs Vives (1993) *cited in* Costa et al (1996) stated that *all* wetlands, irrespective of their importance, should be covered by a national wetlands inventory. This is particularly true in Middle Eastern countries where water is often ephemeral, and generally a scarce to rare resource.

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Annex 1 Outputs from the meta-data analysis of the Middle East dataset

Scale of Inventory of Material	
Global Scale	50%
Supra-Regional Scale	0%
Regional Scale	0%
Sub-Regional Scale	50%
National Scale	25%
Single country studies	0%
National Scale refs including more than one country	25%
Sub-National Scale	0%
National and other Scale Combination	25%
Source is a Directory/Inventory or equivalent?	
Yes	50%
No	50%
Type of Source Material	
Peer Review Journals	0%
Peer Review Books	0%
Chapters in Books	0%
Conference or Keynote Presentations	0%
Article in Conference Proceedings	0%
Internal Government Reports	0%
Government Formal Publications	0%
Other Government Materials	0%
NGO reports	0%
Formal NGO Publications	75%
Consultancy Reports	0%
Newsletter Articles	0%
Practitioner Periodical Articles	0%
Database Manuals	0%
Electronic Databases	25%
World Wide Web Articles	0%
Theses	0%
Other	0%
Unknown	0%
Language of Study	0%
English	100%
Other	0%
Format of Study	
Paper	75%
Electronic text	25%
Electronic Database	25%
Personal Communication	0%
Web Presentation	0%
Format of Study, continued	
Part of GIS or GIS Output	0%
Map Based	0%
Other Format	0%
More than one format	25%

Circulation of Study	
Published	75%
Interdepartmental (unpublished)	0%
Internal (unpublished)	25%
Restricted (unpublished)	0%
Unrestricted (unpublished)	0%
Other Types	25%
Unknown	0%
More than one type	25%
Data Storage Media	
Paper	75%
Web (electronic)	0%
Electronic Database	50%
Other Electronic (not web or DB)	50%
GIS	0%
Hard Copy Map	25%
Digitised Map	0%
Other	25%
Unknown or Ambiguous	25%
More Than One Medium	75%
Study Implementation	
International NGO	100%
National NGO	0%
Sub National NGO	0%
Local NGO	0%
International GO	25%
National GO	0%
Sub National GO	0%
Local GO	0%
Private Agency/Individual	0%
Study Implementation, continued	
Consultancy Agency	0%
Academic Institution	0%
Other body	0%
Unknown	0%
More than one Agency or Body	25%
Study Funding	
International NGO	75%
National NGO	25%
Sub National NGO	0%
Local NGO	0%
International GO	0%
National GO	25%
Sub National GO	0%
Local GO	0%
Private Agency/Individual	0%
Consultancy Agency	0%
Academic Institution	0%
Other body	0%
Unknown	0%
More than one Agency or Body	25%

Statement of Objectives	
Objectives Explicitly Stated	75%
Objectives Not Explicitly Stated	0%
Unknown	25%
Main Objectives of Study	
General Biodiversity	25%
Biodiversity Research	0%
Baseline Biodiversity	0%
Repeat Survey/Surveillance	0%
Management Tool for Biodiversity	0%
Biodiversity Monitoring	0%
Wetland Products	0%
Geographical	0%
International Designation	75%
Baseline Inventory	0%
Academic Research	0%
Land Use Planning	0%
Wetland Services	0%
Public Education	50%
Other Research	0%
Other	75%
Wetland Definition	
Definition Provided	50%
Definition Implied	50%
No Definition Provided or Implied	0%
Unknown/Ambiguous	0%
Ramsar Definition	
Ramsar Definition Used	50%
Ramsar Definition NOT used	0%
Use of Ramsar Definition Unknown	50%
Ramsar Classification	
Ramsar Wetland Types Used	25%
Other Wetland Classification Used	0%
Wetland Classification Varies	0%
Unknown	0%
Not Applicable	75%
Extent of Coverage	
All Wetlands	0%
Part of Wetland Resource	100%
Ambiguous	0%
Basis of Selection (if not complete wetland coverage)	
Geography / Jurisdiction	25%
Land Cover or RS Data	0%
Landform Type	0%
Suprahabitat	0%
Habitat Type	25%
Floral / Faunal Groups or Species	25%
Climate	0%
Wetland Function	0%
Hydrology	0%
Biodiversity Value	75%
Cultural Value	0%
Artefact of Data Collection	0%

Basis of Selection (if not complete wetland coverage), continued	
Other Basis	25%
Unknown or Ambiguous	0%
More than One Basis	75%
Temporal Scale	
Studies With a Temporal Scale	0%
Partly Include a Temporal Scale	0%
No Temporal Scale (eg Review)	100%
Unknown	0%
Discrete Surveys	0%
Not Discrete Surveys	100%
Ad Hoc Surveys	50%
Not Ad-Hoc Surveys	50%
Update Purpose to Add Sites	50%
Update Purpose to Review Status	0%
Update Purpose to Make Corrections	50%
Other Update Purpose	0%
Unknown Purpose	0%
Current /Ongoing Surveys	0%
Updated on Ad-hoc Basis	0%
Updated on Annual Basis	0%
Frequency of Update Unknown	0%
Data Collection Methodology	
Collation or Review	100%
Ground Survey	0%
Remote Sensing	0%
Questionnaire Survey	25%
More Than One Methodology	25%
Unknown Methodology	0%
Extent of Ground Survey	
Total	0%
Partial	0%
Unknown	0%
Type of Remote Sensing	
Satellite Imagery	0%
Aerial Photography	0%
Videography	0%
Radar Imagery	0%
LIDAR Imagery	0%
Map Product	0%
Unknown	0%
Summary Provided	
Summary Provided	50%
Summary NOT Provided	50%
Not Known if Summary Provided	0%
Wetland Type Coverage	
Sources Providing Area Values per Wetland Type	50%
Sources PARTIALLY Providing Area Values per Wetland Type	0%
Sources NOT Providing Area Values per Wetland Type	50%
Not known	0%

Wetland Loss and Degradation	
Sources Providing Information on Wetland Loss &/or Degradation	0%
Sources NOT Providing Information on Wetland Loss &/or Degradation	100%
Not known	0%
Wetland Status Description	
Overall Wetland Status Description Included	50%
Overall Wetland Status Description NOT Included	50%
Unknown	0%
Values and Benefits	
Some Level of Information	0%
Always	0%
Most of the time	25%
Commonly	0%
Sometimes	0%
Rarely	50%
Never	25%
Unknown	0%

Annex 2 Best estimates of Wetland Coverage

	Country name (& Code) AFGHANISTAN AFG		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Scott 1995	301	0	25,291	200	25,491	Area of specific wetland types stipulated
2	0	301	0	*75,000*	*0*		Area of a combination of wetland types given
3	0	0	0	*0*	*0*		Total area for Afghanistan
4	0	0	0	75,000	0	75,000	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			0	100,291	200	100,491	

Notes/comments on best estimate

No other estimates other than Scott identified for Afghanistan

Date of best estimate 27-Aug-98

	Country name (& Code) BAHRAIN BHR		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Ramsar database	none	2	0	0	2	Date of extraction 14 August 1998; data available for only one site (out of two)
2	Spalding, Blasco and Field 1997	501	300	0	0	300	i) Estimate of mangrove only. ii) Data based on Abbott (1995) unpublished report for WCMC and Reefbase.
3	Scott 1995	301	8,500	0	240	8,740	Marine/Coastal is overestimation based on records which included areas of whole islands. Man-made figure includes some Tp inland, and does not include a type 7 mentioned but without area…
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			8,500	0	240	8,740	

Notes/comments on best estimate

No other estimates for Bahrain identified other than Scott 1995, therefore values must be used for best estimate.

Date of best estimate 21-Aug-98

	Country name (& Code) IRAN IRN		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Ramsar database	none	635,500	721,650	-	1,357,150	Date of data extraction August 14th 1998
2	Spalding, Blasco and Field 1997	501	74,900	0	0	74,900	i) Estimate of mangrove only. ii) Data based on Mobayen and Tregubove (1970) Carte de la vegetation naturelle de l'Iran. 1: 2,500,000
3	Scott 1995	301	39,370	67,953	4,000		Value for specific wetland types
4	0	0	822,257	929,582	600		Values for wetland complexes which cannot be easily spilt into wetland areas per wetland type
5	0	0	*861,627*	*997,535*	*4,600*	1,863,762	Total value for Scott 1995 entry for Iran
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			861,627	997,535	4,600	1,863,762	

Notes/comments on best estimate

Scott 1995 is the only comprehensive estimate identified and is therefore used as a best estimate

Date of best estimate 27-Aug-98

	Country name (& Code)						
	IRAQ			***Area (ha) Wetland***			
	IRQ		MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Scott 1995	301	*56,000*	*616,650*	*32,500*		Specified wetland type area
2	0	0	*0*	*1,319,850*	*?*		Lumped (mostly inland) wetland types' area
3	0	0	56,000	1,936,500	32,500	2,025,000	Total area of wetlands according to Scott 1995
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			56,000	1,936,500	32,500	2,025,000	

Notes/comments on best estimate

No other estimates other than Scott 1995 were identified and therefore values used for best estimate.

Date of best estimate 27-Aug-98

	Country name (& Code) ISRAEL ISR		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Ramsar database	none	0	?	366	366	Date of data extraction August 14th 1998
2	Spalding, Blasco and Field 1997	501	300	0	0	300	i) Estimate of mangrove only. ii) Data based on Abbott (1995) unpublished report for WCMC and Reefbase.
3	Evans 1994	302	1,363	17,000	512	18,875	Values are underestimate and placed in wetland types very approximately.
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			1,363	17,000	512	18,875	

Notes/comments on best estimate

No other estimates other than Evans were identified, and therefore values must be used for best estimate

Date of best estimate 27-Aug-98

	Country name (& Code) JORDAN JOR		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Ramsar database	none	0	7,372	?	7,372	Date of data extraction : August 14th 1998
2	Scott 1995	301	0	*250*	*1,800*		Values for specific wetland types
3	0	0	0	*110,300*	*0*		Values for wetlands complexes which cannot be separated out into area per wetland type
4	0	0	0	110,550	1,800	112,350	Total value for Scott 1995 for Jordan
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			0	110,550	1,800	112,350	

Notes/comments on best estimate

No other estimates other than Scott identified for Jordan

Date of best estimate 27-Aug-98

	Country name (& Code) KUWAIT KWT		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	Reference code					
1	Scott 1995	301	6,523	450	0	9,223	Total area is much higher than sum of coastal, inland and man-made, since many times areas are mixed and cannot be split.
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4		0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			6,523	?	?	9,223	

Notes/comments on best estimate

The inland area of Scott 1995 is a large underestimation of the real situation, therefore it has not been used.
The coastal area is also an underestimation, the total area includes figures for mixed coastal/inland/man-made wetland types.
Therefore 2700 ha is undescribed, in terms of wetland type

Date of best estimate 26-Aug-98

	Country name (& Code) LEBANON LBN		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Scott 1995	301	?	280	?	780	Total area which is provided by Scott 1995 is more than the partial areas, since some is described as "mixed inland and coastal" wetlands but the area values not quantified.
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			?	?	?	780	

Notes/comments on best estimate

see notes with Scott, 1995: only total can be used. It is probably an underestimation.

Date of best estimate 26-Aug-98

	Country name (& Code)						
	OMAN			***Area (ha) Wetland***			
	OMN		MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Spalding, Blasco and Field 1997	2998	3,400	0	0	3,400	i) Estimate of mangrove only. ii) Data based on IUCN (1986), (1988) & (1988) Oman Coastal Zone Management plans.
2	Scott 1995	301	325,650	0	0	325,650	Included in the figure for coastal is 288.800 ha classified as "mixed coastal with minor inland"
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			325,650	?	?	325,650	

Notes/comments on best estimate

Scott's figure for coastal area may be an overestimation, see notes with Scott 1995.

The figure for total area probably is an underestimation, since no inland or man-made wetlands were included at all.

Date of best estimate 27-Aug-98

	Country name (& Code) QATAR QAT		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	Reference code					
1	Scott 1995	301	3,065	0	51	15,116	There is 12.000 ha mixed coastal/marine with some inland that could not be split.
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			?	?	51	15,116	

Notes/comments on best estimate

The estimate for man-made is probably low (only two sites included).

The estimate for coastal could not be made, since 12.000 ha of mostly coastal wetland area could not be split into coastal and inland.

(note: some 15065 ha are included in the total area estimate, but not attributed to a wetland type)

Date of best estimate 27-Aug-98

	Country name (& Code)						
	SAUDI ARABIA			***Area (ha) Wetland***			
	SAU		MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Spalding, Blasco and Field 1997	2998	29,200	0	0	29,200	i) Estimate of mangrove only. ii) Data based on IUCN/MEPA maps (1984/1985)
2	Scott 1995	301	796,273	168,525	750	982,598	The overall total does not match the subtotals for coastal, inland and man-made, since there was some limited area defined as "mixed coastal/inland" and "mixed inland/man-made".
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			796,273	168,525	750	982,598	

Notes/comments on best estimate

The best estimates are at least a little underestimation, see notes with Scott 1995.
(some 17050ha are included in the total for best estimate but not accorded to a wetland type)

Date of best estimate 27-Aug-98

	Country name (& Code) SYRIA SYR		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Ramsar database	none	0	0	0	0	no data yet, Syria is a new Contracting Party that has not submitted data yet for its one Ramsar site.
2	Scott 1995	301	50	40,050	68,300	154,900	Although a marine area is given, no marine wetland types are known. An additional 46,500 ha are classified as "mixed inland and man-made"
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			?	?	?	154,900	

Notes/comments on best estimate

All values under Scott are a clear underestimation; marine because of the length of Syria's coastline, and inland and man-made because of the 46.500 ha mixed area mentioned in the notes.

Date of best estimate 27-Aug-98

	Country name (& Code)						
	YEMEN		Area (ha) Wetland				
	YEM		MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Spalding, Blasco and Field 1997	501	8,100	0	0	8,100	i) Estimate of mangrove only. ii) Data based on IUCN (1987) , plus additions from Sheppard (1992).
2	Scott 1995	301	77,400	832	8	100,865	Additional information: 500 ha mixed type M/N; mixed inland/coastal 22.500 ha; mixed coastal/man-mde 50 ha; mixed inland/man-made 75 ha.
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			77,400	?	?	100,865	

Notes/comments on best estimate

The marine/coastal estimate is an underestimation, see notes with Scott 1995.
Inland and man-made estimates cannot be made from these data, see notes with Scott 1995
(note: Some 23465 ha are included in the best estimate of the total, but not attributed to a wetlands type)

Date of best estimate 27-Aug-98

	Country name (& Code) United Arab Emirates ARE		Area (ha) Wetland				
			MARINE/COASTAL	INLAND	MANMADE	TOTAL	NOTES
	Reference author	**Reference code**					
1	Scott 1995	301	1,715,740	700	0	1,716,440	Wetland types N+M listed for 700 ha; mixed coastal/inland 19,550 ha; mixed man-made/coastal 2.250 ha; mixed inland/man-made 7.200 ha.
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Best estimates (ha)			1,715,740	700	?	1,716,440	

Notes/comments on best estimate

In the total coastal/marine area, some open sea is included. The total is still a little underestimation (see notes Scott 1995)
For inland this is an underestimation, for man-made, no estimate could be made.

Date of best estimate 27-Aug-98

Annex 3

Extraction of data from: Scott 1995, A Directory Of Wetlands In The Middle East

NOTE: Figures in the Area column have been imported from original word-processed files via macro. NOT all figures necessarily apply to *wetland* area. In the Wetland Description column an attempt has been made to assign codes for Ramsar Wetland Type (See Annex 4).

AFGHANISTAN	**Dir. ID**	**Wetland Description**	**AREA**
	1a	O	Area: Zor Kol c.3,500 ha;
	1b	O	Chaqmatin Lake c.2,500 ha.
	(2)		(Area: Present area unknown; formerly at least 40,000 ha.)
	2a	FloodPlain wetlands	20,000 ha
	2b	Riverine wetlands	20,000 ha
	3	6x Lakes [O]	Area: Combined area of lakes 600 ha; area of National Park 41,000 ha.
	4	Brackish Lake [Q] +marshes	Area: 191 ha.
	5a	Barrage [6]	Area: Lake Sarobi 200 ha;
	5b	Lake [O]	Area: Lake Duronta 2,000 ha.
	6	Brackish Lake [Q]	Area: Ab-I Nawar 3,500 ha; Waterfowl Sanctuary 7,500 ha; Dashte Nawar plain 70,000 ha.
	7	Alkaline Lake [Q]	Area: Maximum area of lake c.13,000 ha; Waterfowl Sanctuary 27,000 ha.
	8	O & (extensive) Tp/Ts marshes	Area: c.35,000 ha.
BAHRAIN	**Dir. ID**	**Wetland Description**	**AREA**
	1	A,G,I,(Tp,9)	Area: Approximately 2,500 ha.
	2	Artificial lake [7, Tp]	Area: 240 ha.
	3	E,G	Area: 200 ha.
	4	G,B	Area: 500 ha.
	5	A,E,B	Area: Approximately 5,300 ha of islands.

IRAN	Dir. ID	Wetland Description	AREA
	1	Q/R & T/S marshes	Area: 600 ha.
	2	3,M,W,Tp/Ts	Area: 3,000 ha.
	3	O/P,Tp	Area: 120 ha.
	4	Q (hypersaline), Sp	Area: 483,000 ha.
	(5)		(Area: 2,500 ha)
	5a	Q + marshes	Area: Shur Gol 2,000 ha;
	5b	O + marshes	Area: Yadegarlu 350 ha;
	5c	O + marshes	Area: Dorgeh Sangi 150 ha.
	6	Tp	Area: 500 ha.
	7	Tp & Ts	Area: 400 ha.
	8	O-Q + marshes	Area: 1,200 ha.
	9	6	Area: 1,000 ha.
	10	A,E,J,K + marshes	Area: 650 km of shoreline.
	11	Xf,Tp	Area: Area of wetland unknown; within a Protected Area of 949 ha.
	12	6,Xf	Area: 45 ha.
	13	O,Tp	Area: 200 ha.
	14	Complex of K, Tp, Ts, E, 6 types [for retaining irrigation water, thus not really “3”]	Area: Approximately 15,000 ha.
	15	Complex of A, Tp, Ts, E types	Area: 500 ha.
	16	Lake [O], some Tp	Area: 1,230 ha.
	17	Several 6 types [for retaining irrigation water, thus not really “3”]	Area: 1,000 ha.
	(18)		(Area: 1,600 ha)
	18a	6, 3	Area: Seyed Mohalli and Zarin Kola 600 ha;

	18b	Ts	Area: Larim Sara 1,000 ha.

IRAN	Dir. ID	Wetland Description	AREA
	19	(2x) K with Tp	Area: 950 ha.
	20	A, E, Tp?, Ts	Area: 97,200 ha. [Gorgan Bay is 23,800 ha]
	21	J 4,850 ha + Sp(?) 150 ha????	Area: c.20,000 ha including 4,850 ha of lagoons.
	(22)		(Area: 1,540 ha; Ramsar Site 1,400 ha.)
	22a	R-P	Area: Alagol 900 ha;
	22b	O-P, Tp	Area: Ulmagol 280 ha;
	22c	O-P, Tp	Area: Ajigol 360 ha;
	23	O, Tp	Area: 50 ha.
	24	6	Area: 500 ha.
	(25)		(Area: 550 ha) (Bibishervan 300 ha; Eymar 250 ha).
	25a	O, Tp	Area: Bibishervan 300 ha;
	25b	O, Tp	Area: Eymar 250 ha.
	26	O, Tp	Area: 1,550 ha.
	27	Tp	Area: 400 ha.
	28	6	Area: 1,500 ha.
	29	Tp, Xf	Area: c.15,000 ha (3,500 ha of permanent wetlands).
	30	Tp, Ts, O, Xf	Area: c.20,000 ha (8,000 ha of permanent wetlands).
	31	4, Tp	Area: 2,500 ha.
	32	Tp (4)	Area: 12,000 ha.
	33	Ts, 4, (O = 3 ha)	Area: 20,000 ha.
	34	Sp,Ss,Tp,Ts,4	Area: c.30,000 ha.
	35	F,G,Tp,Ts,Sp,H,E,J?	Area: 425,140 ha. Ramsar Site 400,000 ha.
	(35a)		Area: Shadegan Marshes 282,500 ha;

	(35b)		Area: Khor-al Amaya 19,200 ha;

IRAN	Dir. ID	Wetland Description	AREA
	(35c)		Area: Khor Musa 123,440 ha.
	36	2x O + Tp	Area: 1,400 ha.
	37	Tp (Ts)	Area: 1,600 ha.
	38	Ts	Area: 1,500 ha. {Site “will disappear” pers comm. J. Mansoori, 20/08/98}
	(39)		(Area: 63,300 ha. Ramsar Site 43,000 ha.)
	39a	Q	Area: Gavekhoni Lake 12,000 ha (13,000 including about 1,000 ha of marsh).
	39b	Tp? (delta marshes)	Area: about 1,000 ha of marsh.
	39c	Ts	Area: about 50,300 ha (63,300 - 13,000 ha).
	40	6	Area: Unknown.
	41	O/P (“semi-permanent”) + marshes	Area: 4,700 ha.
	42	2x O, 5x P, + marshes	Area: 70 ha. {Site “is gone” pers. comm. J. Mansoori, 20/08/98}
	(43)		(Area: Ramsar Site 6,600 ha [Dasht-e Arjan 2,400 ha; Lake Parishan 4,200 ha]).
	43a	P+Ts, Y	Area: Dasht-e Arjan 2,200 ha;
	43b	Q (almost O), Sp (almost Tp)	Area: Lake Parishan 4,000 (4,200 max) ha.
	44	Q, Tp-Sp (400 ha at max),Y	Area: 21,600 ha at maximum extent of flooding.
	(45)		(Area: Ramsar Site 108,000 ha.)
	45a	2x Q,Tp,Ts,Y	Area: Lake Bakhtegan and Lake Tashk 136,500 ha;
	45b	Tp,Ts,3	Area: Kamjan Marshes 5,250 ha.
	46	O (?)	Area: Unknown.
	(47)		Area: c.170,000 ha. Ramsar Site 50,000 ha.
	47a	O/P(“semi-permanent”),L,Ts/Tp,Sp,Q	Area: Hamoun-i Sabari 101,300 ha;
	47b	O/P(“semi-permanent”),L,Ts/Tp,Sp,Q	Area: Hamoun-i Hirmand 65,600 ha.
	48	O,(P,Tp,Ts)	Area: 14,900 ha. Ramsar Site 10,000 ha.

	49	C,E,(A?)	Area: 312 ha.

IRAN	Dir. ID	Wetland Description	AREA
	50	K,J,G,F,H,Tp	Area: 35,600 ha.
	51	A,G,E	Area: 27,000 ha.
	52	F,G,Tp,M,0,H	Area: 26,870 ha.
	53	D,E,Sp,F	Area: 2,045 ha (Nakhilu 15 ha; Morghu 2,000 ha; Ummal Korm 30 ha).
	54	C,D,E (A?)	Area: 160 ha.
	55	D	Area: 2,620 ha.
	56	F,I (6,800 ha),G,E	Area: 100,000 ha.
	57	F,I (300 ha),G,E,A,N	Area: 11,800 ha of wetlands. Ramsar Site 20,000 ha.
	58	F,I (900 ha),G,E,N	Area: 15,000 ha.
	59	F,I (100 ha),G,E,(N?)	Area: 11,500 ha.
	60	F,I,G,E,N	Area: c.14,000 ha.
	61	A,B,C,E,F,G	Area: 9,000 ha.
	62	A,B,C,E,F,G	Area: 33,500 ha.
	63	N/M,F,Tp,I,G	Area: Lower Sarbaz River 2,900 ha; Khor Govater 11,560 ha.
IRAQ	**Dir. ID**	**Wetland Description**	**AREA**
	1	Tp? O? [“complex of marshes and lakes”] M	Area: Unknown.
	2	Q (Tp,9)	Area: c.230,000 ha.
	3	6,Tp,Xf,7	Area: c.20,000 ha.
	4	Q/R,(Tp,5)	Area: 5,000-8,000 ha.
	5	“remnants” of 6,O,Tp	Area: c.2,000 ha.
	6	Ss,R,Q,3	Area: c.40,000 ha. (Q=50 ha)
	7	R/Q,Sp/Ss,M	Area: c.40,000 ha.
	8	Q (or 6?),(9)	Area: At least 20,000 ha.

	9	Q,O,Tp	Area: c.150,000 ha. (O=100 ha)

IRAQ	Dir. ID	Wetland Description	AREA
	10	Ts	Area: At least 1,000 ha.
	11	6,Tp	Area: Unknown.
	12	Tp,Ts,3	Area: c.10,000 ha.
	(13-31)		(Area: Between 1,500,000 and 2,000,000 ha.)
	13	O	Area: c.20,000 ha.
	14	O	Area: c.100,000 ha.
	15	Q	Area: c.50,000 ha.
	16	2x O “with extensive marshes”	Area: Haur Um Al Baram 5,000 ha; Haur Al Abjiya 5,000 ha.
	17	Tp/O	Area: 8,000 ha.
	18	Tp/Ts	Area: Unknown. Approximately 125 km in length.
	19	O/Tp	Area: c.32,500 ha.
	20	O (Tp)	Area: c.140,000 ha.
	21	Tp/O	Area: Unknown.
	22	2 [14x artificial ponds]	Area: Unknown.
	23	O/Tp	Area: c.27,500 ha.
	24	O	Area: c.40,000 ha.
	25	Tp,O	Area: c.25,000 ha.
	26	O	Area: 7,500 ha.
	27	Tp,O	Area: c.300,000 ha.
	28	O,Tp	Area: At least 350,000 ha.
	29	Tp,M,O/P,Ts	Area: c.15,000 ha.
	30	Ts,Tp	Area: c.220,000 ha.
	31	M	Area: Unknown. About 165 km in length.

	32	F, including G	Area: 20,000 ha.

IRAQ	Dir. ID	Wetland Description	AREA
	33	Tp/Sp? (90,000ha), G (36,000ha)	Area: c.126,000 ha.
	****	4 “new” reservoirs	Area: Unknown. Max 65 x 15km; Unknown. >30km long; c25,000 ha; c7,500 ha.
JORDAN	**Dir. ID**	**Wetland Description**	**AREA**
	Dir. ID	Wetland Description	AREA
	1	M,Tp,Y	Area: c.3,000 ha.
	2	6 (N)	Area: 26,700 ha.
	3	6 (N,Y)	Area: 10,600 ha.
	4	6 (M)	Area: Area of river basin 402,500 ha.
	5	8	Area: 300 ha.
	6	Sp/6/Tp/N	Area: Wadi Damia 18,600 ha; Kibed Pool 50 ha; Kafrein Dam 800 ha; Shu'eib Dam 600 ha; area of Swaimeh Pool unknown.
	7	N,M,Y	Area: Area of wetlands unknown; area of catchment 659,600 ha.
	8	O	Area: 200 ha.
	9	R/Ss	Area: c.3,000 ha.
	10	Ss/R (6,127ha), TP (50ha),1 (100ha), 5	Area: c.12,000 ha.
	11	Ss/R	Area: c.35,000 ha.
	12	Ss/R	Area: c.1,500 ha.
	13	D,C,E,B	Area: Unknown; 27 km of coastline.
KUWAIT	**Dir. ID**	**Wetland Description**	**AREA**
	1	8,Tp	Area: 250 ha.
	2	A (770 ha),G (890 ha)	Area: 1,660 ha.
	3	A (2595 ha), G (2250 ha), R/Ss (450 ha)	Area: Sulaibikhat Bay 4,845 ha; Doha Peninsula Nature Reserve 450 ha.
	4	C,E,D	Area: 18 ha.

	5	G,F,J,N,R/Ss	Area: c.2,000 ha.

LEBANON	Dir. ID	Wetland Description	AREA
	1	Ts,N	Area: 280 ha.
	2	D,E,U?,Tp	Area: c.500 ha.
OMAN	**Dir. ID**	**Wetland Description**	**AREA**
	1	E,I,N [The Khawrs here, have major type I components]	Area: Approximately 9,000 ha of wetlands along 300 km of coast, including Khawr Kalba 100 ha, Khawr Shinas 1,200 ha and Khawr Nabr 300 ha. {Khawr= "the mouths of wadis which flood occasionally"}
	2	G,A,J,(I),E,R/Ss,(C)	Area: Barr Al Hikman 290,000 ha (coastline 160 km, greatest area of exposed mudflats at least 22,000 ha). Masirah Island 109,500 ha (coastline 170 km, greatest area of exposed mudflats 2,000 ha).
	3	A,J,F,G,E	Area: Approximately 1,000 ha.
	4	K,E	Area: 100 ha.
	5	F,E,G	Area: Approximately 1,000 ha.
	6	F,Y,E,J,K,(I),(Tp? "from reeds")	Area: Total area unknown. Khawr Rawri 1,100 ha [K/J]; Khawr Hassan 300 ha[K/J]; Khawr ad Dahariz 150 ha [K/J]; Khawr Salalah 200 ha [K].
QATAR	**Dir. ID**	**Wetland Description**	**AREA**
	1	A,I,G,H,E	Area: 3,000 ha. [Max of 1,000ha = type I]
	2	G,D,E,(C)	Area: 65 ha.
	3	8	Area: c.50 ha.
	4	8	Area: About one hectare.
	5	A,F,G,E,D,C,R/Ss	Area: c.12,000 ha.
SAUDI ARABIA	**Dir. ID**	**Wetland Description**	**AREA**
	1	A,E,R/Ss,D,G,H,I,B,(C)	Area: 20,000 ha.
	2	E,R/Ss,(C)	Area: Approximately 12,500 ha.
	3	8	Area: Approximately 500 ha.
	4	C,E	Area: Approximately 190 ha, excluding surrounding reefs. (Harqus 2 ha, Karan 128 ha, Kurain 8 ha,

			Jana 33 ha and Juraid 20 ha).

SAUDI ARABIA	Dir. ID	Wetland Description	AREA
	5	A,E,G (+remnant I,B,H)	Area: Approximately 41,000 ha.
	6	N,Tp,R/Ss	Area: Approximately 7,500 ha.
	7	G,E,D,A,B	Area: 62,500 ha.
	8	Y,R/Ss	Area: 40 ha.
	9	Tp,3,6	Area: Approximately 2,500 ha (covering the original marsh plus the new reservoir). [new reservoir=150ha]
	10	8,6 [100ha],Tp	Area: Not defined.
	11	N,Tp	Area: 160,000 ha.
	12	O,Y,Tp	Area: 35 ha.
	13	9 (8),Tp	Area: 2,500 ha.
	14	O	Area: 3,000 ha.
	15	9 (8),Tp	Area: Approximately 300 ha.
	16	N/M	Area: Approximately 5,000 ha.
	17	Tp	Area: Approximately 200 ha.
	18	N/M	Area: Approximately 250 ha.
	19	6,N,Tp	Area: 2,500 ha.
	20	D,E,A,I,B,(C)	Area: Approximately 288,000 ha.
	21	I,F,E,C,H,R/Ss	Area: Approximately 700 ha.
	22	A,G,J?,E, R/Ss	Area: Approximately 900 ha.
	23	J,E?,I,B	Area: Approximately 40,000 ha.
	24	D	Area: 14.7 ha.
	25	G,J,E,I,B	Area: Approximately 150 ha.
	26	D,E,C	Area: Approximately 8 ha.
	27	A,G,I	Area: Approximately 200 ha.

	28	E,G	Area: 200 ha.

SAUDI ARABIA	Dir. ID	Wetland Description	AREA
	29	J?,G,R/Ss,I,Sp/Tp	Area: Approximately 1,000 ha.
	30	C,D,E,G,I,(B)	Area: The main archipelago lies within an area of 75 by 50 km; the site includes approximately 70,000 ha of land with 605 km of coastline; the proposed Marine Protected Area covers 331,000 ha.
SYRIA	**Dir. ID**	**Wetland Description**	**AREA**
	1	4	Area: Area of wetlands unknown; entire region 48,000 ha.
	2	O,1	Area: 800 ha (formerly 1,200 ha).
	3	O/P,Tp,Ts	Area: Area of wetlands unknown; entire region c.30,000 ha. {Wetlands may be gone. Evans 1994 ME IBAs}
	4	M,Tp,Xf,O,1	Area: Unknown; c.420 km of river.
	5	6	Area: 63,000 ha.
	6	6,Tp	Area: c.100 ha.
	7	Q,Tp/Sp,5	Area: 37,500 ha; maximum extent of flooding in recent years c.10,000 ha.
	8	R,Y	Area: c.20,000 ha.
	9	6	Area: 5,300 ha.
	10	coastal wetland	Area: c.50 ha.
	11	P,Ts	Area: Unknown.
	12	M,O,Tp	Area: Yarmuk Valley 20,000 ha; Lake Muzayrib 50 ha.
UNITED ARAB EMIRATES	**Dir. ID**	**Wetland Description**	**AREA**
	1	G,E,I,R/Ss,(C)	Area: 263,000 ha.
	2	G,E,I,R/Ss,H,A,B,C	Area: 478,000 ha, including sea area.
	3	D,E,C	Area: 455,000 ha, including sea area.
	4	D,C	Area: 380,000 ha, including sea area.
	5	A,D [a wetland?]	Area: 3,500 ha. The site excludes that part of the island which is developed.

	6	E,G,I,H,R/Ss	Area: 99,500 ha.
	7	R/Ss,8	Area: At least 3,000 ha.

UNITED ARAB EMIRATES	Dir. ID	Wetland Description	AREA
	8	D [a wetland?]	Area: 1,500 ha.
	9	F,G,8,E,I (introduced)	Area: Approximately 2,000 ha.
	10	8,H?,J	Area: c.250 ha.
	11	G,E,F,I	Area: Approximately 3,000 ha.
	12	G,E,I,J	Area: 5,000–7,500 ha.
	13	E,G,I,C,F,J	Area: 1,000–1,500 ha.
	14	J,G,F,E	Area: 4,600 ha.
	15	J,I,G,F,E,H,Y,Tp	Area: 19,550 ha.
	16	A,E	Area: 27,780 ha. About half of the site lies in UAE territory, the remainder being in Oman.
	17	6,Tp	Area: c.500 ha.
	18	N,F,G,E,H,	Area: Unknown.
	19	N/M	Area: Approximately 500 ha (including the main wadi system, cultivated areas and village).
	20	F,E,I,G,R/Ss	Area: 7,750 ha.
	21	N/M	Area: 200 ha.
	22	6,N	Area: Over 800 ha.
	23	Y/O,9,Tp	Area: c.1,400 ha.
	24	8,Tp,R/Ss	Area: 1,500 ha.
YEMEN	**Dir. ID**	**Wetland Description**	**AREA**
	1	E,G,D,I,(B)	Area: 30,000 ha.
	2	E,C,(I,B),D	Area: c.5,000 ha.
	3	A,E,G,I,C,B	Area: c.35,000 ha.
	4	M/N	Area: Unknown.

	5	G,I,E,A,R/Ss,C,B	Area: Unknown.
	6	8,Tp,A,G	Area: c.50 ha.

YEMEN	Dir. ID	Wetland Description	AREA
	7	A,G,J,I,R/Ss,Tp,B,C,N	Area: c.12,500 ha.
	8	G,I,R/Ss,B,C	Area: c.7,000 ha.
	9	J,R/Ss	Area: 100–200 ha.
	10	8 (8ha),Tp	Area: c.250 ha.
	11	Tp,M/N	Area: 90 ha.
	12	G,E,Tp,R/Ss	Area: c.10,000 ha.
	13	M/N	Area: c.500 ha.
	14	M/N,6,Tp	Area: 50–100 ha.
	15	E,J	Area: c.100 ha.
	16	J,E	Area: c.50 ha.
	17	E,F	Area: c.100 ha.

Annex 4

Ramsar Wetland Type †

Marine/Coastal

A – Permanent **shallow marine waters** less than six metres deep at low tide; includes sea bays and straits.

B – Marine **subtidal aquatic beds**; includes kelp beds, sea-grass beds, tropical marine meadows.

C – **Coral reefs**.

D – **Rocky marine shores**; includes rocky offshore islands, sea cliffs.

E – **Sand**, **shingle** or **pebble shores**; includes sand bars, spits and sandy islets; includes dune systems.

F – **Estuarine** waters; permanent water of estuaries and estuarine systems of deltas.

G – **Intertidal mud**, **sand** or **salt flats**.

H – **Intertidal marshes**; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.

I – **Intertidal forested wetlands**; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.

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

K – **Coastal freshwater lagoons**; includes freshwater delta lagoons.

Inland Wetlands

L – **Permanent inland deltas**.

M – **Permanent rivers/streams/creeks**; includes waterfalls.

N – **Seasonal/intermittent/irregular rivers/streams/creeks**.

O – **Permanent freshwater lakes** (over 8 ha); includes large oxbow lakes.

P – **Seasonal/intermittent freshwater lakes** (over 8 ha); includes floodplain lakes.

Q – **Permanent saline/brackish/alkaline lakes**.

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† The Ramsar *Classification System for 'Wetland Type'* was approved as Rec. 4.7. Annex 2 B., at the Fourth Meeting of the Conference of the Contracting Parties of the Ramsar Convention, Montreux, 1990 (Ramsar Convention Bureau, 1990). At the Sixth Meeting of the Parties, Brisbane, 1996, an additional wetland type 'subterranean karst wetlands' was added to the classification by Res. VI.5.

The actual codes used for data recording and input of Ramsar Wetland Type into the Ramsar Database, were developed subsequently to the Montreux Conference. The wetland type codes presently in use have evolved slightly but continue to accommodate the original 'classification'. This coding system is intended only to provide a very broad framework to aid swift identification of the principal wetland habitats represented at each site. This has ensured its global applicability. The framework was and is *not* intended as an attempt at a comprehensive wetland classification.

Literature cited: Ramsar Convention Bureau 1990. Proceedings of the fourth meeting of the conference of contracting parties. Montreux, Switzerland, 27 June to 4 July 1990. Vol. I. Gland, Switzerland.

R – **Seasonal/intermittent saline/brackish/alkaline lakes and flats**.

Sp – **Permanent saline/brackish/alkaline marshes/pools**.

Ss – **Seasonal/intermittent saline/brackish/alkaline marshes/pools**.

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 soil; includes sloughs, potholes, seasonally flooded meadows, sedge marshes.

U – **Non-forested peatlands**; includes shrub or open bogs, swamps, fens.

Va – **Alpine wetlands**; includes alpine meadows, temporary waters from snowmelt.

Vt – **Tundra wetlands**; includes tundra pools, temporary waters from snowmelt.

W – **Shrub-dominated wetlands**; Shrub swamps, shrub-dominated freshwater marsh, shrub carr, alder thicket; on inorganic soils.

Xf – **Freshwater, tree-dominated wetlands**; includes freshwater swamp forest, seasonally flooded forest, wooded swamps; on inorganic soils.

Xp – **Forested peatlands**; peatswamp forest.

Y – **Freshwater springs**; oases.

Zg – **Geothermal wetlands**

Zk – **Subterranean karst and cave hydrological systems**.

Note : 'floodplain' is a broad term used to refer to one or more wetland types, which may include examples from the R, Ss, Ts, W, Xf, Xp, or other wetland types. Some examples of floodplain wetlands are seasonally inundated grassland (including natural wet meadows), shrublands, woodlands and forest. Floodplain wetlands are not listed as a specific wetland type herein.

Man-made wetlands

1 – **Aquaculture** (eg, fish/shrimp) **ponds**

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

3 – **Irrigated land**; includes irrigation channels and rice fields.

4 – **Seasonally flooded agricultural land**.*

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.

9 – **Canals and** drainage **channels**, ditches.

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* To include intensively managed or grazed wet meadow or pasture.