INVENTORY, ASSESSMENT
AND MONITORING OF MEDITERRANEAN WETLANDS

THE PAN-MEDITERRANEAN WETLAND INVENTORY MODULE

Pere Tomàs-Vives

Nick J Riddiford scientific reviewer
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Inventory, assessment and monitoring of Mediterranean wetlands incorporates the following series of manuals:
• The Pan-Mediterranean Wetland Inventory Module (Tomàs-Vives, 2008)
• The Catchment Module & The Site Module (Farinha et al, 2008)
• The Water Framework Directive Module (Cenni & Tarsiero, 2008)
• The Surveillance Module (Farinha & Fonseca, 2008)
• The Indicators Module (Fitoka et al, 2008a)
• The MedWet Inventory Data Sharing Protocol (Fitoka et al, 2008b)
• Mapping Wetlands Using Earth Observation Techniques (Fitoka & Keramitsoglou, 2008)

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CONTENTS

ABOUT THIS MANUAL ........................................................................................................................................................................................5
  The new MedWet series ........................................................................................................................................................................5
  Purpose of the manual .........................................................................................................................................................................5
  Structure of the manual .......................................................................................................................................................................6
  Who should use this manual .............................................................................................................................................................6

INTRODUCTION .................................................................................................................................................................................................................7

PAN-MEDITERRANEAN WETLAND INVENTORY (PMWI) MODULE DATA FORM .................................................................................................8
  A. Basic Information ...........................................................................................................................................................................10
  B. Status ..............................................................................................................................................................................................................11
  C. Values ............................................................................................................................................................................................................12

REFERENCES ..............................................................................................................................................................................................................13
The new MedWet series

The manual for The Pan-Mediterranean Wetland Inventory Module is part of the new series Inventory, assessment and monitoring of Mediterranean wetlands published under the auspices of the “MedWet information and knowledge network for the sustainable development of wetland ecosystems (MedWet CODDE)” project. Undertaken between 2005-2007, the MedWet CODDE addresses the urgent need for policy makers, wetland managers and researchers to have easy access to up-to-date and standardized data in order to assess and monitor the current status and trends of Mediterranean wetlands and their surroundings. The project was launched through the INTERREG IIIC programme.

The purpose of the new MedWet publication Inventory, assessment and monitoring of Mediterranean wetlands is to assist wetland managers and scientists to inventory their wetland resources, to facilitate the monitoring and assessment of these resources and to promote data harmonization and compatibility among various inventory efforts in the Mediterranean and beyond. It has its roots in the original MedWet wetland inventory work (Costa et al, 1996; Hecker et al, 1996; Farinha et al, 1996; Zalidis et al, 1996) developed during the MedWet 1 (ACNAT) project and presented in 1996 at the Conference on Mediterranean Wetlands in Venice as a standard inventory methodology for the countries of the Mediterranean region. The publication also draws on the outputs of the first upgrading effort done under the SUDOE project (INTERREG IIB).

Inventory, assessment and monitoring of Mediterranean wetlands introduces a Mediterranean-wide system which is based on: a web database, the MedWet Web Information System (MedWet/WIS) which provides the tool for the creation of a Mediterranean wetland databank; a data sharing protocol which supports data exchange and sharing between wetland stakeholders; and the use of Earth Observation techniques (EO) as enhanced means of mapping wetland features. Inventory, assessment and monitoring of Mediterranean wetlands guides the reader through the upgraded MedWet system incorporating the socioeconomic and cultural aspects of wetlands, the Water Framework Directive requirements, inventory based indicators, the Pan-Mediterranean Wetland Inventory and EO techniques. Most importantly, it provides a full description of and guidance through the new online MedWet/WIS - a system which offers an advanced and flexible way to provide or restrict access to data, supported by a relevant protocol.

Inventory, assessment and monitoring of Mediterranean wetlands incorporates the following series of manuals:

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- The MedWet Inventory Data Sharing Protocol
- Mapping Wetlands Using Earth Observation Techniques

They set out to explain the background, the relevance and the benefits of the new MedWet system and to provide detailed guidance on how to apply it. Each manual can be used in two ways: as a stand-alone reference for its particular theme or subject; or as an integral part of a series of works which guide the reader through the entire process from the early pioneering work to joining, using and getting the best out of the system.

Purpose of the manual

The purpose of this manual is to describe and explain how to fill in the data fields which record the relevant information for compiling the Pan-Mediterranean Wetland Inventory (PMWI), serving the three main principles which had been set in the original MedWet wetland inventory work (Hecker et al, 1996). These principles are:

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Compatibility: The module includes data fields required by existing international programmes such as the Ramsar Convention, CORINE Biotope and NATURA 2000 network (European Habitat and Bird Directives).

Uniformity: The module presents the required wetland data in a standard way to ensure uniformity in data recording and storage. This uniformity is a key element for comparisons and analysis of different inventory projects from different countries, or different regions within a country.

Flexibility: The module includes a number of data fields, basic or optional, which permit the users to choose how they wish to contribute to the PMWI, whatever their technical and financial resources or data dissemination policy, thus allowing flexibility in the extent to which they make their data available to the public – in full or only partially.

Structure of the manual

This manual is structured as follows:

“Introduction” gives an overview of the Pan-Mediterranean Wetland Inventory aims, content and the levels of detail that users can choose to apply.

“Pan-Mediterranean Wetland Inventory Data Form” focuses directly on describing and explaining how to fill in each and every data fields.

Who should use this manual

This manual is targeted at wetland scientists and technical staff of local, regional and national authorities, research institutes and Non Governmental Organisations (NGOs) who work on wetland management and conservation and wish to follow a standardized and widely promoted inventory methodology which allows for the assessment and monitoring of wetlands at Mediterranean as well as at national or regional level.

This manual is intended for users willing to contribute to the compilation of the Pan-Mediterranean Wetland Inventory. They have to store the data directly in the MedWet/WIS, the current upgrade of the MedWet database. Therefore, they should also familiarize themselves with the MedWet Web Information System User Manual (Katsaros et al, 2008) regarding the use of the MedWet/WIS tools; and the MedWet Inventory Data Sharing Protocol (Fitoka et al, 2008b) for understanding the framework of defined procedures applied for data stored in the MedWet/WIS.

Users are also advised to refer to the other manuals in the new MedWet series which provide specific detail relating to the relevant wetland data recommended for wetland inventories. These manuals are of particular relevance to users contemplating or undertaking the following inventory approaches:

(i) simple or detailed inventory of wetland sites and their catchments – refer to The Catchment Module & The Site Module (Farinha et al, 2008);

(ii) integrating their wetland inventory with the European Water Framework Directive – refer to The Water Framework Directive Module (Cenni & Tarsiero, 2008);

(iii) surveillance programmes on hydrochemistry and soil elements or on wetland birds – refer to The Surveillance Module (Farinha & Fonseca, 2008).

As an end product to these data recording exercises, users may wish to undertake statistical calculations and derive indicators for status and trends relating to wetland area, water quality, threats, bird populations and wetland extent covered by Ramsar designation. In such cases, they are advised to refer to The Indicators Module (Fitoka et al, 2008a).

The above manuals can be accessed through the present cdrom menu or by downloading from the ‘Downloads’ section of the MedWet/WIS (at http://www.wetlandwis.net).
INTRODUCTION

The new MedWet system *Inventory, assessment and monitoring of Mediterranean wetlands* introduces an inventory approach which permits assessment and monitoring of wetlands at different levels (from catchment and site to habitat) and scales (from local and regional to national or Mediterranean).

The Pan-Mediterranean Wetland Inventory Module is one of six modules\(^1\) designed for the new MedWet system and gathers the relevant data in one homogenous Data Form. This module has been designed in order to fulfil the recommendation of the Mediterranean Wetlands Committee (MedWet/Com, 4\(^{th}\) meeting, 2001) to create a Pan-Mediterranean Wetland Inventory (PMWI) by 2010.

The PMWI consists of a compilation of inventory data from Mediterranean countries in order to build a Mediterranean-wide wetland inventory. This will allow an overall picture to be built of the location and extent of the wetlands in the Mediterranean. For this the PMWI aims to:

- Include as many wetlands as possible in each Mediterranean country.
- Include information useful for assessing the status of wetlands.
- Be easy and quick to compile.
- Facilitate data transfer, through the online database.
- Be accessible to contributors, through the online database.
- Allow dissemination of up-to-date information/results.
- Allow the production of location maps of Mediterranean wetlands at different scales.

The first objective of the PMWI is to provide answers to some basic questions:

- How many wetlands are there in the Mediterranean countries and region?
- What is the area of these wetlands?
- Where are these wetlands located?

In addition, the PMWI aims to answer the following questions:

*On the status of Mediterranean wetlands:*

- What is their condition (degree of modification by human activities)?
- What is their protection status (legal designations)?
- What is the site tenure (public/private)?
- Which wetlands are affected by human activities and impacts?

*On the values of Mediterranean wetlands:*

- Where are the important habitats (MedWet types and/or Ramsar wetland types)?
- Where are the important species of flora and fauna?
- Which wetlands meet the Ramsar criteria?
- Which wetlands meet physical and biological functions?
- Which wetlands meet socioeconomic values?

Explanations and descriptions of how to use the PMWI Data Form are presented below. The Data Form is appended to the end of this manual. Users can access the Appendices, which provide the codes needed to complete the PMWI Data Form, as well as the Data Forms of the rest modules, independently of the current manual, through the cdrom menu.

In order to simplify and facilitate data recording and storage, the fields included in the PMWI are a small subset of the fields existing in the complete MedWet system. Any data entered into MedWet/WIS will automatically feed the PMWI. This means that if you are using the MedWet/WIS to store the complete inventory data through the Catchment Module and the Site Module, you do not need to complete the PMWI, as data will be transferred automatically. It is also possible to store PMWI data without having to undertake a complete inventory.
PMWI consists of basic data and optional data. Basic data include those fields needed to answer the basic questions. These are the minimum data needed to include a site in the PMWI, and they will be public. The data fields are: i) Date of the data, ii) Site code, iii) Site name, iv) Country, v) Catchment code, vi) Catchment name, vii) Geographic coordinates, viii) Wetland area, ix) General wetland description (including category, salinity, presence of water) and x) Source(s) of the data.

Optional data allow for the compilation of information on status and values of each wetland site. They are considered optional data in order to keep the PMWI as simple as possible, but users are strongly encouraged to complete and submit this information as it will allow for more comprehensive analysis of the status and values of Mediterranean wetlands. They may include the data fields related to status information such as i) Condition, ii) Protection status (legal designations), iii) Site tenure (% public/private), iv) Human activities and v) Impacts. Also, they may include the data fields related to values information such as: i) MedWet habitats, ii) Ramsar wetland types, iii) Noteworthy Flora, iv) Noteworthy Fauna, v) Ramsar criteria, v) Physical and biological functions and vi) Socioeconomic values (social, cultural, economic). Explanations and descriptions of how to use the PMWI Data Form are presented below. The Data Form is appended to the end of this manual. Users can access the Appendices, which provide the codes needed to complete the PMWI Data Form, as well as the Data Forms of the rest modules, independently of the current manual, through the cdrom menu.

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Date of compilation/Date of update: The date on which the data form was created, updated or completed, in the format: day/month/year.

Country: The country of the compiler.

Compiler’s name: The name of the individual who filled in the data form, including the name of the pertinent institution.

Address/telephone/fax/e-mail: The full address of the individual filling in the data form, including telephone, fax and e-mail numbers when available.
A. BASIC INFORMATION

A1. Site identification

Site code: It is essential to allocate an identification code to each site. The code must be unique as this will allow all the information to be associated with the relevant site. The site codes must be established at national level, and the country should be identified by the first two digits following the ISO code rules (Appendix C). The site code is composed of a maximum of ten alphanumeric digits (Appendix D). In the MedWet/WIS, this field is preceded by an asterisk (*) which denotes that the field is obligatory.

Usual Wetland name: Specify the commonly known denomination of each wetland or the name that identifies it more precisely, always giving preference to the vernacular or the officially designated name when it relates to a protected natural area. Whenever the wetland lacks an individual name, the name of the closest village or place-name should be used. In the MedWet/WIS, this field is preceded by an asterisk (*) which denotes that the field is obligatory.

Other names: Specify other names used to identify the site.

Country: Name the country to which the site belongs. In the MedWet/WIS, this field is preceded by an asterisk (*) which denotes that the field is obligatory.

A2. Catchment identification

Catchment area code: The national code (up to four digits) assigned for this catchment area. A list of catchment areas and corresponding codes must be established at national level in the country where the inventory is carried out. For example, in Portugal, two letters are used to identify each catchment area (see example in Appendix A), and two extra digits may be used to subdivide the catchment area (e.g., secondary rivers or streams).

Name of the catchment area: Name of the catchment area pertaining to the code.

A3. Geographic location

Site coordinates: Specify the site's latitude and longitude, expressed in degrees, minutes and seconds (WGS 84 system). The coordinates should pinpoint the central point of the wetland site.

A4. Wetland area (ha): The surface area of the site, in hectares. If possible this should be calculated through algorithms support by a digital Geographic Information System.

A5. General Wetland description: Supply a brief description of the wetland site, based on a general overview of its characteristics, physical and ecological components, and/or any other relevant factors. Indicate cases of elevated annual variability of category, salinity or water residence.

Category: Classify the wetland using the following options (if the site is complex, you can choose more than one option):

1. Marine/coastal (includes estuaries, deltas and costal lagoons)
2. Inland (includes rivers, marshes and peatlands)
3. Artificial - when the wetland is created or modify by human activity (includes ponds, wastewater treatment areas, salt exploration sites and aquacultures).
Dominant Salinity: Enter the dominant salinity class during summer (if the site is complex, you can choose more than one option):

0. No available information
1. Fresh (<0.5 g/l)
2. Fresh/brackish (0.5-5.0 g/l)
3. Brackish (>5.0-18.0 g/l)
4. Brackish/salty (>18.0-30.0 g/l)
5. Salty (>30.0 g/l)

Presence of water: Characterize the water residence in the wetland site as (if the site is complex, you can choose more than one option):

1. Permanent – the habitat is permanently flooded
2. Seasonal – the habitat is seasonally or periodically flooded.
3. Temporary/ intermittent – the flooding period does not follow a seasonal or regular pattern.

A6. Source of the data:
List the data sources when filling in the datasheet.

B. STATUS

B1. Condition: Indicate the conservation status of the site in relation to its natural (undisturbed) state, using one of the following options:

1. Unknown
2. Untouched. No signs of man/made changes
3. Original habitats/landform still predominant (>50%)
4. Original habitats/landform partially modified (10-50% untouched)
5. Original habitats/landform highly modified (<10% untouched)
6. Original habitats/landform totally changed

B2. Protection status

Code: List the site's designation codes indicating its protection status, as granted at national or international level (Appendix H).

Name of the designated site: Specify the actual name of the site as it appears in the designation.

Legislation: Specify the type of legal document (law, decree, regulation etc) which designates the wetland as a protected site and the date it was issued.

Cover (%): Indicate the approximate percentage area of the site allocated protection legislation.

B3. Site tenure: Supply a general description of the ownership regime of the wetland site (private, state-owned, provincial etc), specifying the owners when possible.

Area (%): In case of multiple ownership of the site, provide approximate percentages for the total area under public and private ownership.
B4. Human activities and impacts affecting the wetland (inside or outside):

**Activity Code:** Use the numeric codes of Appendix P (Natura 2000 list) and fill in as many lines of information as needed to record information on all relevant activities having a positive or negative effect on the site.

**Activity:** Write the name(s) of the activity or activities as defined in the above code.

**Impact Code:** Use the numeric codes from Appendix Q (Natura 2000 List) and fill in as many lines of information as needed to record information on relevant impacts occurring on the site. If an activity causes more than one impact, it should be registered on different lines. On the other hand, if the activity causing an impact is not known, the impact should still be recorded in the form, with the corresponding “activity” fields left empty.

**Impact:** Write the name of the impact as defined in the above code.

**Activity Remarks:** Supply any additional relevant information concerning the activities affecting the wetland.

**Impact Remarks:** Supply any additional relevant information concerning the impacts affecting the wetland.

C. VALUES

C1. Habitat

**MedWet Habitat code (up to third level)**

**Code:** Enter the three first digits of MedWet Habitat code (system, subsystem and class according to the MedWet Habitat Description System - Appendix K).

**Cover(%):** Indicate the percentage of the site’s area covered by each MedWet habitat. Give an approximate estimate if no exact values are available.

**Ramsar wetland types**

**Code:** List all the Ramsar wetland types present in the site, using the appropriate Ramsar classification code (Appendix G) for each wetland type present.

**Cover(%):** Indicate the percentage of the site’s area covered by each Ramsar wetland type. Give an approximate estimate if no exact values are available.

C2. Flora:

**Species:** Specify the scientific name of the species.

C3. Fauna:

**Species:** Specify the scientific name of the species.

**Number:** If known, specify the estimated number of individuals of the species within the wetland. If the number is not known, only fill in the “A - Abundance” box.

C4. Ramsar criteria

**Code:** Whenever appropriate, fill in the criteria codes defined by the Ramsar Convention to identify wetlands of international importance (Appendix N).

**Remarks:** Briefly explain the choice of the adopted criteria.

C5. Wetland values (physical and biological functions)

**Code:** Specify the most important wetland values (Appendix O) that may be attributed to the site.

C6. Socioeconomic values

**Social and cultural values:** Supply a brief description of the social and cultural values of the wetland.

**Economic values:** Supply a brief description of the economic values in the wetland.
REFERENCES


