# Ramsar Sites Overview

## A Synopsis of the World's Wetlands of International Importance

Scott Frazier

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Ramsar

WETLANDS INTERNATIONAL

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RIZA (Netherlands Institute for Inland Water Management and Waste Water Treatment) is part of the Ministry of Transport, Public Works and Water Management. RIZA prepares and evaluates the Netherlands national policy concerning water management. It's main tasks concern the flood control, and the management and restoration of freshwater systems.

The Netherlands, situated in the complex delta formed by the Rivers Rhine, Meuse and Scheldt, is rich in wetlands, and is situated on the vital African/Eurasian migratory waterbird flyway. RIZA recognizes the great importance of wetlands. In addition to national wetlands policy work, RIZA specifically conducts wetland ecological research and monitoring, and the planning and design for ecological restoration of wetlands. These include freshwater lagoons, lakes and marshes, and the Rhine and Meuse Rivers (including their floodplains).

Being a knowledge centre, RIZA considers training and the exchange of knowledge, both nationally and internationally, to be an important aspect of its mission. Close links exist with institutes in countries that share rivers with the Netherlands. Other international contacts include a programme for bilateral scientific exchange concerning wetlands with counterparts in Central and Eastern Europe. There is regular co-operation with the Ramsar Convention Bureau, and with non-governmental organisations like Wetlands International and the World Wide Fund for Nature.

A special unit has been established within the Institute to co-ordinate requests from abroad for technical advice from RIZA. This unit is the Wetland Advisory and Training Centre, or WATC. The WATC has an Advisory Board in which Wetlands International, the Ramsar Bureau and various government Ministries of the Netherlands are represented. WATC ensures that RIZA's knowledge is made available abroad, by organising study tours and training courses in the fields of wetland management, wetland development and wetland restoration. WATC also assists in keeping RIZA's expertise up-to-date by supporting its networks for international scientific exchange.

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by Scott Frazier



CONVENTION ON WETLANDS
CONVENTION SUR LES ZONES HUMIDES
CONVENCIÓN SOBRE LOS HUMEDALES
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Photos in Figure 5:
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# Table of Contents

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# Foreword

On 2 February 1971, at an intergovernmental conference in the town of Ramsar in Iran, representatives of 18 nations signed the Convention on Wetlands, committing their governments to the conservation and wise use of these habitats in their territory. By March 1999, the number of Contracting Parties to the Ramsar Convention had grown to 114, and they had included almost 1,000 wetlands in the Ramsar List of Wetlands of International Importance which covered more than 70 million hectares.

More importantly, the Ramsar Convention has been instrumental in changing – in less than 30 years – a centuries-long perception of wetlands as filthy, useless places that had to be drained and converted into something "more useful". Today most scholars, governments, funding institutions, business people and the general public accept that wetlands perform a series of functions that are extremely beneficial to the ecosystems in which they are located, functions that in turn bring considerable benefits to local communities and to the national society as a whole.

Yes, the perception of wetlands values has changed, and continues to change. Yet, as with all other habitats, on many occasions the temptation is still strong to over-use wetland resources, and even to continue converting them, in order to obtain more rapid and substantial economic returns. But the Convention is equipping governments, wetland managers, decision-makers and local communities with more and more technical and policy tools to assist them in taking the right decisions and the best management approach to ensure that wetlands become important assets of the national capital, for the benefit of biodiversity, the ecological processes of the planet, and the well-being of people all over the world.

This is the second and updated edition of this publication, initiated at the time of the last Conference of the Parties to Ramsar in 1996. It provides an analysis of the information submitted by the member countries to the Ramsar Database when designating their most significant wetlands for inclusion in the Ramsar List. The Ramsar Database is managed on behalf of the Convention by Wetlands International.

We hope that, once more, the production of this Overview will help to increase the awareness of the Convention, and of its internationally important sites, leading to more effective conservation measures for these wetlands, further designations to the Ramsar List, and wiser use of wetlands in general.

Delmar Blasco, Secretary General
Ramsar Convention Bureau

Dr Phillip Edwards, Executive Director
Wetlands International, Africa Europe Middle East

# About the Ramsar Convention

The Convention on Wetlands (Ramsar, Iran, 1971) is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands. The Convention entered into force in 1975 and at March 1999 had 114 member countries.

The secretariat, or Ramsar Bureau, is located at Gland, Switzerland, sharing the headquarters building of IUCN – The World Conservation Union.

Because wetlands are very important for ecological processes as well as for their rich flora and fauna, the broad objectives of the Convention are to ensure their conservation and wise use. To meet these objectives, the Convention places general obligations on member countries relating to the conservation of wetlands throughout their territory, and special obligations pertaining to those wetlands which have been designated for the List of Wetlands of International Importance (the “Ramsar List”).

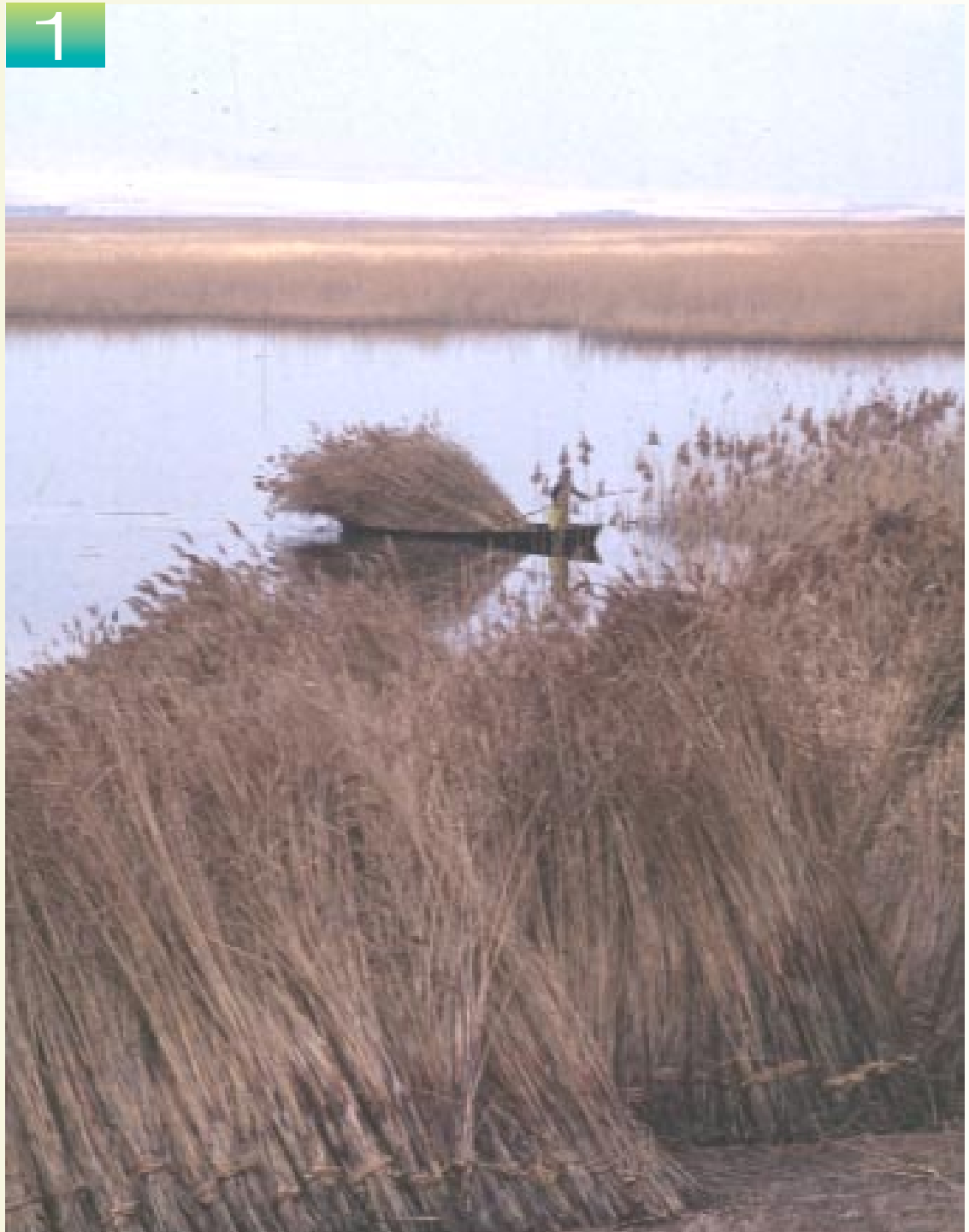
The selection of Ramsar sites should be based on “international significance in terms of ecology, botany, zoology, limnology or hydrology”. Specific criteria have been developed by the Convention to aid in the identification of these sites. Contracting Parties are further obliged to maintain the ecological character of listed sites and to cooperate for the management of shared wetlands and shared wetland species.

A key concept embodied in the Convention is that of “wise use” of wetlands, which has been defined as equivalent to “sustainable use”.

The Conference of Contracting Parties meets every three years to discuss national experiences, review the status of sites on the List, promote cooperative activities, and adopt technical and policy instruments to assist members countries to implement the treaty. This publication is being produced on the occasion of the 7th Meeting of the Conference, to be held in San José, Costa Rica, on 10–18 May 1999.

More details about the Convention can be found on its Web site: http://ramsar.org/

1



Reed harvesting, Karamik, Turkey. PHOTO: GERNANT MAGNIN.

# Introduction

The first major geographic and thematic analysis of wetlands of international importance was published in 1996. This was called *An Overview of the World's Ramsar Sites* (Frazier, 1996a) and it covered the first 25 years of the Convention on Wetlands (1971–1996). The analysis was based upon information routinely supplied by the Convention's Contracting Parties and managed by Wetlands International within the Ramsar Database.

This *Ramsar Sites Overview* is an updated analysis of that presented in 1996. However there are differences. Much of the background information on the Convention has not been reproduced again here, as the previous presentation still stands. In addition, many analyses have been simplified. There are less photographs, but maps and many graphics are larger to enhance clarity. The intention is to present essential Contracting Party and Ramsar site information in a more concise volume.

In the three years separating these two *Overviews*, there has been significant growth in numbers of both Contracting Parties and the sites they have designated to the *List of Wetlands of International Importance*, the Ramsar List. This growth has obviously influenced both the global and regional coverage and composition of the Convention, and this is the subject of the next chapter.

As with its predecessor, this *Overview* is organized thematically, with regional analyses presented or discussed in each chapter. Information on the number, location, and size of Ramsar sites have been treated by "Contracting Party Ramsar region", as decisions relating to designations are at the discretion of the Contracting Parties involved. Inherent attributes such as the types and importance of these wetlands, as well as their uses and the challenges facing them, are discussed within the chapters by geographic region. These differences in presentation concern only countries with overseas/dependent territories (i.e. France, the Netherlands, and the United Kingdom).

# 2 About the List of Wetlands of International Importance

**Biebrza Marshes, Poland.** PHOTO: WWF-CANON/FRED HAZELHOFF.

At the end of 1995 (the date covered by the previous *Overview*), there were 91 Contracting Parties to the Convention on Wetlands. These states had designated 771 sites to List of Wetlands of International Importance (the Ramsar List), covering over 52 million hectares. In the subsequent three years membership has grown by one-quarter to 114 states (including the latest country to join, El Salvador in January, 1999). At the end of 1998 the total number of Ramsar sites had grown to 957. This constitutes an increase in designated sites of over 24%. The cumulative area of designated wetlands now stands at over 70.5 million hectares representing a growth in area of nearly 35%, during these last three years. The total designated area of the world's Ramsar sites is now slightly larger than the territories of Belgium, Germany, Luxembourg and Poland combined.

For administrative purposes, and to enhance implementation of the Ramsar Convention through regionalization, the world has been divided into 7 administrative Ramsar Regions. These are Africa, Asia, Eastern Europe, Western Europe, the Neotropics, North America and Oceania. The current distribution of Ramsar Contracting Parties is depicted on Map 1. In general, the regional gaps in membership remain the same as in 1995, but there are some notable exceptions. All of central America and all but one of the south American mainland countries have now joined, and the gap in accession to the Convention is rapidly closing in Western Europe. Large gaps in membership do remain in parts of Africa (although this is also the region with the most Parties), the Middle East, central and southeast Asia, the Caribbean and in Oceania.

Figure 1 depicts the regional distribution of Contracting Parties and the number and cumulative area of their Ramsar sites. Maps 2–8 display this distribution spatially, including the general location of Ramsar sites.

## Ramsar Contracting Parties*

| Country | Convention | Wetlands | Area (ha) |
|---|---|---|---|
| Albania | 29/03/96 | 1 | 20,000 |
| Algeria | 04/03/84 | 2 | 4,900 |
| Argentina | 04/09/92 | 6 | 420,039 |
| Armenia | 06/11/93 | 2 | 492,239 |
| Australia | 21/12/75 | 49 | 5,099,180 |
| Austria | 16/04/83 | 9 | 102,772 |
| Bahamas | 07/06/97 | 1 | 32,600 |
| Bahrain | 27/02/98 | 2 | 7 |
| Bangladesh | 21/09/92 | 1 | 596,000 |
| Belgium | 04/07/86 | 6 | 7,935 |
| Belize | 22/08/98 | 2 | |
| Bolivia | 27/10/90 | 2 | 805,240 |
| Botswana | 09/04/97 | 1 | 6,864,000 |
| Brazil | 24/09/93 | 5 | 4,536,623 |
| Bulgaria | 24/01/76 | 5 | 2,803 |
| Burkina Faso | 27/10/90 | 3 | 299,200 |
| Canada | 15/05/81 | 36 | 13,050,975 |
| Chad | 13/10/90 | 1 | 195,000 |
| Chile | 27/11/81 | 7 | 100,174 |
| China | 31/07/92 | 7 | 588,380 |
| Colombia | 18/10/98 | 1 | 400,000 |
| Comoros | 09/06/95 | 1 | 30 |
| Congo, Democratic Republic of | 18/05/96 | 2 | 866,000 |
| Congo, The Republic of | 18/10/98 | 1 | 438,960 |
| Costa Rica | 27/04/92 | 7 | 245,301 |
| Cote d'Ivoire | 27/06/96 | 1 | 19,400 |
| Croatia | 25/06/91 | 4 | 80,455 |
| Czech Republic | 01/01/93 | 10 | 37,891 |
| Denmark | 02/01/78 | 38 | 2,283,013 |
| Ecuador | 07/01/91 | 3 | 94,750 |
| Egypt | 09/09/88 | 2 | 105,700 |
| El Salvador | 22/05/99 | 1 | ? |
| Estonia | 29/07/94 | 10 | 215,950 |
| Finland | 21/12/75 | 11 | 101,343 |
| France | 01/12/86 | 18 | 795,085 |
| Gabon | 30/04/87 | 3 | 1,080,000 |
| Gambia | 16/01/97 | 1 | 20,000 |
| Georgia | 07/06/97 | 2 | 34,223 |
| Germany | 26/06/76 | 31 | 672,852 |
| Ghana | 22/06/88 | 6 | 178,410 |
| Greece | 21/12/75 | 10 | 163,501 |
| Guatemala | 26/10/90 | 3 | 83,099 |
| Guinea | 18/03/93 | 6 | 225,011 |
| Guinea-Bissau | 14/05/90 | 1 | 39,098 |
| Honduras | 23/10/93 | 3 | 102,575 |
| Hungary | 11/08/79 | 19 | 149,841 |
| Iceland | 02/04/78 | 3 | 58,970 |
| India | 01/02/82 | 6 | 192,973 |
| Indonesia | 08/08/92 | 2 | 242,700 |
| Iran, Islamic Republic of | 21/12/75 | 18 | 1,357,150 |
| Ireland | 15/03/85 | 45 | 66,994 |
| Israel | 12/03/97 | 2 | 366 |
| Italy | 14/04/77 | 46 | 56,950 |
| Jamaica | 07/02/98 | 1 | 5,700 |
| Japan | 17/10/80 | 10 | 83,530 |
| Jordan | 10/05/77 | 1 | 7,372 |
| Kenya | 05/10/90 | 2 | 48,800 |
| Korea, Republic of | 28/07/97 | 2 | 960 |
| Latvia | 25/11/95 | 3 | 43,300 |
| Liechtenstein | 06/12/91 | 1 | 101 |
| Lithuania | 20/12/93 | 5 | 50,451 |
| Luxembourg | 15/08/98 | 1 | 313 |
| Madagascar | 25/01/99 | 2 | 53,095 |
| Malawi | 14/03/97 | 1 | 224,800 |
| Malaysia | 10/03/95 | 1 | 38,446 |
| Mali | 25/09/87 | 3 | 162,000 |
| Malta | 30/01/89 | 2 | 16 |
| Mauritania | 22/02/83 | 2 | 1,188,600 |
| Mexico | 04/11/86 | 6 | 1,095,414 |
| Monaco | 20/12/97 | 1 | 10 |
| Mongolia | 08/04/98 | 4 | 264,220 |
| Morocco | 20/10/80 | 4 | 10,580 |
| Namibia | 23/12/95 | 4 | 629,600 |
| Nepal | 17/04/88 | 1 | 17,500 |
| Netherlands | 23/09/80 | 24 | 326,928 |
| New Zealand | 13/12/76 | 5 | 38,868 |
| Nicaragua | 30/11/97 | 1 | 43,750 |
| Niger | 30/08/87 | 1 | 220,000 |
| Norway | 21/12/75 | 23 | 70,150 |
| Pakistan | 23/11/76 | 8 | 61,706 |
| Panama | 26/11/90 | 3 | 110,984 |
| Papua New Guinea | 16/07/93 | 2 | 594,924 |
| Paraguay | 07/10/95 | 4 | 775,000 |
| Peru | 30/03/92 | 7 | 2,932,059 |
| Philippines | 08/11/94 | 1 | 5,800 |
| Poland | 22/03/78 | 8 | 90,455 |
| Portugal | 24/03/81 | 10 | 65,813 |
| Romania | 21/09/91 | 1 | 647,000 |
| Russian Federation | 11/02/77 | 35 | 10,323,767 |
| Senegal | 11/11/77 | 4 | 99,720 |
| Slovak Republic | 01/01/93 | 11 | 37,130 |
| Slovenia | 25/06/91 | 1 | 650 |
| South Africa | 21/12/75 | 16 | 492,830 |
| Spain | 04/09/82 | 38 | 158,216 |
| Sri Lanka | 15/10/90 | 1 | 6,210 |
| Suriname | 22/11/85 | 1 | 12,000 |
| Sweden | 21/12/75 | 30 | 382,750 |
| Switzerland | 16/05/76 | 8 | 7,049 |
| Syria | 05/07/98 | 1 | 10,000 |
| Thailand | 13/09/98 | 1 | 494 |
| The FYR of Macedonia | 08/09/91 | 1 | 18,920 |
| Togo | 04/11/95 | 2 | 194,400 |
| Trinidad and Tobago | 21/04/93 | 1 | 6,234 |
| Tunisia | 24/03/81 | 1 | 12,600 |
| Turkey | 13/11/94 | 9 | 159,300 |
| Uganda | 04/07/88 | 1 | 15,000 |
| Ukraine | 01/12/91 | 22 | 716,250 |
| United Kingdom | 05/05/76 | 119 | 513,585 |
| United States of America | 18/04/87 | 17 | 1,172,633 |
| Uruguay | 22/09/84 | 1 | 435,000 |
| Venezuela | 23/11/88 | 5 | 263,636 |
| Viet Nam | 20/01/89 | 1 | 12,000 |
| Yugoslavia | 28/07/77 | 4 | 39,861 |
| Zambia | 28/12/91 | 2 | 333,000 |
| former USSR** | | 5 | 1,559,500 |
| **Totals** | | **958** | **70,517,638** |

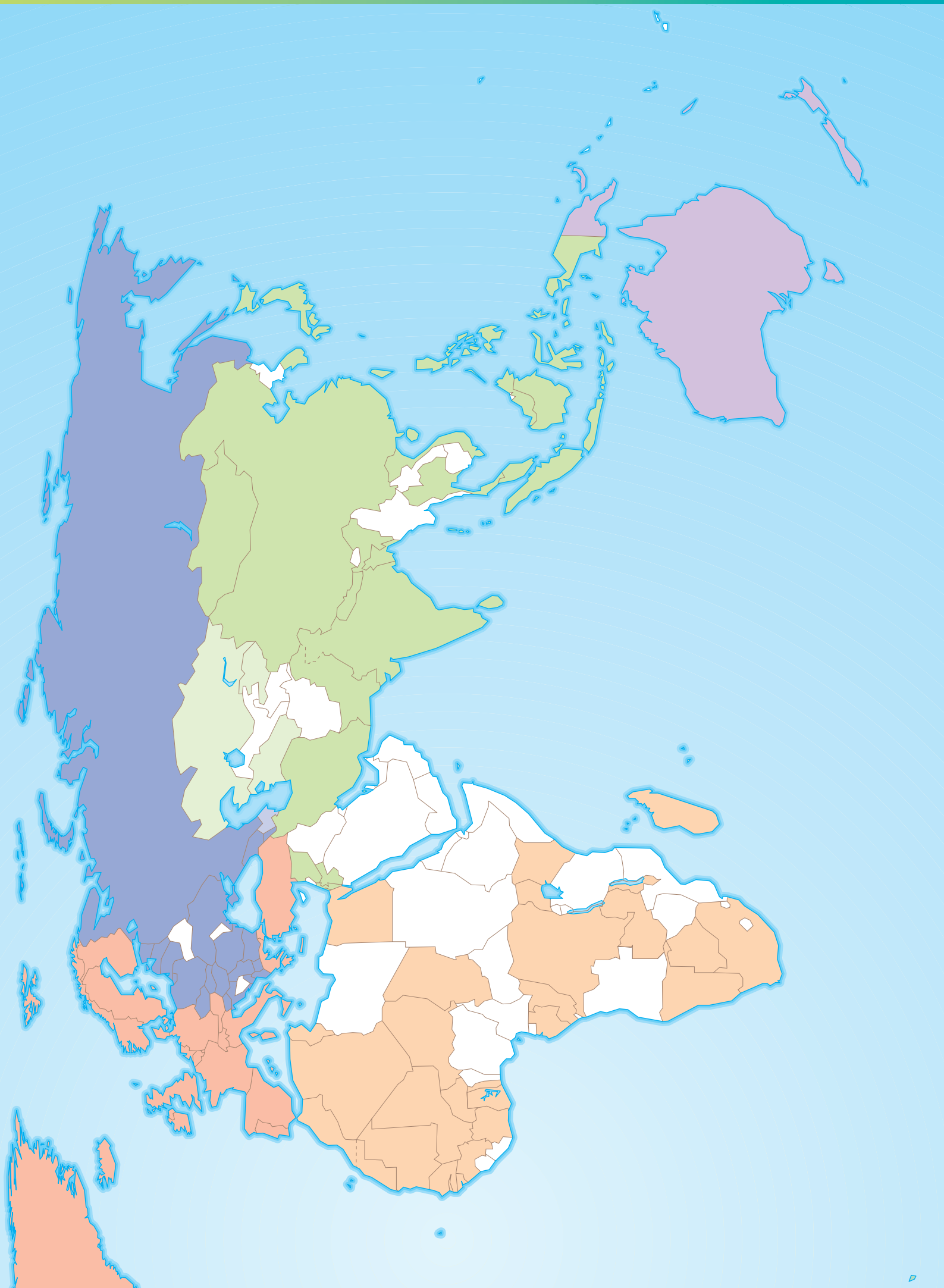
**Notes**

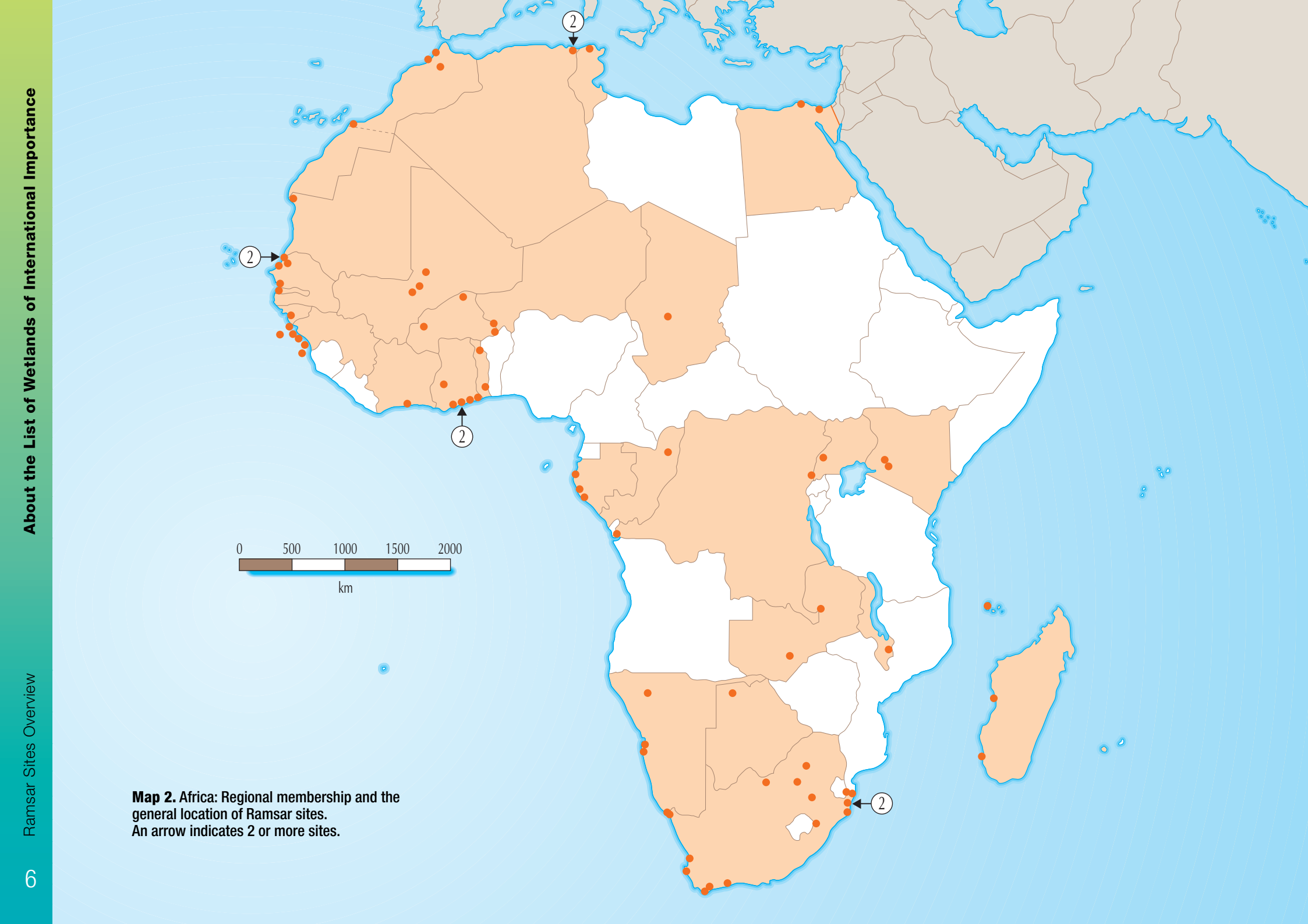
* This list of Contracting Parties to the Convention on Wetlands reflects the situation at 31 December 1998, except that El Salvador, the latest country to join (1999) has been included.

** The Russian Federation has informed UNESCO that it continues to exercise the rights and carry out the obligations of the former USSR under the Ramsar Convention. Of the sites designated in 1976 by the former USSR, 3 are now in the Russian Federation, 4 are in Ukraine and 1 is in Estonia – the remaining 5 sites are in other independent States (Azerbaijan 1, Kazakhstan 2, Kyrgyzstan 1, Turkmenistan 1). Tajikistan and Uzbekistan have deposited with UNESCO a Declaration of Succession to the former USSR but have not yet designated any site for the List. None of the sites designated by the former USSR are in Tajikistan or Uzbekistan.

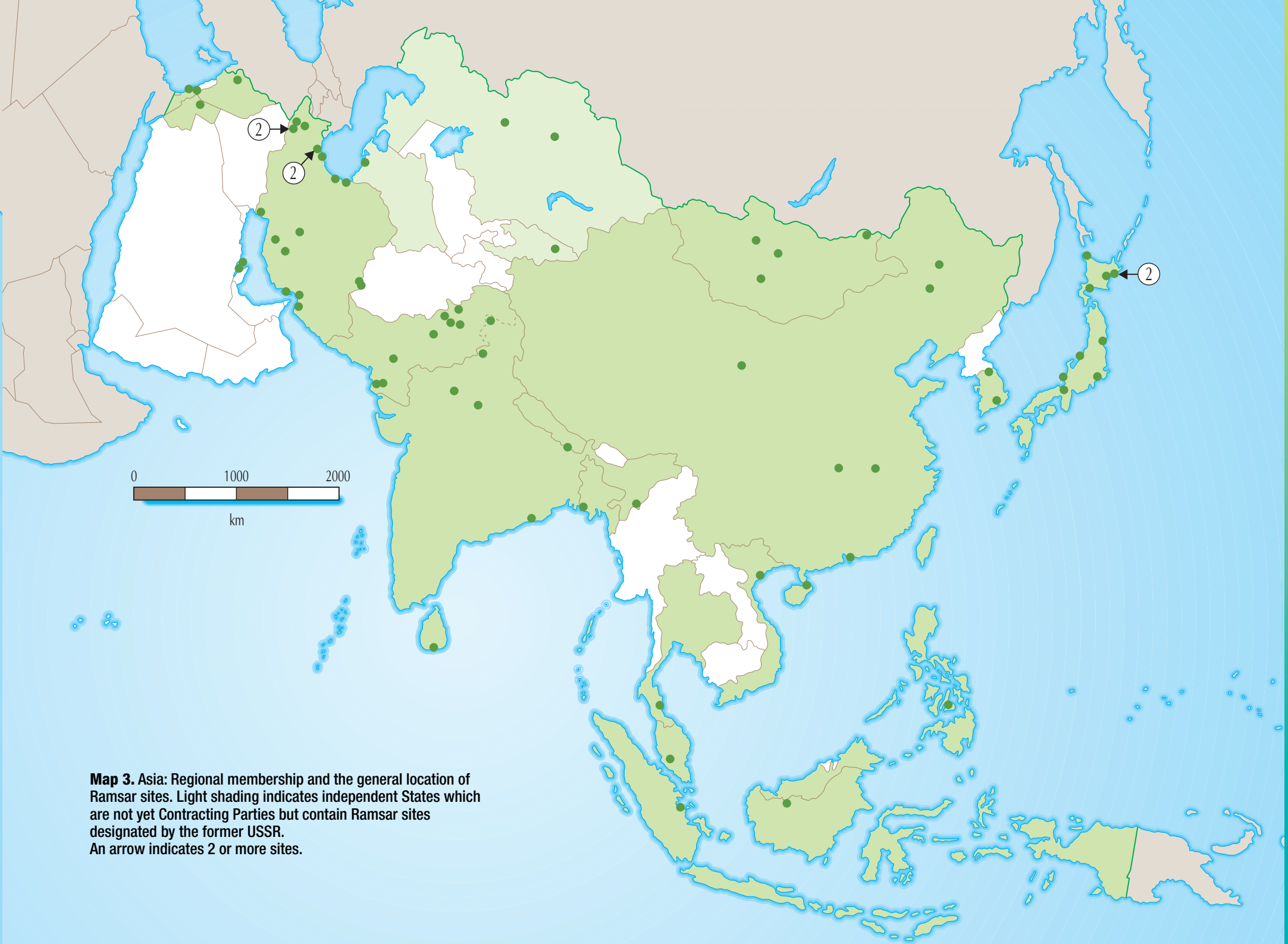
While awaiting confirmation by certain members of the Commonwealth of Independent States (Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, and Turkmenistan) of their status as Parties to the Convention, the Ramsar Bureau points out that these States, together with the Russian Federation, Tajikistan, Ukraine and Uzbekistan, have undertaken, in the Alma-Ata Declaration of 21 December 1991 to guarantee "*in conformity with their legislative procedures, the fulfilment of international obligations, stemming from the agreements signed by the former USSR*".

**Map 1.** The global distribution of Ramsar Contracting Parties per Ramsar region, at January 1999. Countries with no shading have not yet joined the Convention. Light shading indicates independent States which are not yet Contracting Parties but contain Ramsar sites designated by the former USSR.

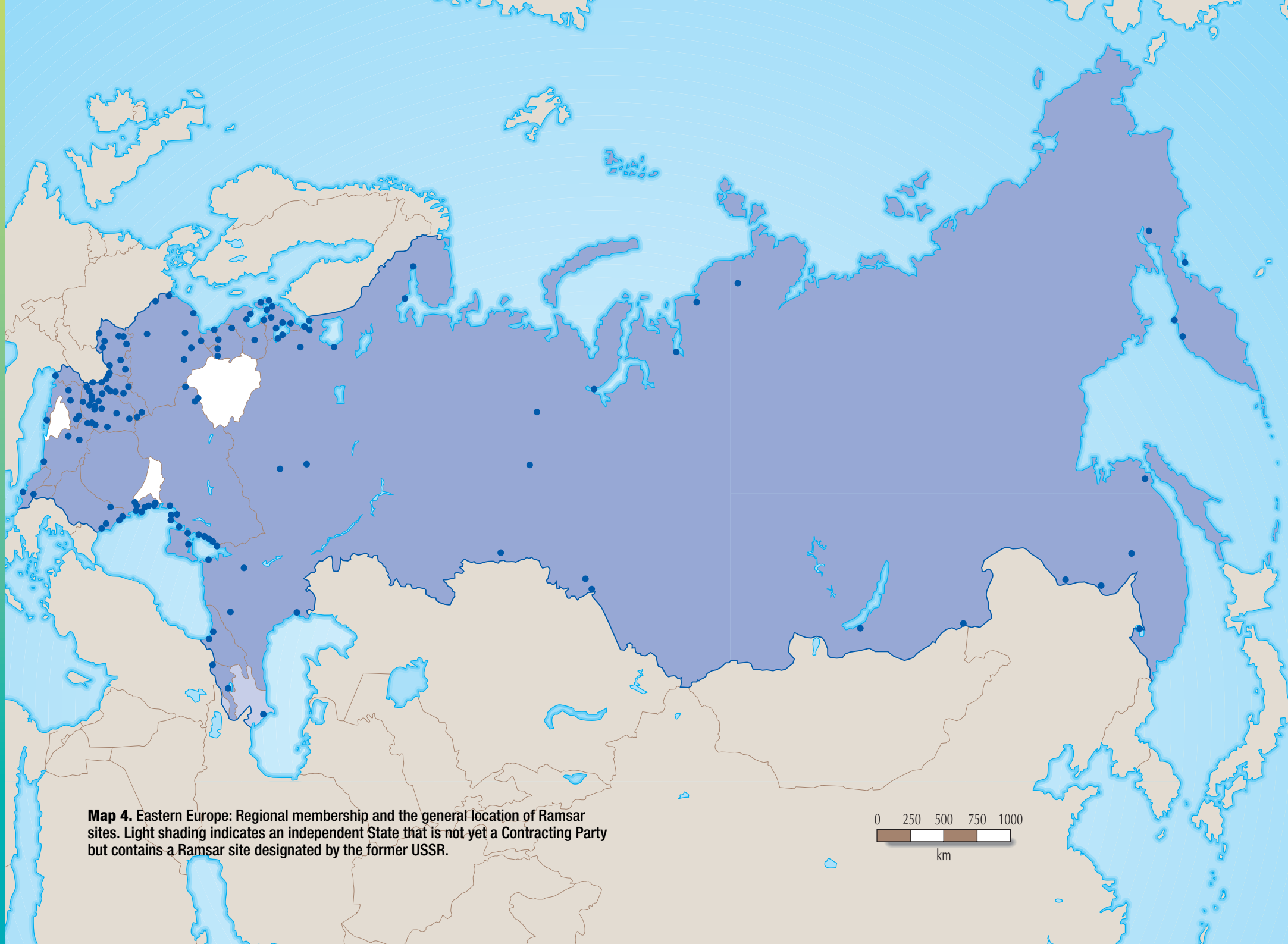




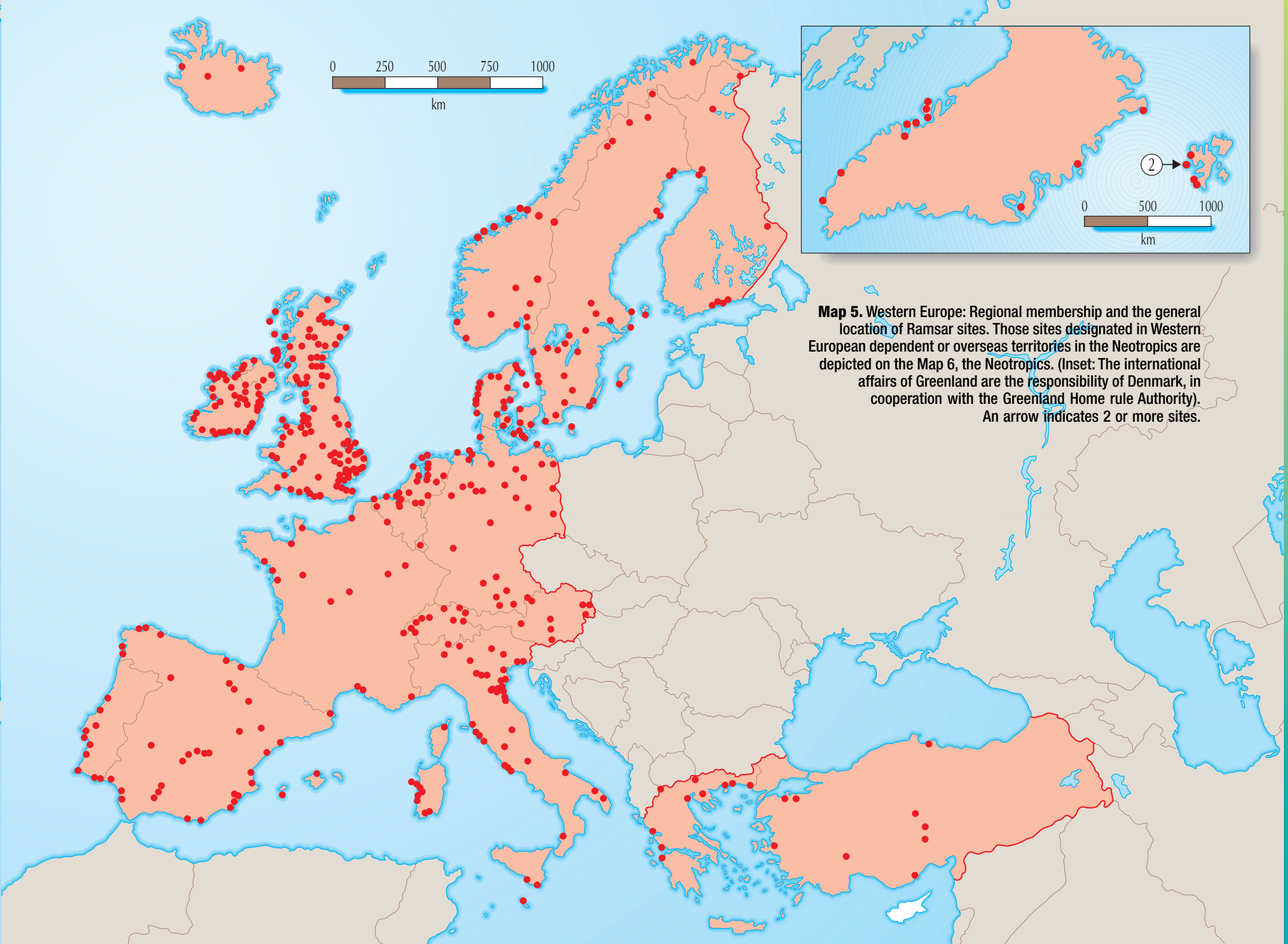

**Map 2.** Africa: Regional membership and the general location of Ramsar sites.
An arrow indicates 2 or more sites.




**Map 3.** Asia: Regional membership and the general location of Ramsar sites. Light shading indicates independent States which are not yet Contracting Parties but contain Ramsar sites designated by the former USSR.
An arrow indicates 2 or more sites.



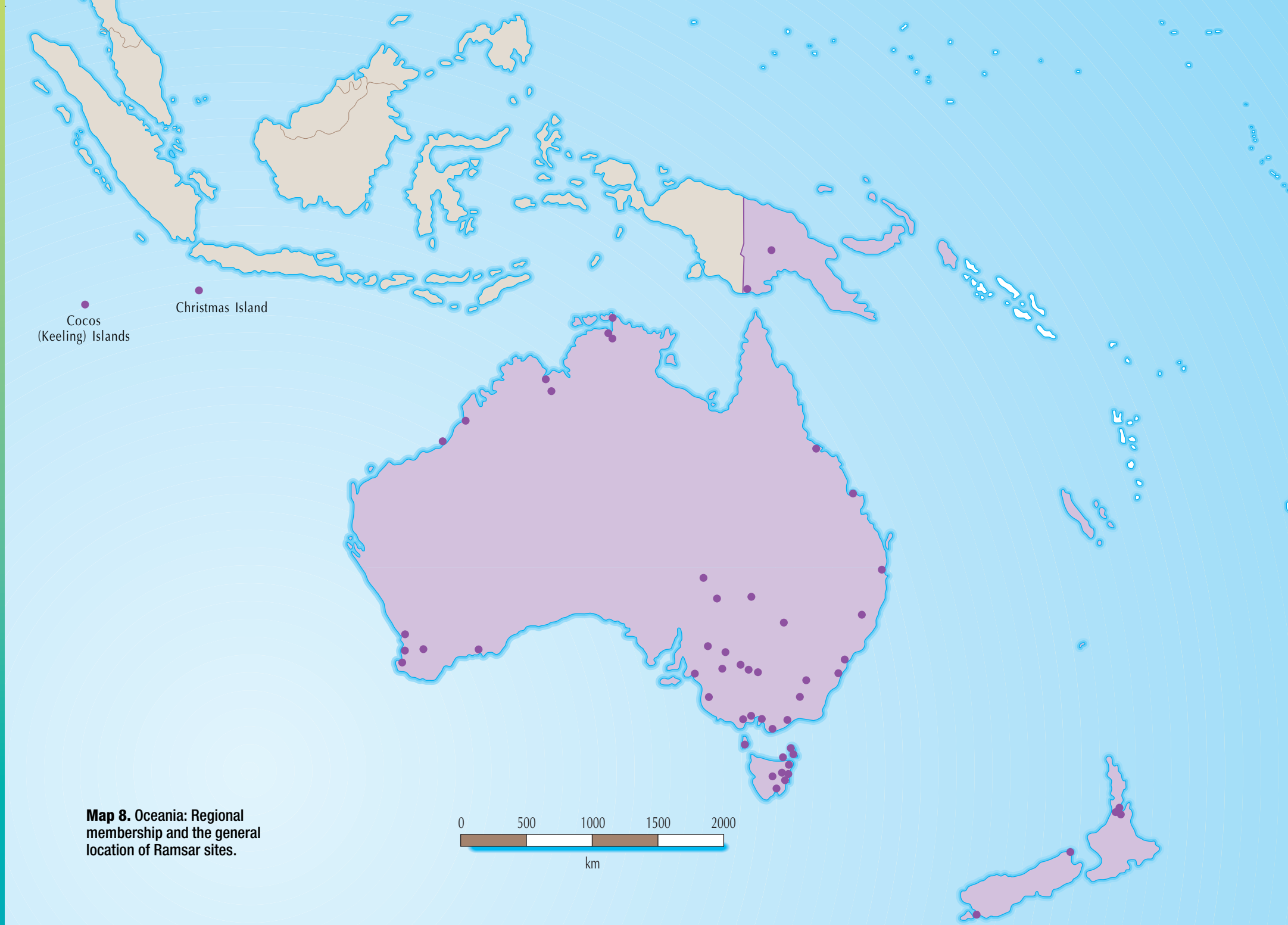

**Map 4.** Eastern Europe: Regional membership and the general location of Ramsar sites. Light shading indicates an independent State that is not yet a Contracting Party but contains a Ramsar site designated by the former USSR.




**Map 5.** Western Europe: Regional membership and the general location of Ramsar sites. Those sites designated in Western European dependent or overseas territories in the Neotropics are depicted on the Map 6, the Neotropics. (Inset: The international affairs of Greenland are the responsibility of Denmark, in cooperation with the Greenland Home rule Authority). An arrow indicates 2 or more sites.


**Map 6.** The Neotropics: Regional membership and the general location of Ramsar sites. An arrow indicates 2 or more sites.


**Map 7.** North America: Regional membership and the general location of Ramsar sites. An arrow indicates 2 or more sites.




**Map 8.** Oceania: Regional membership and the general location of Ramsar sites.

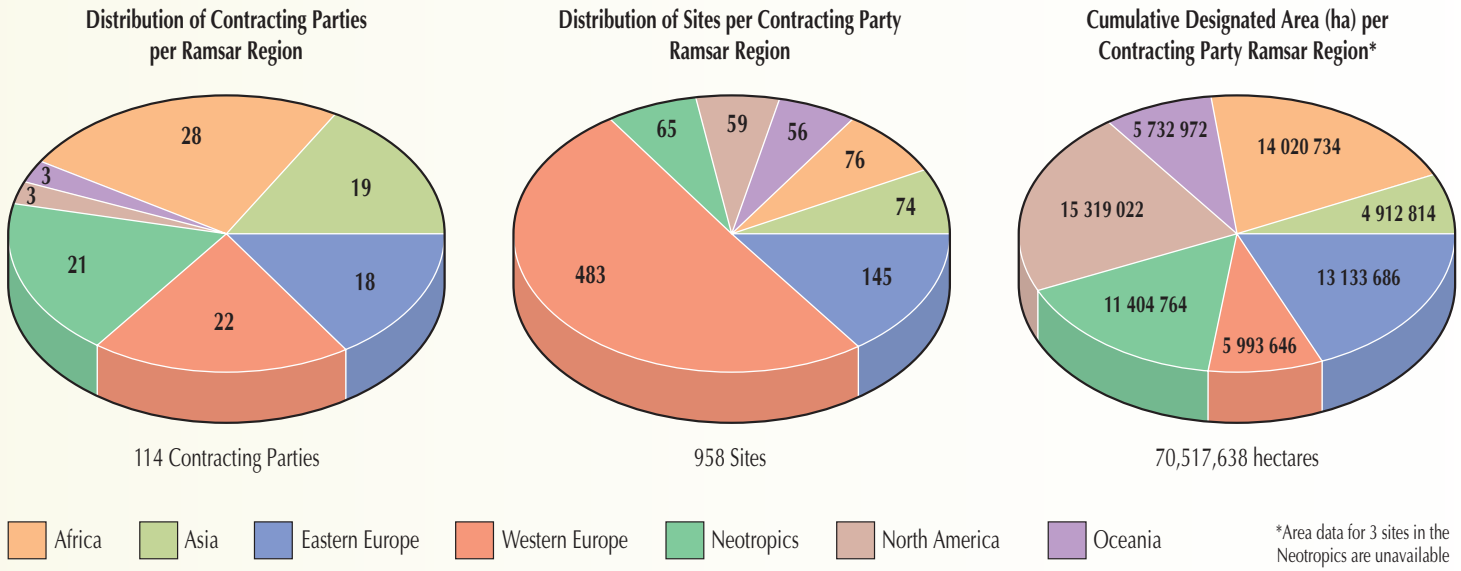
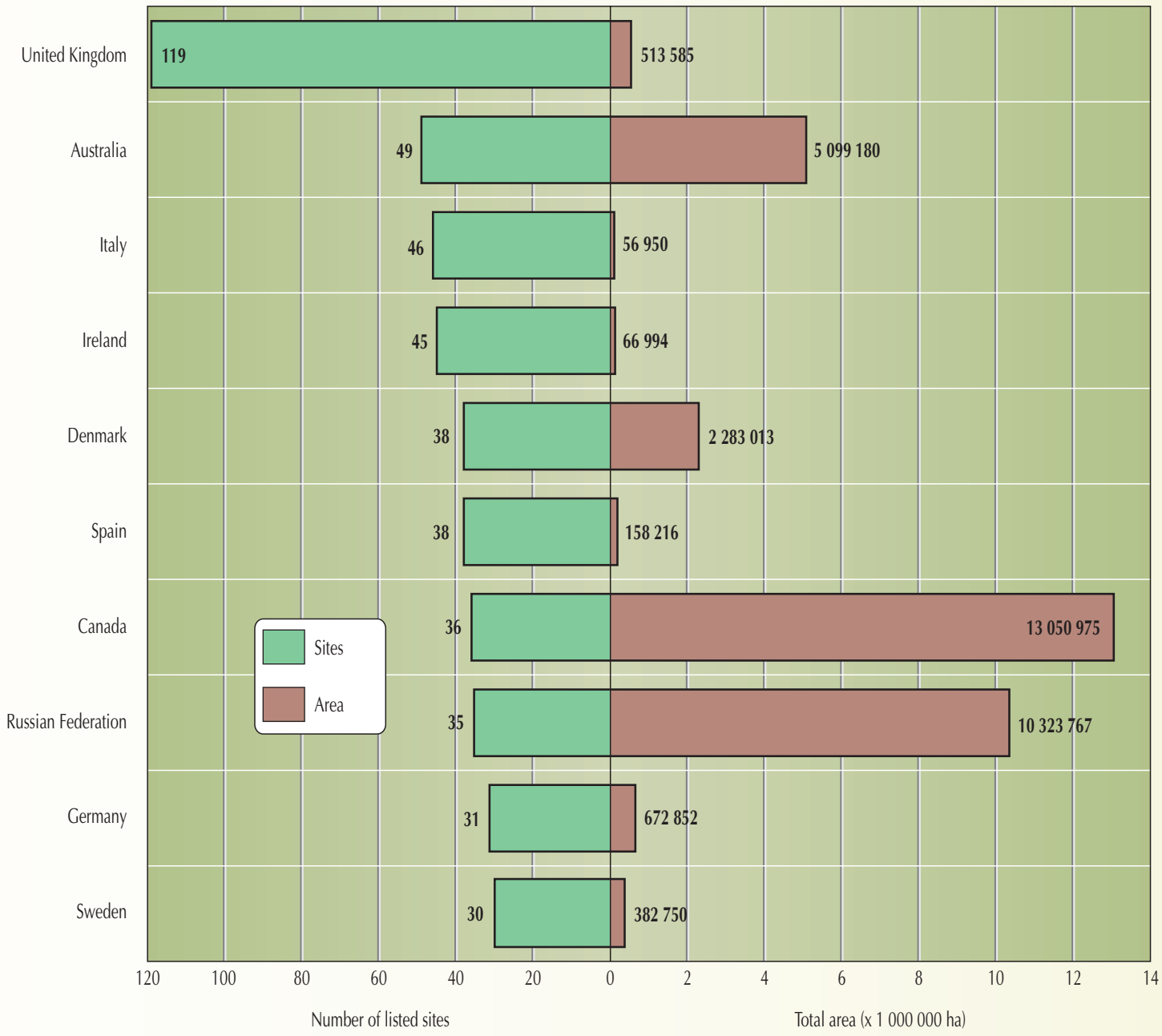



**Figure 1.** The regional distribution of Contracting Parties, Ramsar sites and the combined area of designated wetlands. Western Europe while nearing complete Convention membership, remains the region with the most Contracting Parties after Africa. Over 50% of all Ramsar sites in the world have been designated by Contracting Parties from Western Europe. This far exceeds any other Region in this category. North America, Africa and Eastern Europe have designated the greatest total areas of wetlands, respectively.

**Box 1.** Ramsar sites: some facts and figures

- *The world's largest Ramsar site:* Okavango Wetland System, Botswana, 6,864,000 hectares. This is nearly 10% of the total area of the world's Ramsar sites and almost 50% of the area designated in Africa.
- *The number of Ramsar sites measuring 1,000,000 hectares or more:* Thirteen.
- *The world's smallest Ramsar site:* Hosnie's Spring, on Christmas Island, Australia measures just 0.33 hectare. The site contains some of the largest *Brugieria* mangrove trees ever recorded.
- *The number of Ramsar sites measuring 10 or less hectares in extent:* Eight.
- *The average size of a Ramsar site:* 73,686 hectares.
- *The proportion of Ramsar sites measuring between 1,000 and 10,000 hectares:* 32.4% (the largest size class).
- *The highest Ramsar site:* Salar de Tara, Chile, 4,400 metres in elevation.
- *The most southerly Ramsar site:* Reserva Costa Atlantica de Tierra del Fuego, Argentina (53°20'S 68°30'W).
- *The most northerly Ramsar site:* Kilen, Greenland, Denmark (81°15'N 12°00'W).
- *The oldest Ramsar site:* Coburg Peninsula, Australia, was designated on 8 May 1974.

**Figure 2.** Contracting Parties with the most Ramsar sites (contrasted with cumulative designated area). Seven of the 10 countries having the most Ramsar sites come from Western Europe, but only one of these states is in the top 10 Parties with the greatest area of Ramsar sites (see Figure 3).




Figures 2 and 3 contrast Contracting Parties having the most listed sites with states possessing the greatest area of designated wetlands, respectively. The four Contracting Parties that appear in both graphs (Australia, Canada, Denmark and Russian Federation) are among the largest territorial countries in the world. However, the single largest Ramsar site (see Box 1) is greater in extent, than the country totals of designated Ramsar site area in 111 of 114 Contracting Parties.

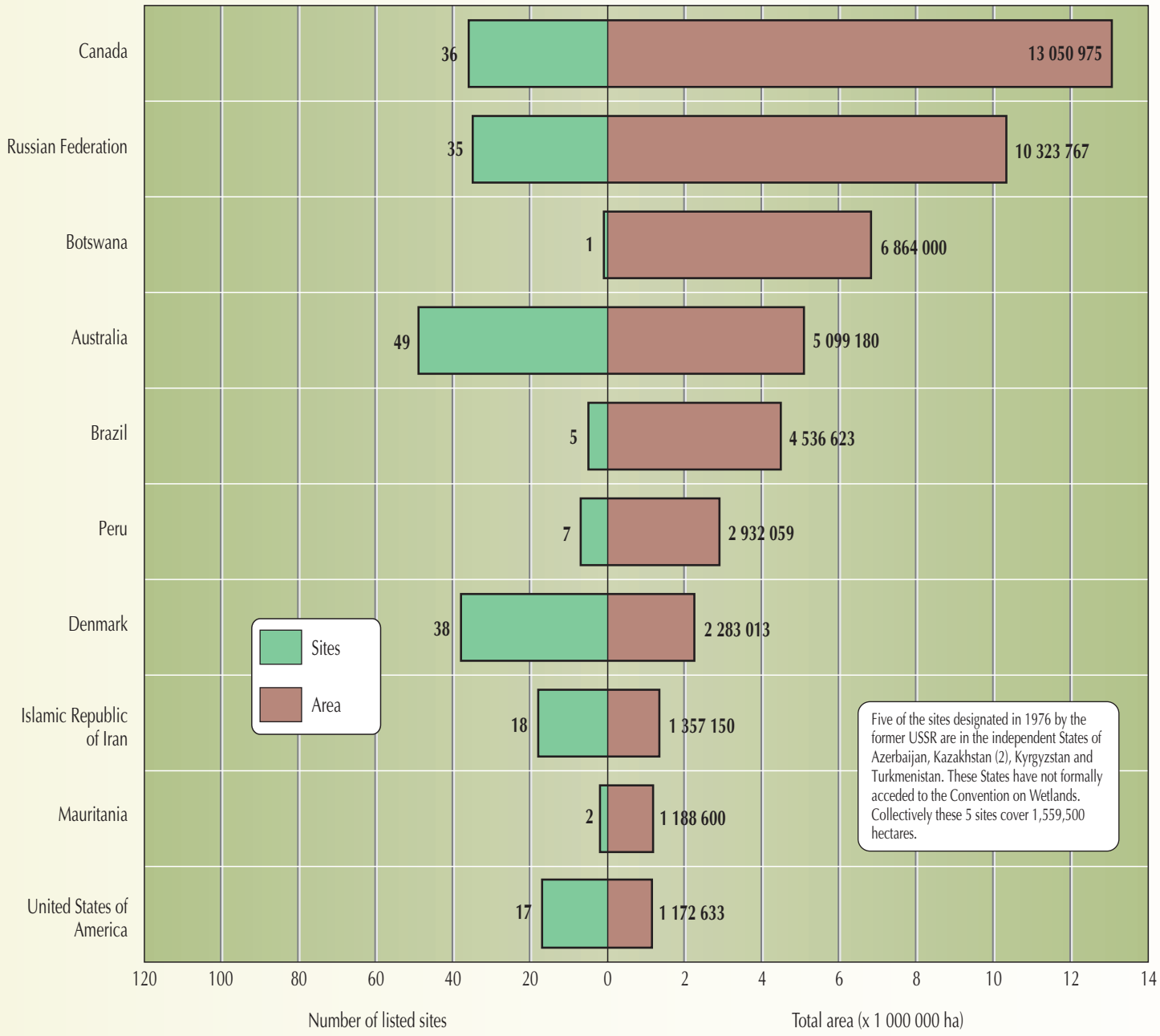



**Figure 3.** Contracting Parties with the largest cumulative areas of Ramsar sites (contrasted with numbers of sites).

In order to become a Contracting Party a state must designate at least one site as a wetland of international importance at the time that it joins the Convention. Australia was the first state to deposit an "instrument of accession" (1974) to the Convention, making it the first Ramsar Contracting Party. The Convention then entered into force in December 1975, after Greece (the seventh state) deposited its instrument. Thereafter, the Convention entered or enters into force in a country four months after it joins. The intervening three years between this and the previous *Overview*, has been one of the most active periods of increase in membership in the Convention's history. Figure 4 charts the trend of accession to the Convention on Wetlands.

Having 114 Contracting Parties to the Convention means that Ramsar wetlands are found in many regions of the globe. The next chapter takes a closer look at the kinds of wetlands represented in the world's Ramsar sites.

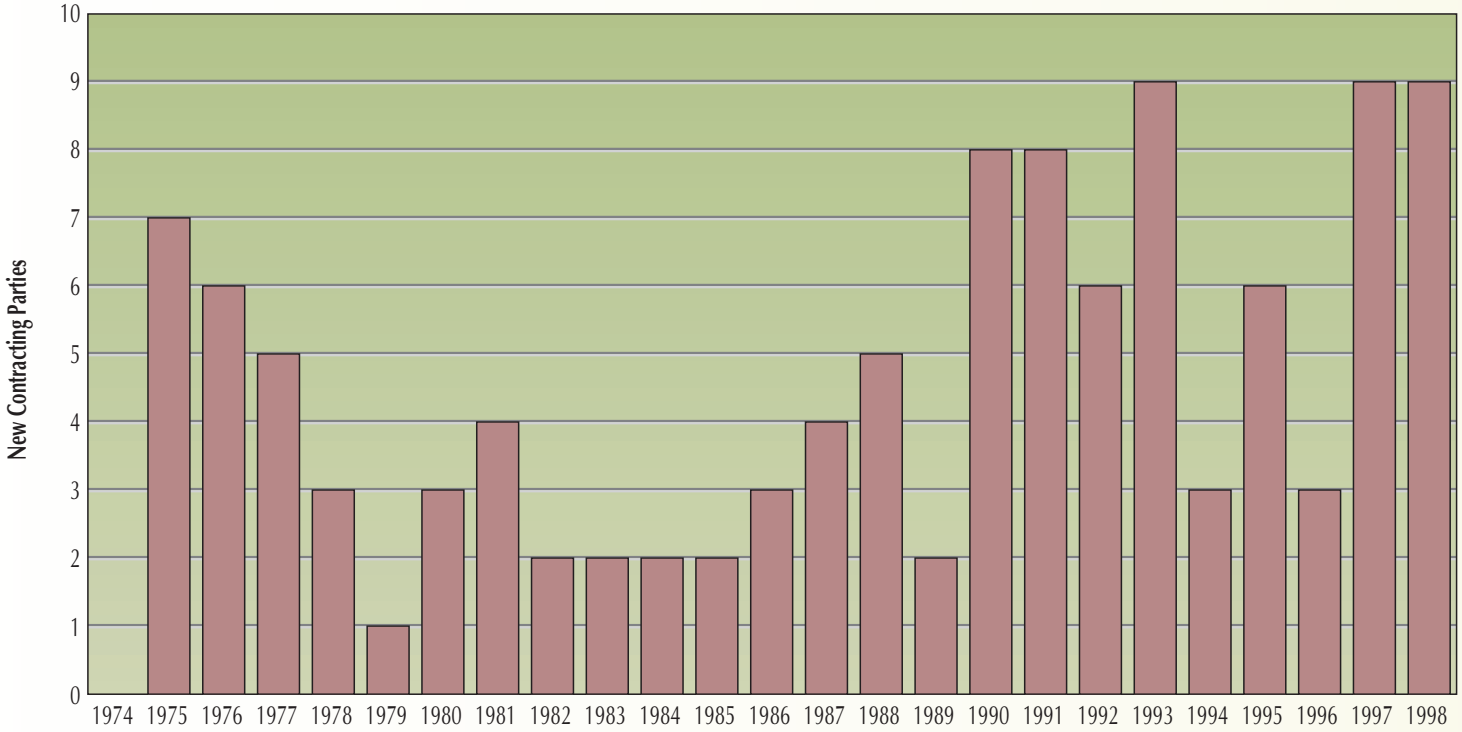



**Figure 4.** The trend of Accession of Contracting Parties to the Convention on Wetlands.

3

# Wetland types

Wetlands possess an extremely wide range of forms. In order to discuss these variations, "wetlands" must first be defined. However definitions of wetlands are many; Dugan (1990) stated that over 50 separate wetland definitions were (even then) currently in use. The Ramsar Convention has defined wetlands in a globally applicable way as:

"*areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres*". The text of the Convention further elaborates that wetlands: "*may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands*".

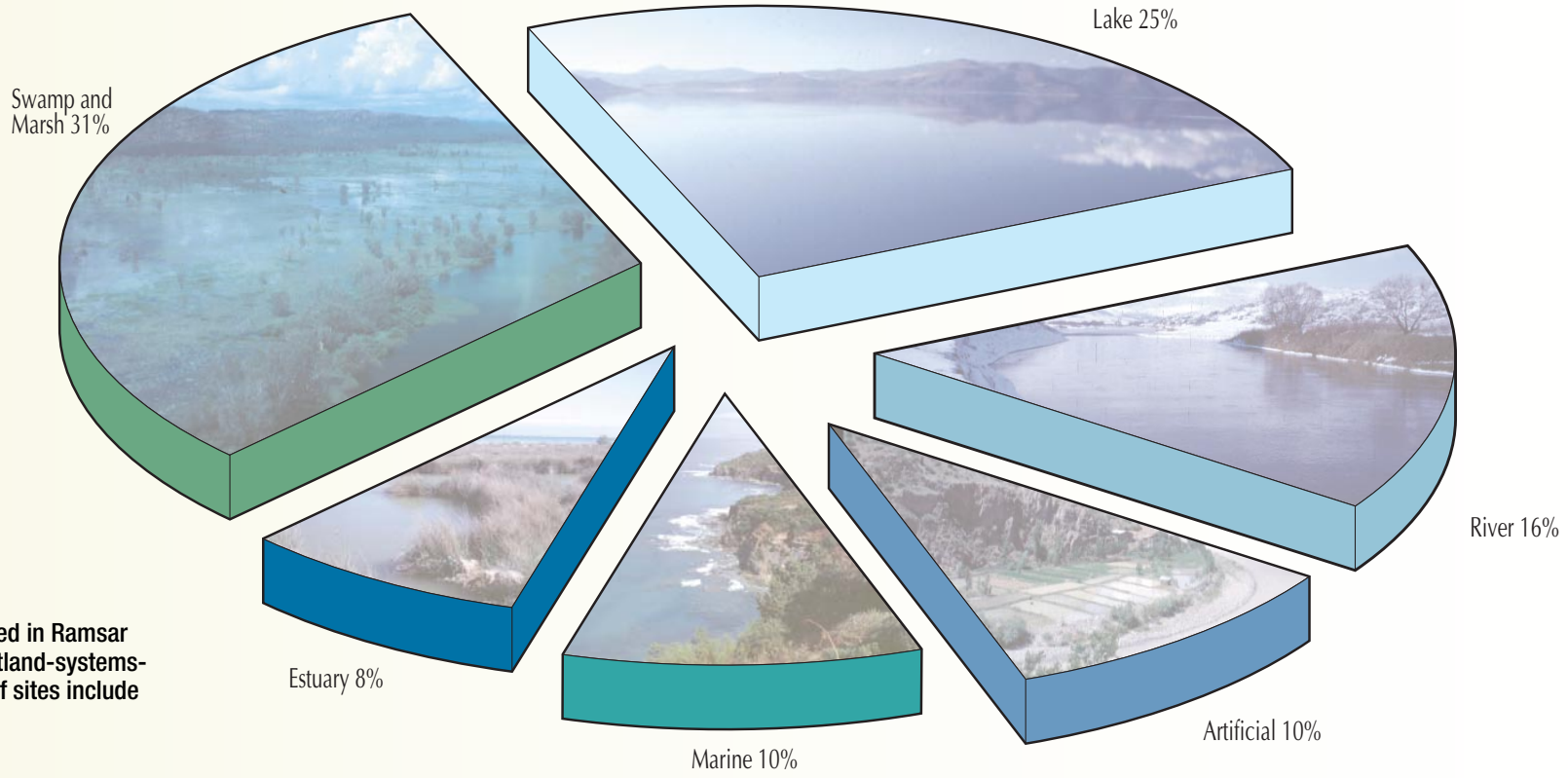
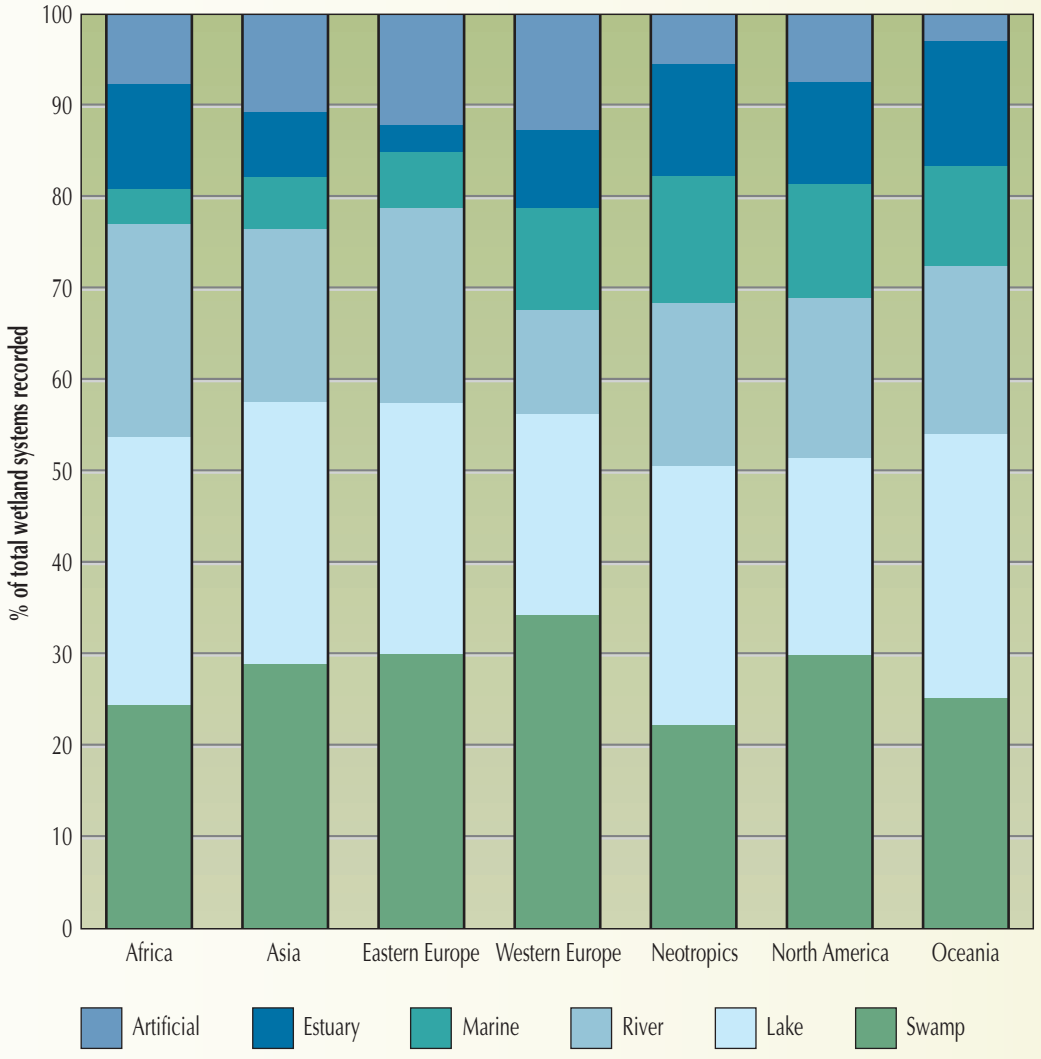



**Figure 5.** Wetland systems recorded in Ramsar sites. Percentage of 2,465 total wetland-systems-records from 957 total sites; 85% of sites include more than one wetland system.

In general, natural wetlands can be assigned to at least one of five basic kinds of divisions or **systems**. These are Lakes, Rivers, Swamps, Estuaries and Marine wetland systems. Within these systems wetland "types" can be assigned. Since there are many wetlands that have been created or greatly modified by humans, "artificial" wetlands are also recognized somewhat arbitrarily at this level. Artificial wetlands are usually subdivided according to their main purpose or function.

Wetlands are dynamic and complex habitats and can rarely be assigned exclusively to just one system. This is borne out by Ramsar sites too. About 85% of Ramsar sites incorporate *more than one* wetland system. The percentage of *all* recorded wetland systems is depicted in Figure 5. Swamps are the most often recorded wetland system (31% of all 2,465 wetland-systems-records from 957 total sites). Lakes are the next most commonly recorded of the six wetland systems (25% of all systems records). On a regional scale, Asia, Eastern Europe, Western Europe and North America exemplify the global trend, while Africa, the Neotropics and Oceania reverse it, with lakes being recorded most followed by swamps. Least represented systems vary regionally between the marine, estuary and artificial (or intensively modified) systems (see Figure 6).

**Figure 6.** Wetland systems recorded in Ramsar sites.*




*85% of these 957 sites have more than one wetland system present

**Box 2.** Ramsar Wetland Types.

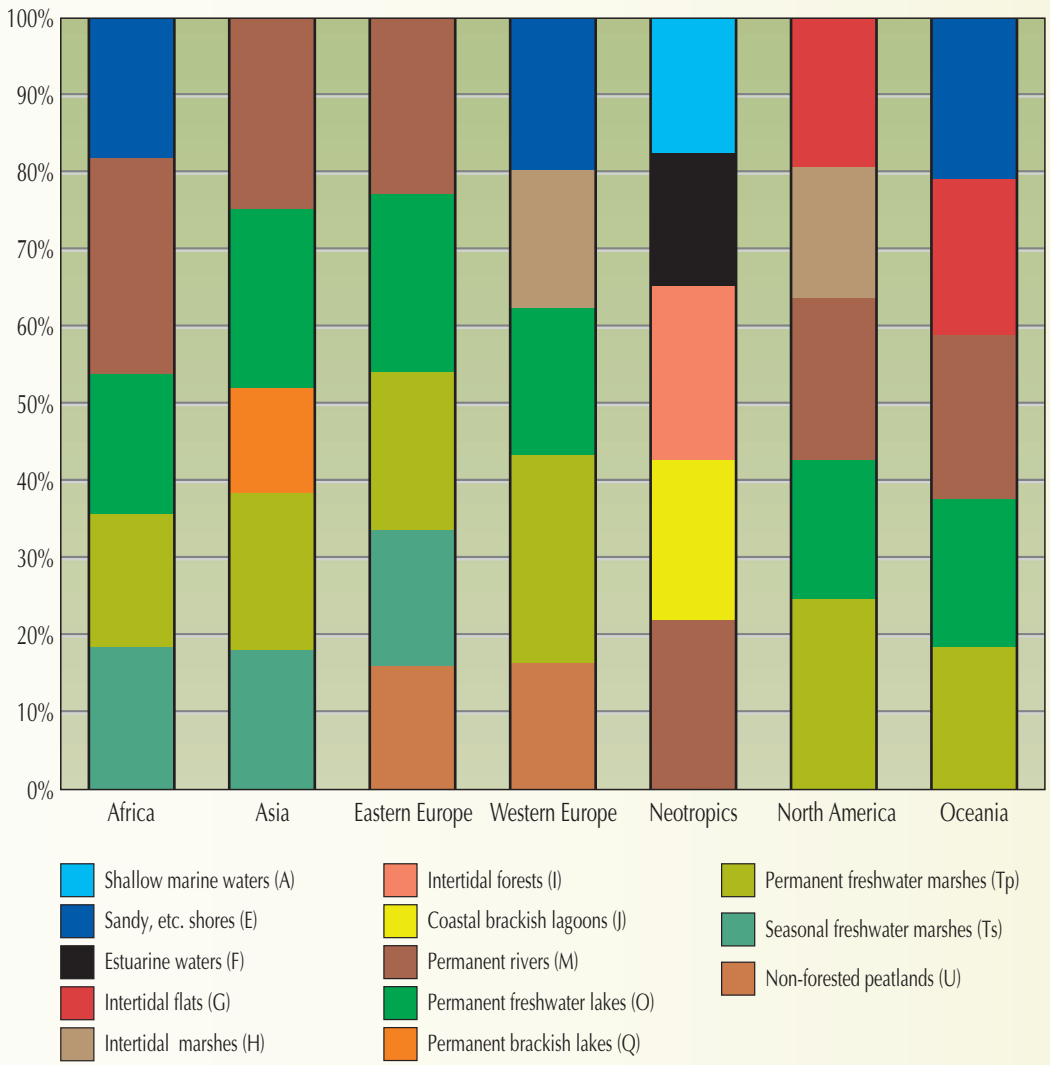
| | Code | Ramsar wetland type |
|---|---|---|
| **MARINE/COASTAL** | A | Permanent **shallow marine waters** less than six metres deep at low tide; includes sea bays and straits. |
| | B | Marine **subtidal aquatic beds**; includes kelp beds, sea-grass beds, tropical marine meadows. |
| | C | **Coral 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**. |
| | 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**. |
| **"MAN-MADE" WETLANDS** | 1 | **Aquaculture** (e.g., 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. |

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.

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

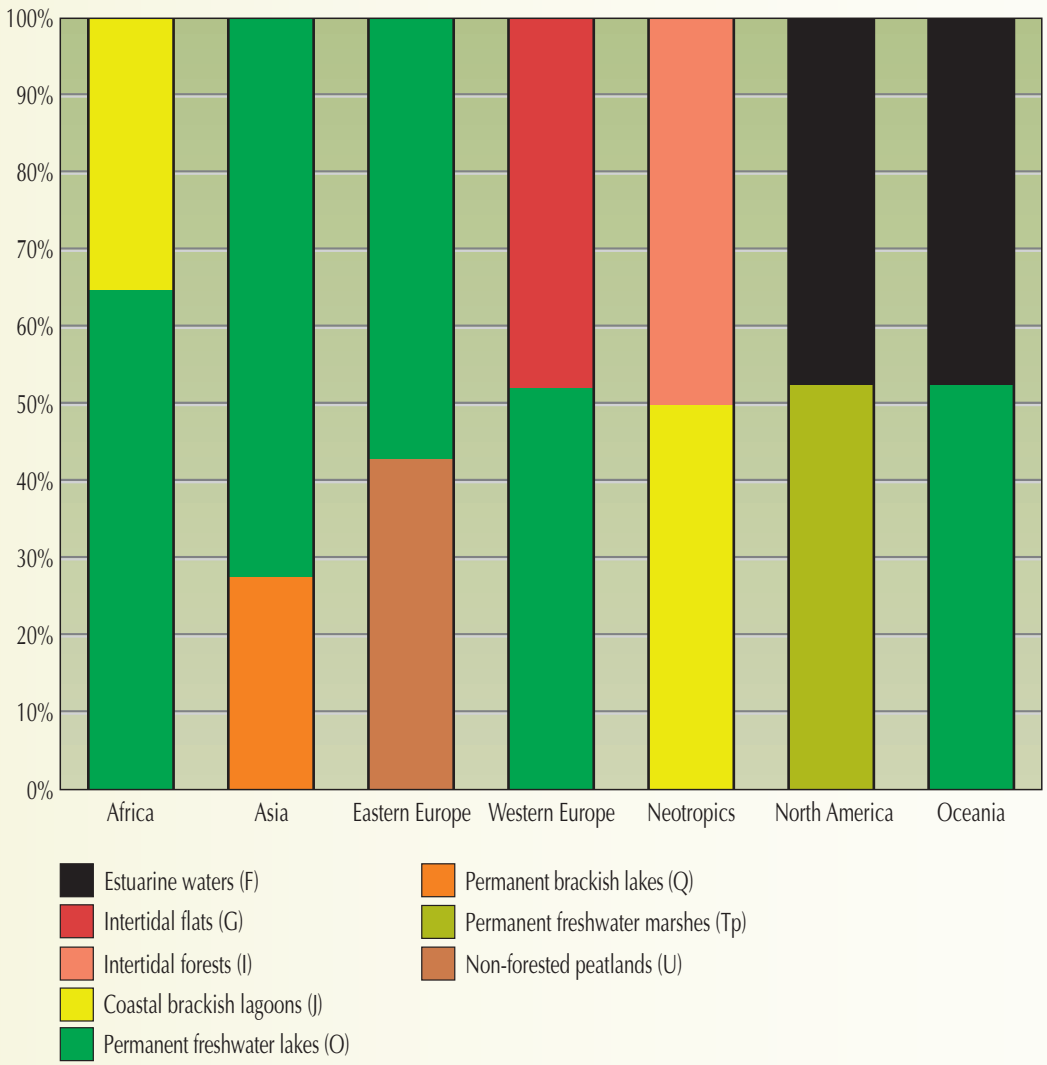
Wetland systems are broad categories that can usefully be broken down into more specific **types**. Knowing which wetlands are similar and which are different is a generalization which is fundamentally useful to wetland management (or to the development of wetland policy) at the national level. Parallel to the existence of many wetland definitions, "more than seventy global [wetland] classification schemes exist internationally" (Öquist and Svensson, 1996). Needless to say classification is a subject of debate. To effectively treat the subject of wetland types in the context of a global Convention on Wetlands, Ramsar Contracting Parties have adopted a simple hierarchy of "wetland terms" to describe the "principal types of wetlands in the world" rather than any formal classification or typology. This typology was based on a list of wetland types (Scott, 1989, unpubl. report) drafted for and approved by the Fourth Meeting of the Contracting Parties at Montreux, Switzerland (1990). It is known as the *Classification System for "Wetland Type".* At the Sixth Meeting of the Contracting Parties at Brisbane, Australia (1996), "subterranean karst and cave hydrological systems" were added to the list of wetland types. Lake Kutubu Ramsar site in Papua New Guinea (designated 1998) was the first Ramsar site to include this new type (See also Figure 9).

**Figure 7.** The five most commonly recorded occurring wetland types per region. (See Box 2.)



All 40 wetland types are represented among the world's Ramsar sites (see Box 2 for the complete list of Ramsar Wetland Types). As with the broader wetland systems, Ramsar sites usually encompass multiple wetland types (there are only 73 sites that record only one). In synchrony with swamps as the most commonly recorded wetland system, it is also **permanent freshwater marshes/pools** (a swamp type) that emerges as the most frequently recorded wetland type. On the regional level, Western Europe and North America support this trend, while Africa, Asia, the Neotropics and Oceania record **permanent rivers/streams/creeks** most. In the Neotropics, this is tied with **intertidal forested wetlands** (which includes, among others, mangroves). Finally, Eastern Europe lists **permanent freshwater lakes**, slightly more than river types, as the most frequently recorded wetland type. The five most commonly recorded wetland types occurring per region are depicted in Figure 7. The most dominant or *primary* wetland types recorded are presented per region in Figure 8. The most obvious trend here is that **permanent freshwater lakes** are predominant in five of the seven regions. Figure 9 presents the *least recorded* wetland types across the world's Ramsar sites. In the first instance, the *newest* type **subterranean karst and cave hydrological systems**, is least recorded (2 sites)**.** But this is also probably a *comparatively* rare type to begin with, like the second least recorded type, **geothermal wetlands**. On the other hand, the low numbers of **coral reefs** or **forested peatlands** recorded probably indicates comparative under-representation in the Ramsar List of sites. This is thought to extend to **seagrass beds, mangroves**, and **peatlands** in general too, even though they are not included among the least-recorded types depicted in this analysis.

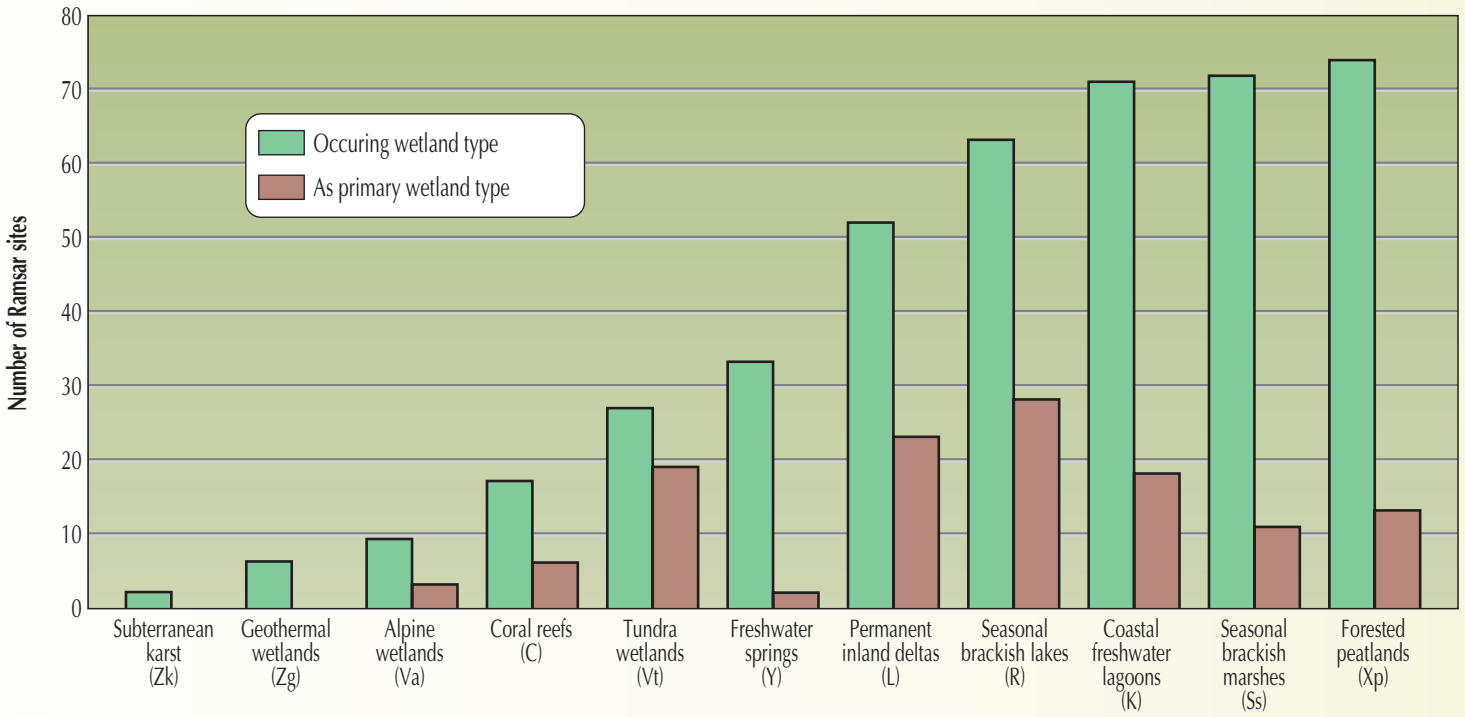
**Figure 8.** The two most frequently recorded primary wetland types per region. (See Box 2.)



Wetland systems and types recorded in the world's Ramsar sites have been counted but their areas have not been "quantified" in most cases (This also extends to wetlands in general). This might largely be the result of difficulty or lack of expertise in delineating wetlands (or fiscal constraints to detailed mapping). It is much easier to count habitats, including wetlands, than to measure them. That is an unfortunate artefact of the data that are available. Still, quantifying the extent of these general wetland types (and of wetlands versus non-wetlands within a designated site) is sorely needed. However methodologies for wetland differentiation are becoming more and more available. For example, the Mediterranean Wetlands Initiative ("MedWet") developed a method for delineating wetlands in the Mediterranean region within a suite of wetland inventory "tools" it produced (see Costa *et al.*, 1996; Farinha *et al.*, 1996; and Zalidas *et al.*, 1996). The same principles could be adapted to other regions, and even simplified to employ more general wetland type delimitation. Technological advance in remote sensing is one area where clearer delineation of wetland extent and diversification seems to hold promise in the not too distant future.

The next chapter provides a look at Ramsar sites in terms of the importance ascribed to them through the *Criteria for inclusion* of sites on the Ramsar List of Wetlands of International Importance.

**Figure 9.** Least commonly recorded Ramsar wetland types (world). (See Box 2.)



4

# The international importance of Ramsar sites

Ramsar sites are by definition internationally important. The Convention has adopted a system for selecting Ramsar sites on the basis of a set of "criteria". These *Ramsar Criteria* have evolved since they were first adopted in 1980 (Ramsar Convention Bureau, 1997); most recently (in 1996) a fourth group or cluster of criteria was added to the existing three groups. These clusters can be labeled: 1) **criteria for representative or unique wetlands**, 2) **general criteria based on plants or animals**, 3) **specific criteria based on waterfowl**, and the newest "family" of criteria, 4) **specific criteria based on fish**. Within these groups, the criteria are further subdivided into a total of 13 specific criteria. See Box 3 for the full list of criteria.

**Box 3.** Criteria for Identifying Wetlands of International Importance.

As adopted by the 4th and 6th Meetings of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar, Iran, 1971) to guide implementation of Article 2.1 on designation of Ramsar sites. Annexes to Recommendation 4.2, Montreux, Switzerland, 1990, and Resolution VI.2, Brisbane, Australia, 1996

A wetland is identified as being of international importance if it meets at least one of the criteria set out below:

**1. CRITERIA FOR REPRESENTATIVE OR UNIQUE WETLANDS**

A wetland should be considered internationally important if:

(a) it is a particularly good representative example of a natural or near-natural wetland, characteristic of the appropriate biogeographical region;

or (b) it is a particularly good representative example of a natural or near-natural wetland, common to more than one biogeographical region;

or (c) it is a particularly good representative example of a wetland which plays a substantial hydrological, biological or ecological role in the natural functioning of an major river basin or coastal system, especially where it is located in a trans-border position;

or (d) it is an example of a specific type of wetland, rare or unusual in the appropriate biogeographical region.

**2. GENERAL CRITERIA BASED ON PLANTS OR ANIMALS**

A wetland should be considered internationally important if:

(a) it supports an appreciable assemblage of rare, vulnerable or endangered species or subspecies of plant or animal, or an appreciable number of individuals of any one or more of these species;

or (b) it is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna;

or (c) it is of special value as the habitat of plants or animals at a critical stage of their biological cycle;

or (d) it is of special value for one or more endemic plant or animal species or communities.

**3. SPECIFIC CRITERIA BASED ON WATERFOWL**

A wetland should be considered internationally important if:

(a) it regularly supports 20,000 waterfowl;

or (b) it regularly supports substantial numbers of individuals from particular groups of waterfowl, indicative of wetland values, productivity or diversity;

or (c) where data on populations are available, it regularly supports 1% of the individuals in a population of one species or subspecies of waterfowl.

**4. SPECIFIC CRITERIA BASED ON FISH**

A wetland should be considered internationally important if:

(a) it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity;

or (b) it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

When gauging the use of Ramsar site selection criteria, a clear parallel presents itself. This is, if a site is internationally important for one *general* reason (i.e., from a cluster) or for one *specific* reason (i.e., a particular criterion), there is a strong likelihood that it is also important for another reason (cluster and/or specific criterion). With the exception of the recently added fish criteria, Figure 10 demonstrates that over 80% of total Ramsar sites qualify for each of the other (three) clusters of criteria. Figure 11 combines these data to reveal that only 10% of sites are listed using criteria that come from only a single criteria cluster. Furthermore, it is highly likely that a significant proportion of the sites designated before "fish" were specifically added to the Ramsar criteria could now also be listed under the fish criteria, given an appropriate update of an official Ramsar Information Sheet (site datasheet). That Ramsar sites are usually important for more than one reason further attests to their special status. It also follows logically that if a Ramsar site or any wetland has a healthy "ecological character", that this will be expressed (within geographical limits, etc.) through its biodiversity and/or its hydrological and ecological functioning.

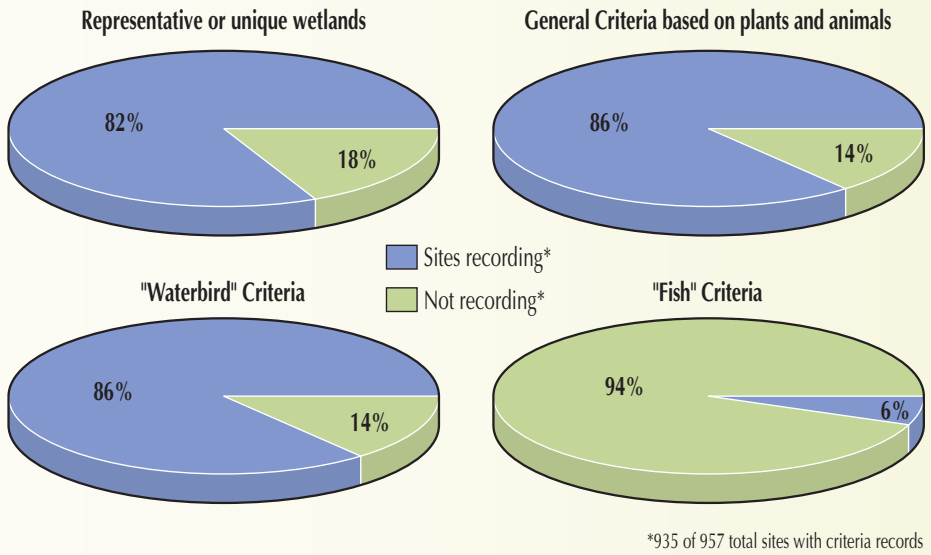



**Figure 10.** World Ramsar sites and the percentage of sites recording each "cluster" of Ramsar criteria.

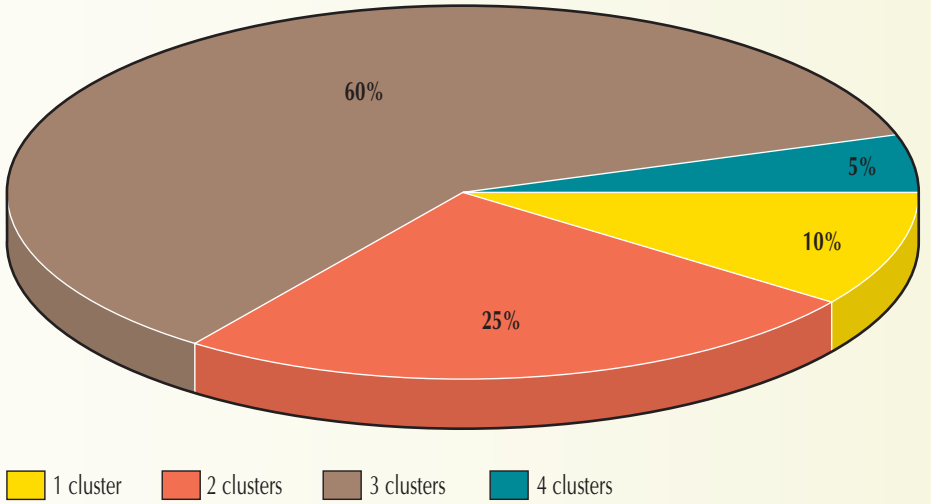
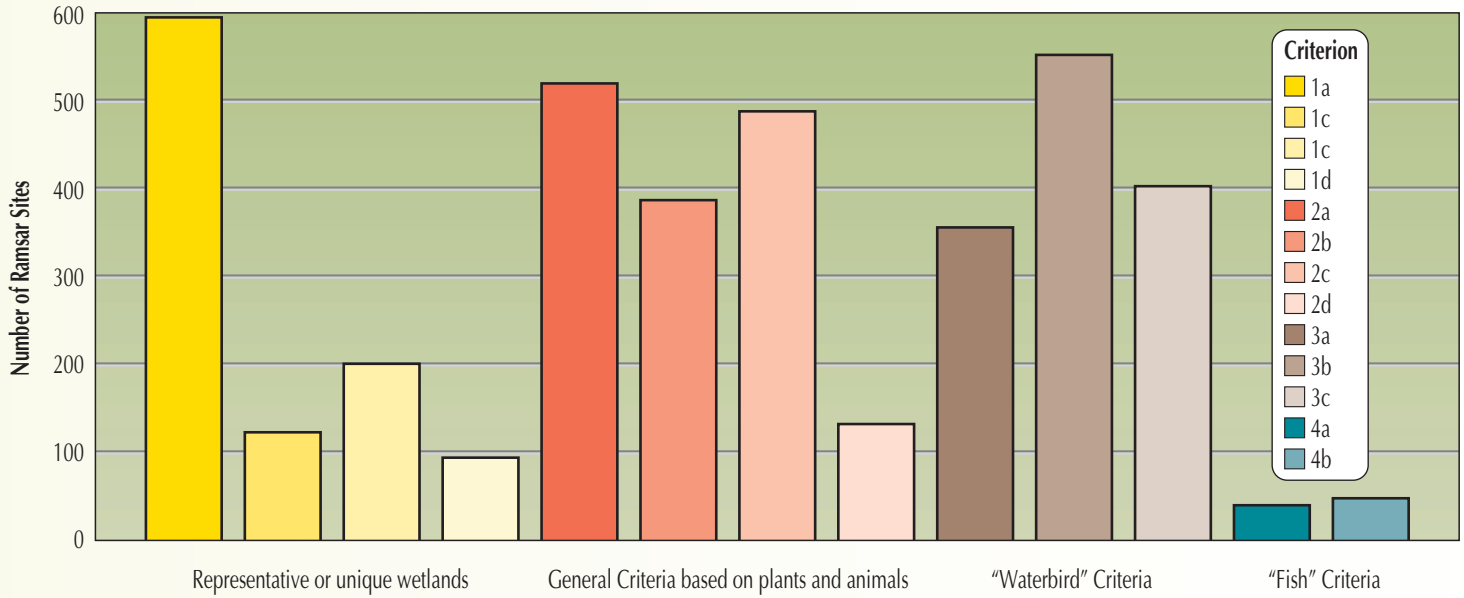



**Figure 11.** Percentage of 935* World Ramsar sites listing one or more criteria "clusters".
*of 957 total sites

Figure 12 shows the individual application of all 13 of the criteria across the entire Ramsar List. The single most frequently used criterion is, not surprisingly, the one that says that the site is a good and representative example of a wetland from its biogeographical region. Figures 13–19 are presented to provide a regional view of the general application of criteria. In this simple analysis, the number of sites in each region that record criteria from among each of the four criteria clusters is depicted. Notwithstanding the fact that the use of the three long-standing *groups* of criteria all *appears* high rather than low, there are regional differences. For instance, in Africa 89% of sites employ one or more of the **representative or unique wetlands** criteria, while **waterbird criteria** are listed for 72% of the sites. In Asia and especially Western Europe, this pattern is reversed (with the waterbird criteria being recorded most frequently). In Eastern Europe, the Neotropics and Oceania it is the second cluster, **general criteria based on plants or animals** that has the most records. North America presents yet another pattern where the first three criteria groups all have a high rate of application, but representative or unique wetlands criteria are listed for all but one site.

The natural productivity and functions of wetlands provide not only for support of biodiversity, but also furnish or contribute to the livelihoods of millions upon millions of people. The next two chapters look first at how Ramsar wetlands are used, and then at some of the factors challenging the sustainable, or wise use, of these wetlands.

**Figure 12.** World frequency of Ramsar criteria application*. (See Box 3.)




*935 of 957 world sites with criteria information

**Ramsar criteria clusters recorded in:**

**Figure 13.** Africa

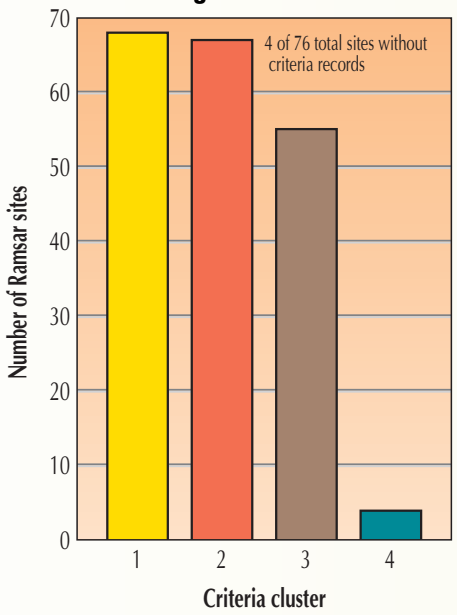



**Figure 14.** Asia

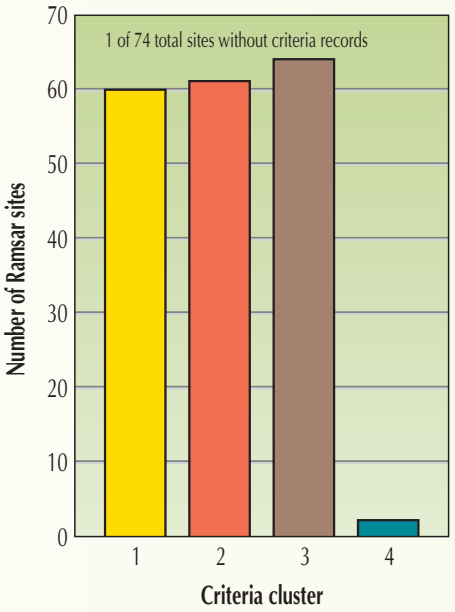
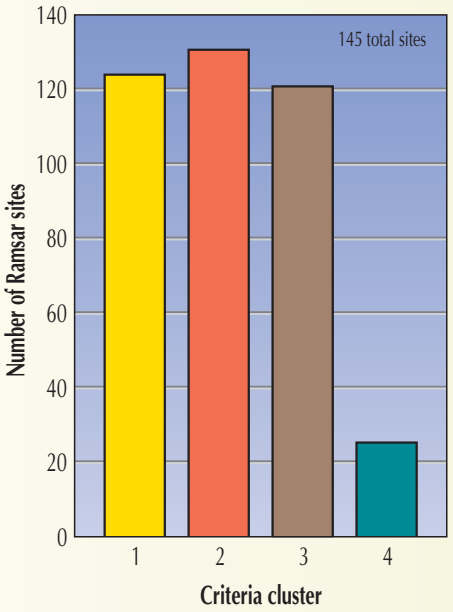



**Figure 15.** Eastern Europe



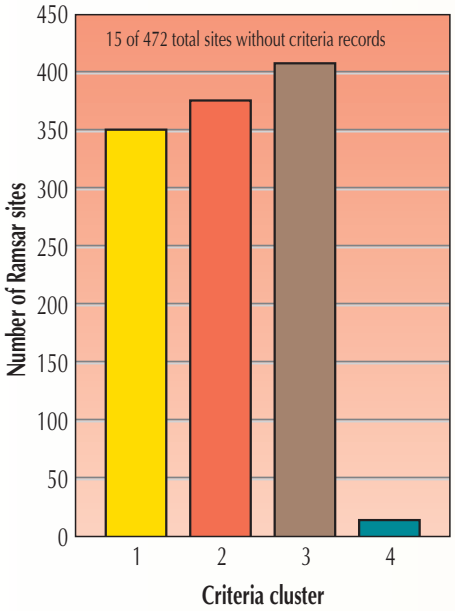




**Figure 16.** Western Europe

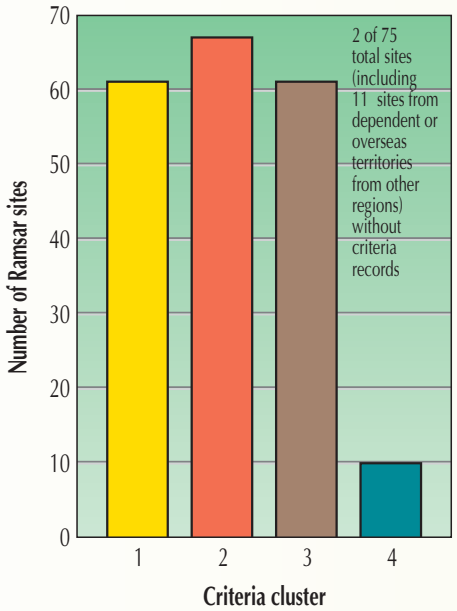



**Figure 17.** Neotropics

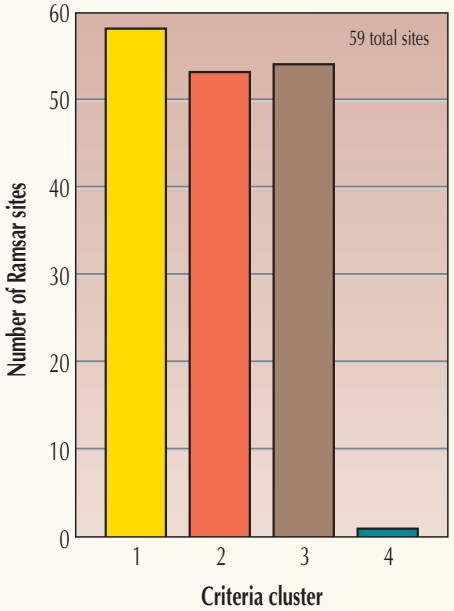



**Figure 18.** North America

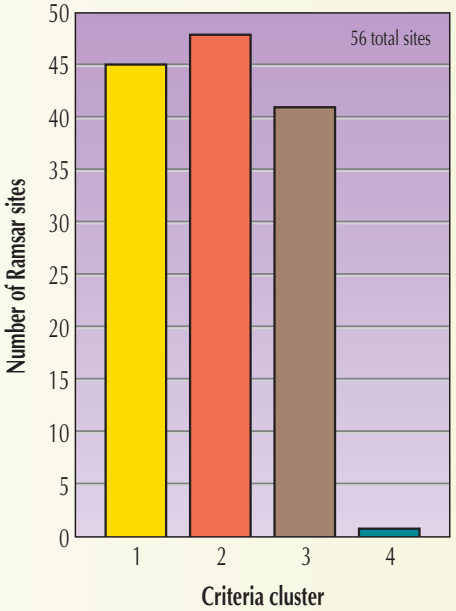



**Figure 19.** Oceania

# 5 Land uses

From its very beginning the Convention has recognized that wetlands play an integral role in the relationship between the environment and a broad section of the human community, providing sustenance, materials and economic opportunities for millions of people. Further, that maintaining the hydrological and ecological functions of wetlands not only sustains biodiversity, but pays a dividend through a host of benefits to humankind. This "wise use" concept has evolved from what was perhaps innovative thinking at the time to what is now a pragmatic realism; that wetlands are valuable in so many ways, that they will be used, and that to maintain their value, they must be used wisely.

The text of the Convention on Wetlands *coined* the phrase "wise use" in 1971 (Article 3.1), calling on Contracting Parties to promote conservation of Listed sites and wise use of other wetlands in their territory. This phrase became a concept when it was defined in 1987 by COP Recommendation 3.3 as the "*sustainable utilization for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem*". Guidelines for wise use of wetlands were presented in 1990 (annex to COP Recommendation 4.10) and these were amplified in 1993 through (an annex to) COP Resolution 5.6. But it was a "Wise Use Project" (see Ramsar Convention Bureau, 1997) culminating in the Ramsar Bureau publication *Towards the Wise Use of Wetlands* (Davis, 1993), which elaborated through case studies, the diversity, complexity and importance of the concept. Finally, the call to wise use of wetlands was echoed strongly in 1996, in the Ramsar Strategic Plan 1997–2002 which outlines 26 specific actions towards implementing wise use of wetlands.

Within the context of the Convention, wise use extends to all wetlands including those identified as internationally important Ramsar sites. Information about land uses in and around Ramsar sites is one of the categories to be reported by Contracting Parties through the Convention-approved Ramsar Information Sheet (the datasheet for describing Listed sites). While guidelines for supplying land use information call for an indication of the importance of each described land use, useful information on "scale" is usually not provided (or is difficult to provide) and is rarely quantifiable. Nor can some kind of "wise use quotient" for particular uses of Ramsar sites be assigned in any general way, given currently available data.

What is possible, is to simply note the frequency that general land uses classes are recorded at Ramsar sites globally and per Ramsar region. In the following analysis only land uses recorded *inside* the Ramsar site are presented. Land uses in the "surroundings" are recorded in the Ramsar Database, but their proximity, influence on, or relevance to the Ramsar site is not always clear from the available information.

Figure 20 depicts the most frequently recorded land use categories inside the world's Ramsar sites. While nothing can be said of the scale of these uses or activities, it is **fishing** (562 of 955 sites with data; 59% of all sites), **conservation**, and **recreation and tourism** (56% of all sites for both) that are most commonly recorded. On a regional basis, fishing is most often listed for sites in Africa, Asia, Eastern Europe and the Neotropics (Figures 21–23 and Figure 25, respectively). Western Europe (Figure 24) and North America (Figure 26) regions list conservation as the most frequent land use category. Figure 27 reveals that recreation and tourism enjoys the highest level of recording in Oceania Ramsar sites of any land use class. Other prevalent land uses include scientific research (in the top five land uses recorded in sites of 5 regions) and agriculture and hunting (both recorded among the most common land uses of sites in 3 regions). Use of sites for collection of natural products was among the most listed uses in two regions, while frequent use of sites for education as well as settlement, were reported for one region each.

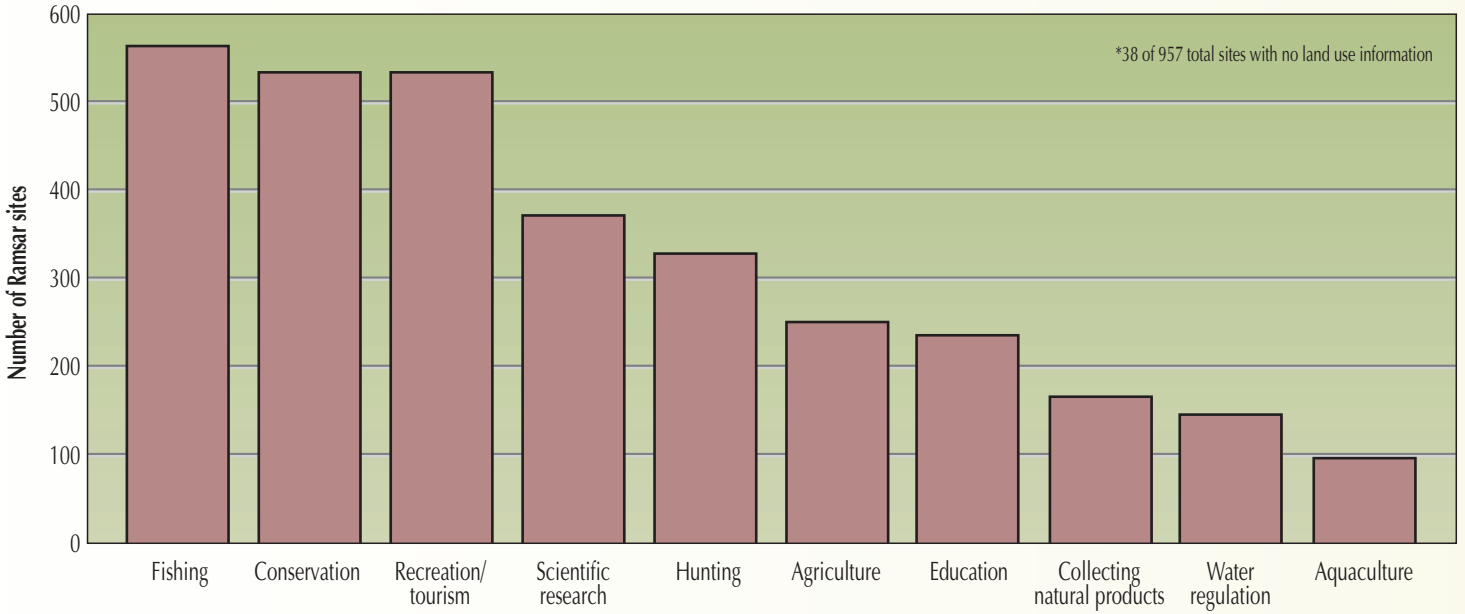



**Figure 20.** Most frequently recorded* land uses inside Ramsar sites (world).

**Most frequently recorded land uses inside Ramsar sites:**

**Figure 21.** Africa

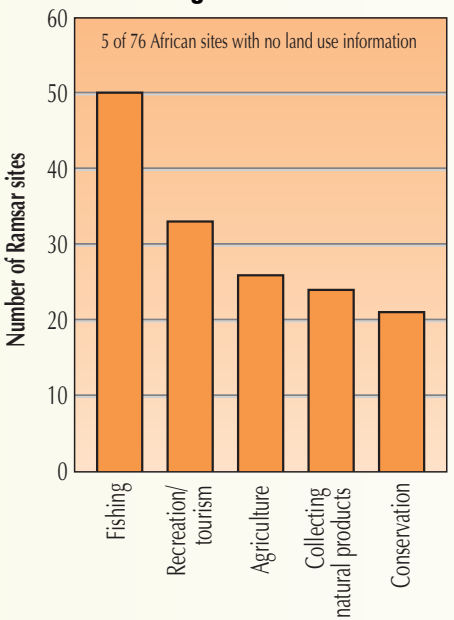



**Figure 22.** Asia

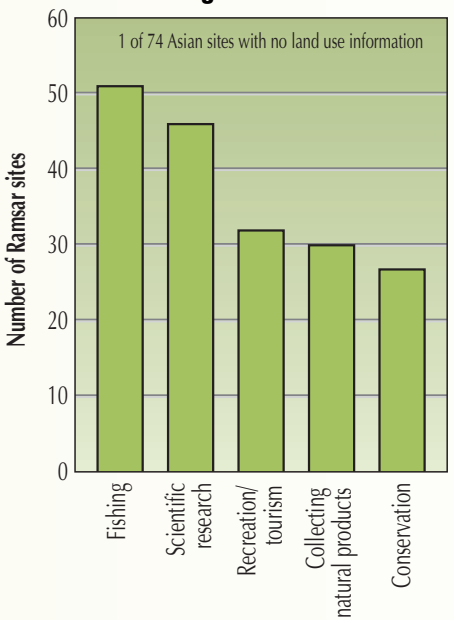
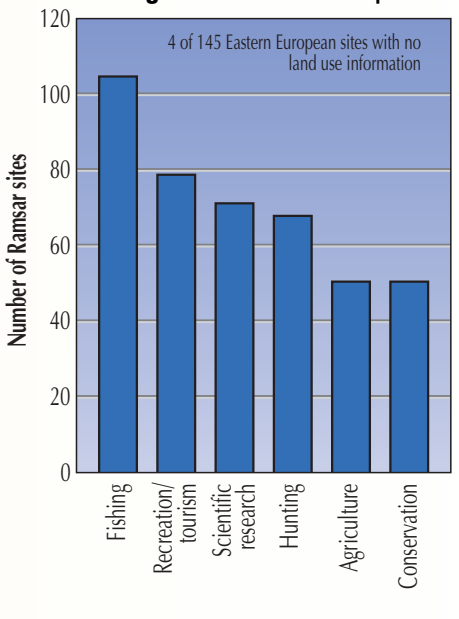



**Figure 23.** Eastern Europe



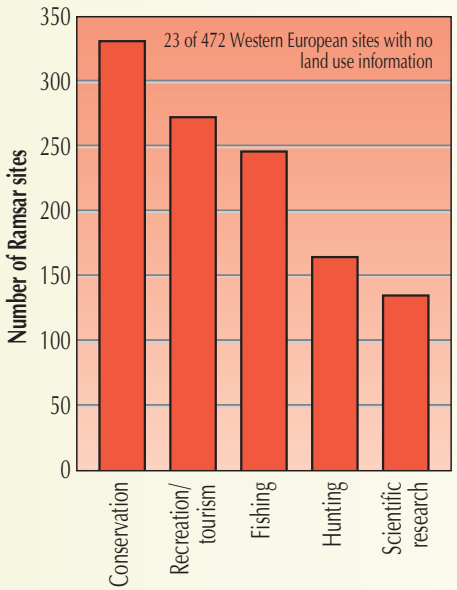




**Figure 24.** Western Europe

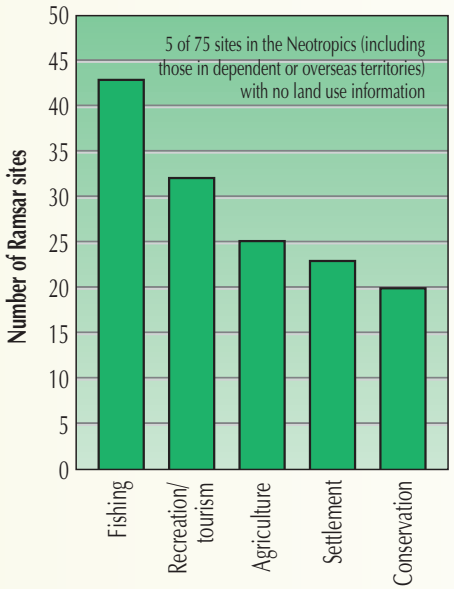



**Figure 25.** Neotropics

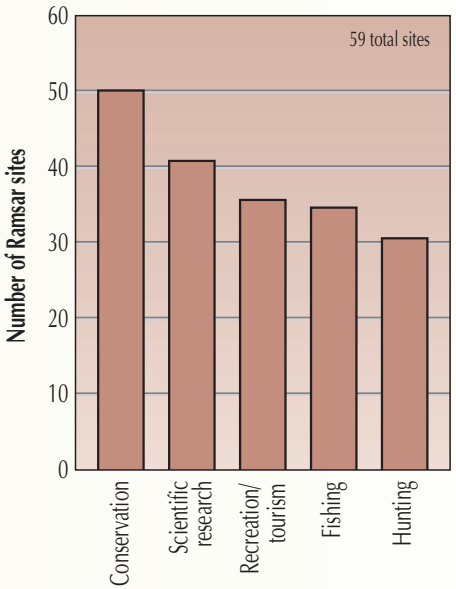



**Figure 26.** North America

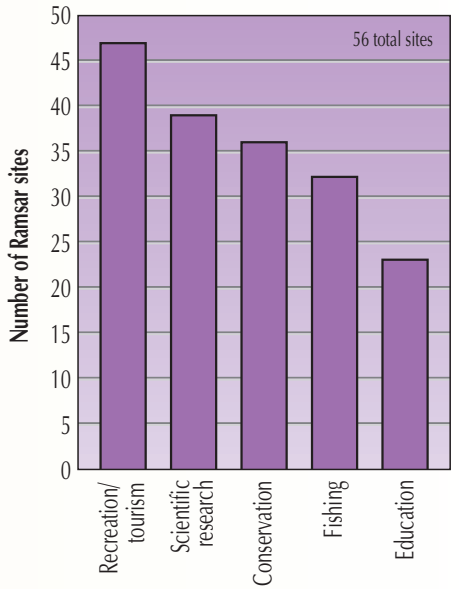



**Figure 27.** Oceania

A particular use of a wetland may or may not be wise. In the case of the latter, an adverse change in the "ecological character" might be expected to manifest itself over time. But impacts appearing within a site can also derive from activities or sources outside of it. In the next chapter, the factors of change that operate in and around Ramsar sites, are discussed.

**Well-planned eco-tourism is a sustainable use of wetlands. Corbett National Park, India.** PHOTO: WWF-CANON/MARTIN HARVEY.

6

# Factors of change

In many places, wetlands have traditionally been seen as sites to be converted (either to something "useful" or to something more "benign"). Even the terminology that evolved reinforced this: witness wetland "reclamation", where the connotation is that there needs to be something more valuable reclaimed from the wetland. While this perception has changed significantly in recent years, there are still residues of its influence in the decision-making processes operating in some places. It is indeed ironic that such productive and integral ecological and hydrological systems could have had (and still upon occasion have) such bad reputations. However, there are other impetuses driving the wetland loss engine. Some wetland areas are under pressure precisely because they are so productive, or because, given scarce or diminishing resources, wetlands are bound to suffer exploitation beyond their natural resilience. Scarce resources can cause wetlands to be *under*-valued (again). And there is another factor that makes wetlands particularly susceptible to certain impacts, and that is that the water that makes them wetlands often comes from somewhere else. Cities create large loads of domestic and industrial wastes that can, and often do, make their way into rivers and other wetlands. Some of the chemicals applied on agricultural land, or soil from activities that cause erosion, flows similarly into the hydrological system. Urbanization and certain industries also require vast amounts of water, often relying on underground sources connected to other regions, or on water supplied from other areas.

Parallel to the topic of land uses, Contracting Parties are requested to report the factors of change that might, or do, adversely affect their Ramsar sites, at the time of designation. This is accomplished through the use of the Ramsar Information Sheet (RIS). Should adverse changes arise after completion of this site datasheet, Parties are asked to provide such information through standard national reports in advance of triennial Conferences of the Parties, or even by directly notifying the Ramsar Bureau. And as with other subjects that are reported, there are certain guidelines for detailing these "adverse factors". In addition to enumerating change factors, Parties are asked to provide measurable/quantifiable information about them, if possible. It appears likely that such detailed information is difficult to obtain, for it is rarely reported in officially submitted data. So what is generally provided are basic descriptions, or even just lists, of change factors (potentially) operating at Ramsar sites. Temporal, spatial and quantifiable contexts of these factors are usually either missing or ambiguous.

Figure 28 illustrates the most frequently recorded change factors reported *in and around* the world's Ramsar sites. Such impacts are many and varied, but their scales are generally unknown. Because some of these factors can be categorized in more than one way, there are overlaps. A case in point are the impacts **from agriculture**, **pollution in general**, and specifically, **agricultural pollution**, all of which appear among the most commonly reported change factors for the global dataset of Ramsar sites**.** Agricultural impacts are the most frequently recorded change factors in this context (513 Ramsar sites). For land uses, agriculture was only the sixth highest recorded land use inside sites (244 records; see again Figure 20), therefore many of these impacts would appear to be coming from agricultural activity outside of the Ramsar sites. Other most frequently recorded change factors for world Ramsar sites include, respectively, general pollution, water regulation, urbanization and settlement, and various other (not specifically agricultural) factors resulting in habitat loss or degradation (e.g. conversion to aquaculture, habitat burning not related to agriculture, and extractive forest impacts).

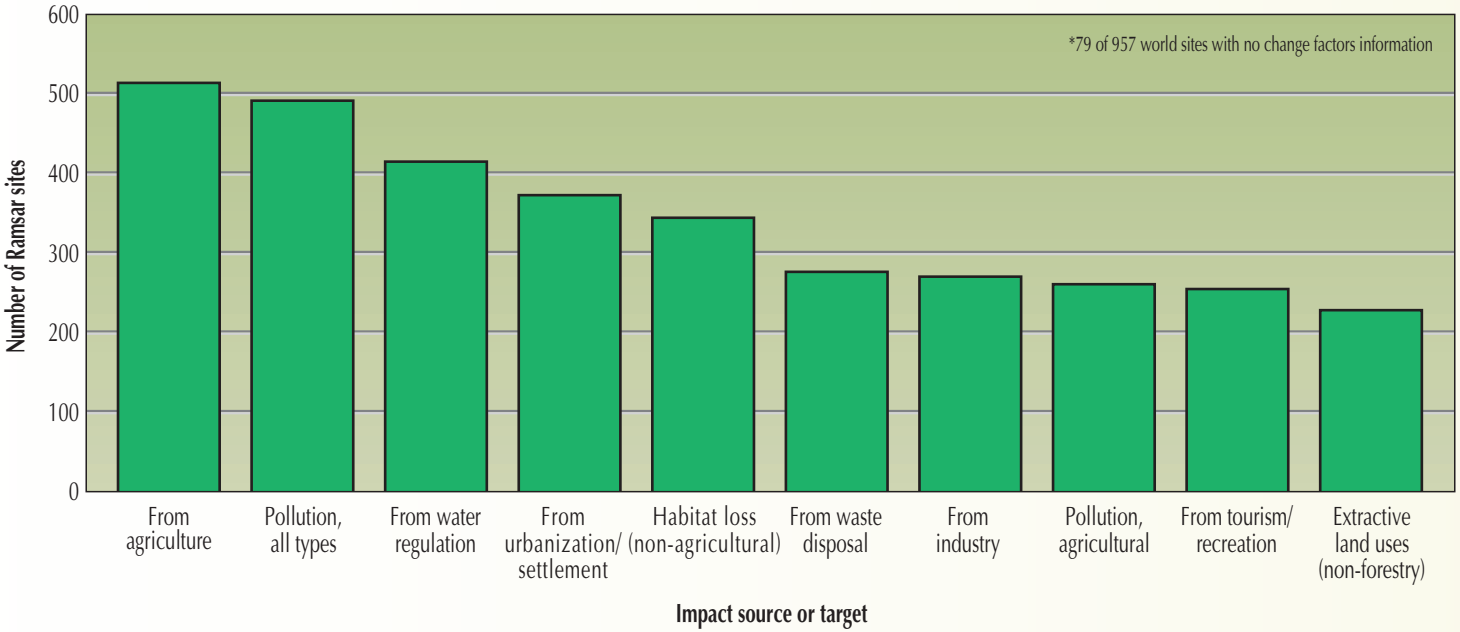
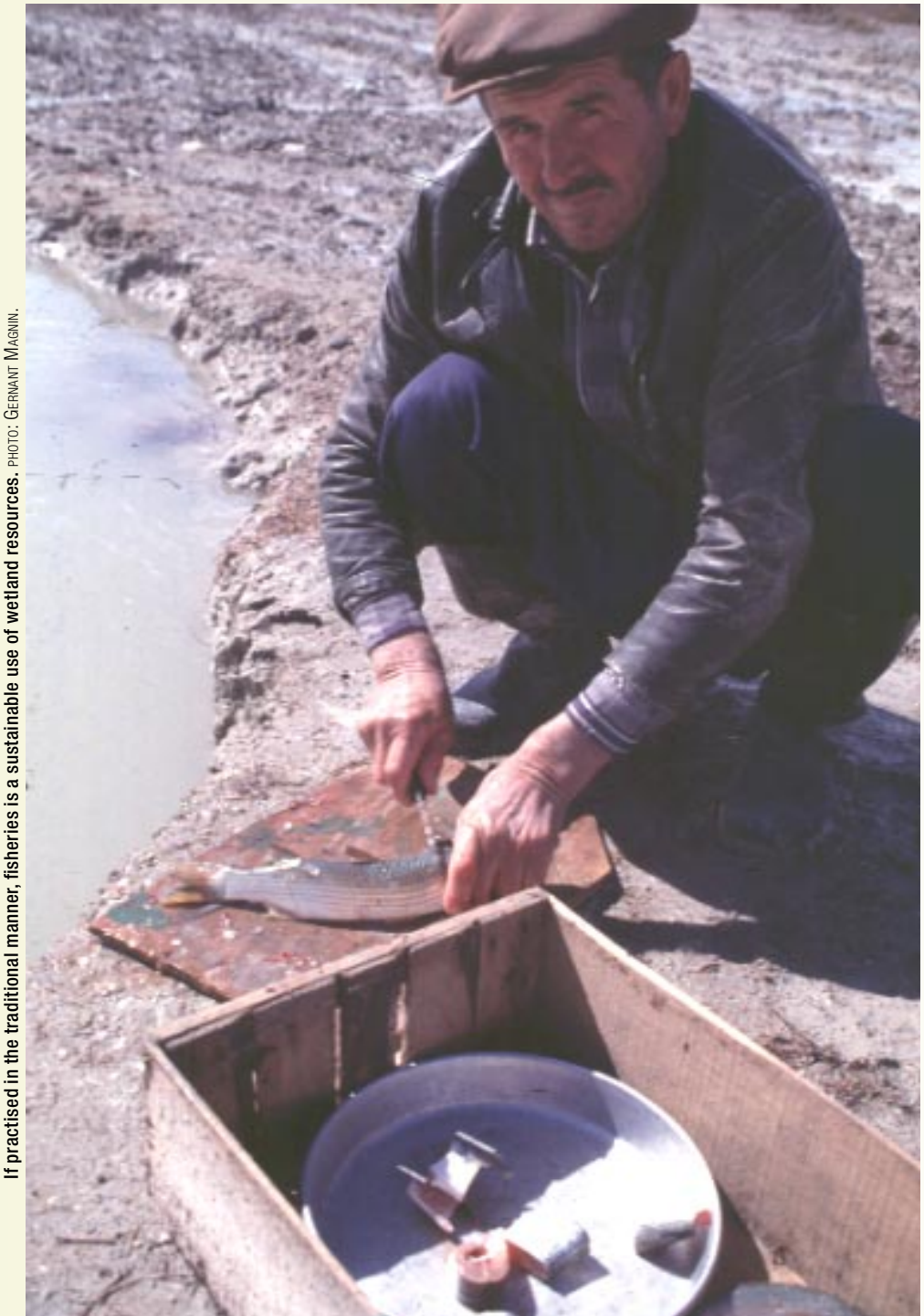



**Figure 28.** Most frequently recorded* change factors in and around Ramsar sites (world).



If practised in the traditional manner, fisheries is a sustainable use of wetland resources. PHOTO: GERNANT MAGNIN.

Upon regional analysis, agriculture is either the most or second most frequently recorded change factor for 6 of 7 Ramsar regions (Figures 29–33 and 35). Only in North America (Figure 34), does it rate less prominently (fifth most recorded change factor), where impacts from water regulation are the most commonly recorded. Pollution, water regulation, and urbanization and settlement impacts are among the five most recorded change factors in every region, but pollution is most important (based on the relative numbers of records) in Eastern Europe, Western Europe and the Neotropics. Interestingly, Africa and Asia (Figures 29 and 30) list in differing proportions the same relative ranking of their five most commonly recorded change factors. Other impact sources of note include, non-agricultural habitat loss and degradation (4 regions) and non-forestry extractive impacts (e.g. from sand, gravel and minerals, extraction) are listed as occurring in and/or around Ramsar sites in two regions.

Of all parameters examined in this Overview, “factors of change” had the highest rate of “no information” (over 8% of all Ramsar sites). Just over 3% of Ramsar sites are specifically recorded as having *no* factors threatening their ecological character.

**Most frequently recorded change factors in and around Ramsar sites:**

**Figure 29.** Africa

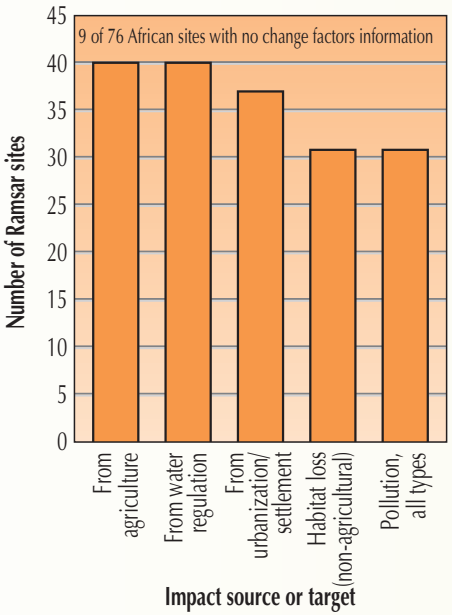



**Figure 30.** Asia

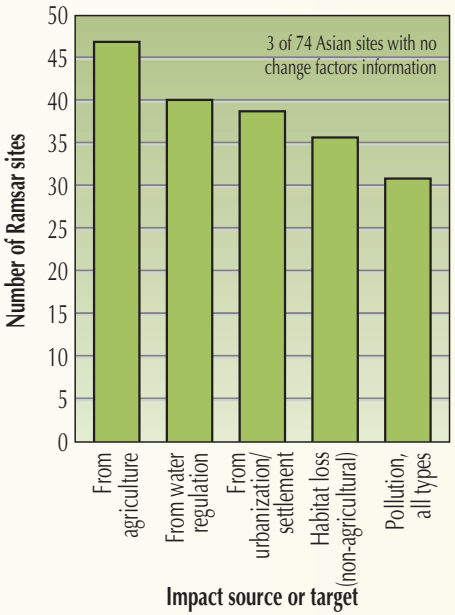
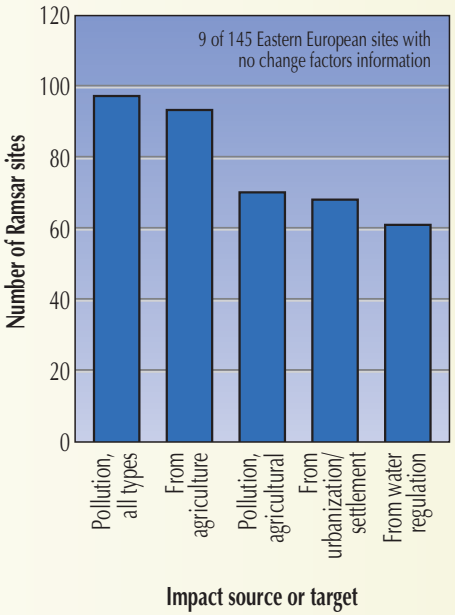



**Figure 31.** Eastern Europe



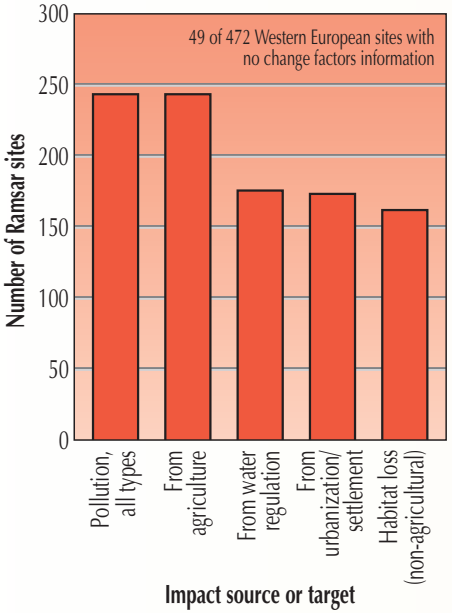




**Figure 32.** Western Europe

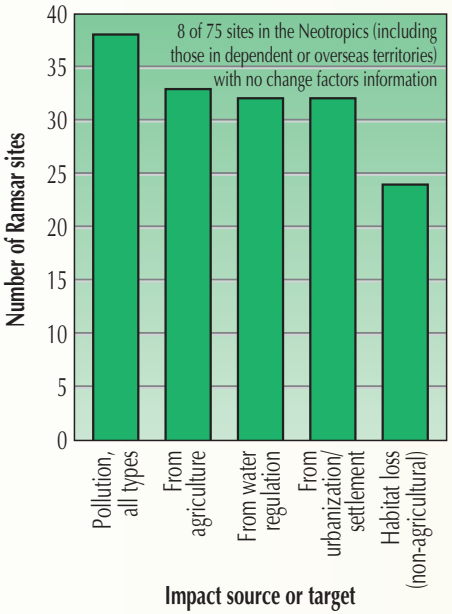



**Figure 33.** Neotropics

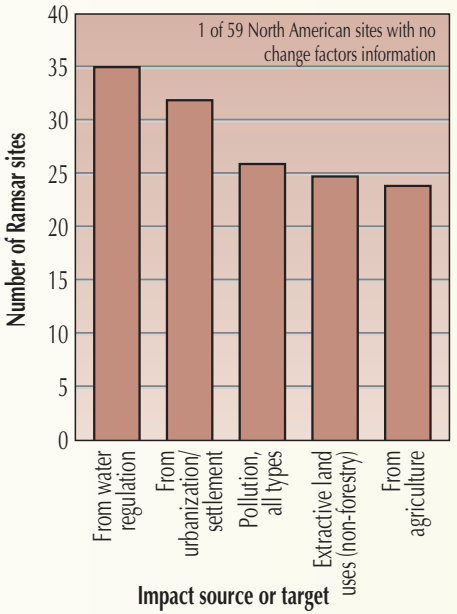



**Figure 34.** North America

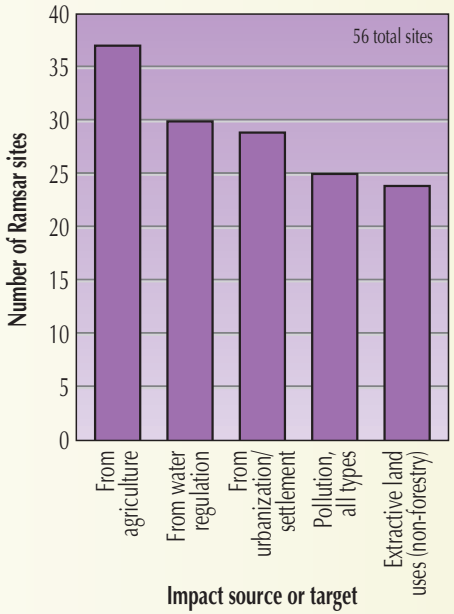



**Figure 35.** Oceania

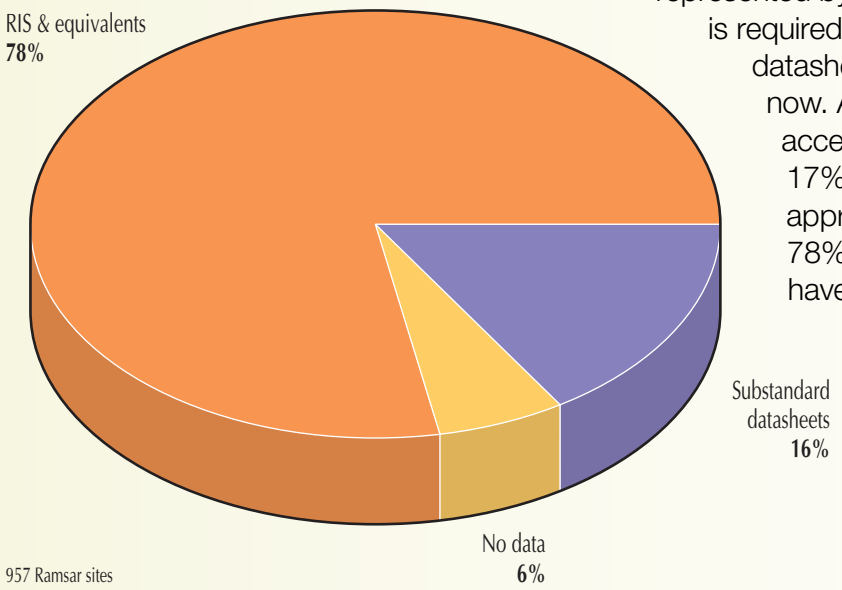
7

# The data on Ramsar sites

The summary information presented in this publication was derived from official data provided to the Ramsar Database by Contracting Parties through the Ramsar Bureau (from data available at 31 December 1998). Contracting Parties have approved the categories of information covered by a *Ramsar Information Sheet* (RIS), a datasheet providing a standardized format for describing their Ramsar sites, and facilitating management of this information by the Ramsar Database. Use of the RIS has been requested through numerous Ramsar COP decisions (Recommendation 4.7, Resolution 5.3, and Resolution VI.13). The presentation of the RIS and the content of its Guidelines have been periodically refined. Other information used in this report may have derived from *Directory of Wetlands of International Importance* series (Jones, 1993; Frazier, 1996b) published by the Ramsar Bureau, or from triennial Ramsar National Reports by Contracting Parties, or from other "official" material.

In the predecessor to the present analysis (Frazier, 1996a), individual Ramsar site datasheets were classified into a number of categories based on the similarity of their content, structure and context to that of the RIS. This analysis has now been greatly simplified owing to the fact that more and more sites are (being) represented by the approved RIS, and to the conclusion that either a datasheet provides what is required (i.e. an RIS or "equivalent") or it does not. Even though the initial overview of datasheet quality was more complicated, a comparison is possible with the situation now. About 65% of site datasheets available for previous *Overview* were of an acceptable structure (i.e. covering the required categories of information). Some 17% were represented by substandard data formats, and 18% of sites had no appreciable data. Contrast that with the present situation (see Figure 36) wherein 78% of the sites have satisfactory datasheet formats, 16% are sub-optimal and 6% have negligible data (a 67% drop in percentage terms).

**Figure 36.** Ramsar Information Sheets (RIS).



In addition to provision of a Ramsar Information Sheet, Contracting Parties should supply a map delimiting the boundaries of their Ramsar sites at the time of designation. In the 1996 version of this publication there was no comparable report, but as of the end of 1998, the level of "good–very good maps" was 31% of all Ramsar sites, while "fair" maps were available for 45% of sites. See Figure 37. "Poor–very poor" maps represented 23% of sites, and 1% of sites had no map. In simplest terms these *subjective* ratings were based on a comparison of the full range of maps, from the "best" to the "worst". Highly rated maps were those including a number of standard cartographic features (e.g. scale, geographic coordinates), Ramsar site boundaries, a clearly legible image on sound media, and perhaps additional useful features (like an indication of habitat zonation). There is still considerable room for improvement in the area of Ramsar site maps.

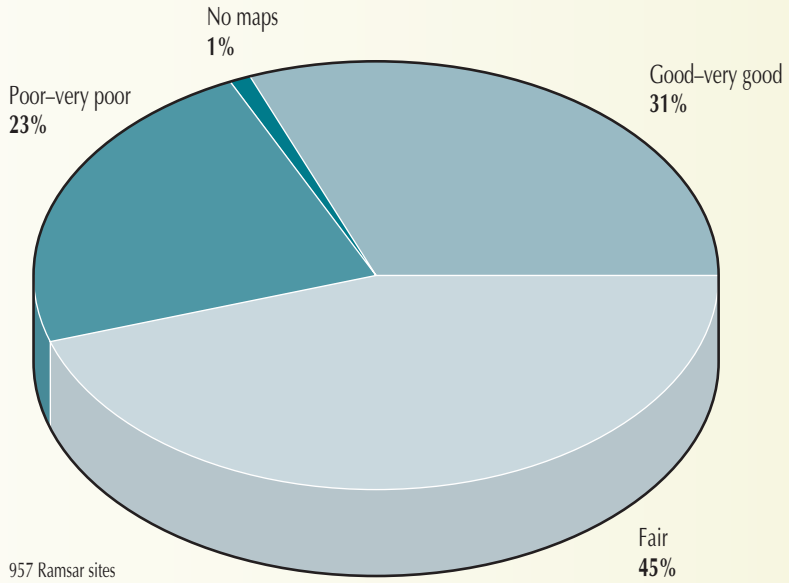



**Figure 37.** Ramsar Site Maps.

Contrasted with the previous analysis, this *Ramsar Sites Overview* was conducted on a "better" set of data. Better, because there was a higher proportion of data available, more information was supplied in the approved (RIS) format, and many data were updated in response to COP Resolution VI.13 which called upon Contracting Parties to revise their site data at least every six years (starting with all sites designated before 31 December 1990). Nevertheless, this substantial tangible improvement must be tempered in the light of still significant information gaps. Any existing gaps were noted in the appropriate foregoing analyses. Incomplete, inaccurate or simply old data impoverishes the List of Wetlands of International Importance and its credibility, and therefore compromises the implementation of the Convention.

8

# Conclusion

The analyses presented in this *Ramsar Sites Overview* represent a snapshot of Contracting Parties and their designated Ramsar sites at 31 December 1998. This publication updates by exactly three years, *An Overview of the World's Ramsar Sites*, which was the first analysis of over 20 years of Ramsar site designations. In just this three year span the number of Contracting Parties has increased by 25%, their Ramsar sites by 24%, and total designated area by 35%.

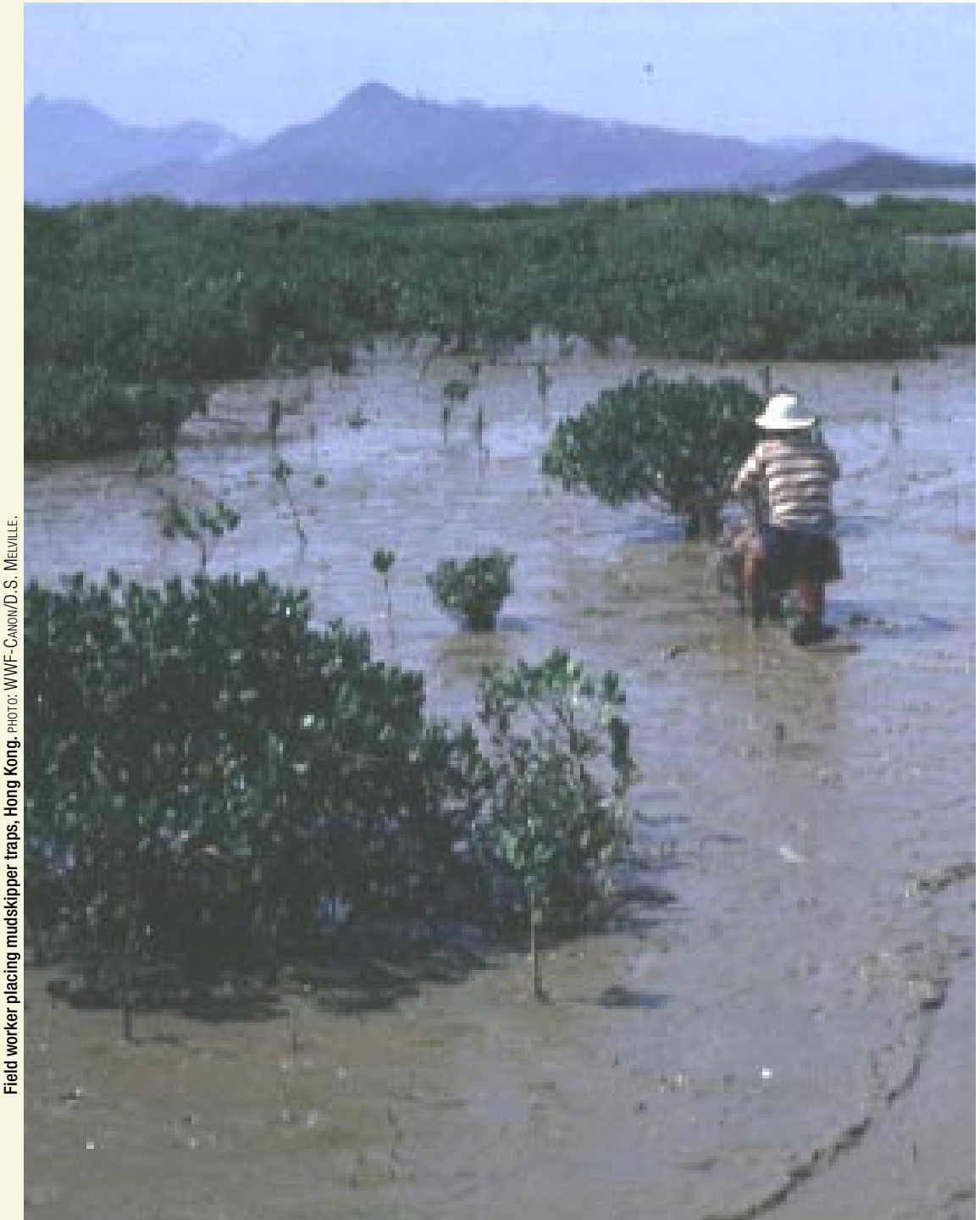
In addition to the coverage of Convention membership, the distribution of Ramsar sites and their areal extent, this Overview has presented information on the types of wetlands represented and the special attributes or criteria, that make them internationally important. Because of the natural richness and productivity of wetlands, they are subject to use, including Ramsar sites. Sometimes the use is in harmony with Ramsar's wise use principle, and sometimes it is not. Information on land uses and factors of change operating in Ramsar wetlands, was also presented. There are some salient conclusions outlined below that can be drawn from these analyses.

Convention membership is complete in North America and coverage in Western Europe is approaching completion. Elsewhere, there is great scope for extension, especially in large parts of Africa, the Middle East, central and southeast Asia, the Caribbean and the Pacific. Many countries with major wetlands, rare and under-represented wetland types, or wetlands important for maintaining global biodiversity, are not yet represented in the Convention. Of course, countries and regions differ widely in geographic size, and the extent and variety of their wetlands. Importantly, differences in Countries' economies, populations and resources must be taken into account. There clearly remains a need to expand assistance to appropriate countries in order to advance toward universal membership and representative wetland coverage in the Convention.

It is not the case that the system of Ramsar Wetland Types provides a comprehensive classification. While a detailed classification might be warranted at the national or regional level, it probably would not be able to provide the element of “global applicability” currently enjoyed. This is not to say that there is not a need for improvements or adjustments, but the international context of Ramsar Wetland Type is the attribute that must be maintained for purposes of the Convention. In this analysis, the most and least frequently recorded wetland types at Ramsar sites have been reported. This approach is dictated by the data that are available, and must be qualified. The fact that a wetland type is not often recorded could mean a number of things. The type could be relatively uncommon because it is geographically restricted (e.g. mangroves or tundra wetlands) or because it is a very specific geologic form (e.g. geothermal wetlands, springs, or inland deltas). Low recording does not necessarily indicate rarity although it might indicate under-representation, depending on the type. For guidance on rare and under-represented wetland types, specialist input is sometimes needed.

In COP Recommendation 6.7, Contracting Parties have acknowledged expert opinion that coral reefs, mangrove forests, and seagrass beds are very important and threatened systems which are under-represented in the Ramsar List. Other experts advise that peatlands too are under-represented. In some cases, low recording of wetland types (e.g. coral reefs and forested peatlands) in the Ramsar Database does match specialist opinion on under-representation. A further element to consider about wetland type information, is that it is nearly always provided without an indication of areal scale. It is likely just as important to know how much of a wetland type there is within Ramsar sites, as to know its distribution among them.

Wetland systems are some of the most productive and important systems on Earth, (influencing climate, flooding, water supply, migratory species, etc.). Ramsar sites are wetlands that have met some threshold of international importance according to a set of criteria. The overwhelming majority of Ramsar sites are important for multiple reasons, though they need only be listed for one of 13 criteria, which are divided among four families or clusters. Ramsar criteria have evolved with the Convention (criteria specific to fish were added in 1996). COP Resolution VI.3 calls for the possible further development of Ramsar site selection criteria.



**Field worker placing mudskipper traps, Hong Kong.** PHOTO: WWF-CANON/D.S. MELVILLE.

Data available for analysis of Ramsar wetland use generally do not include details on spatial extent, temporal context or some quantifiable figure of "wise use". Generally, land use data are simply basic descriptions or even a list of general types. What is clear from this information, is that Ramsar sites are being used in a variety of ways, and that communities often depend on the sustainability of these wetlands. Certain deductions can be made about land uses in general but each record of use is described from a discreet site, with its own set of circumstances. The scale of a land use within a site is crucial to assessing the sustainability, or possible impacts, of the use. Scale extends not only to the spatial coverage of a land use within a site, but also the duration and intensity of that use.

The "wise use of wetlands" principle is the main tenet of the Ramsar Convention. Activities that benefit people but do not adversely affect the "ecological character" of a wetland are compatible with the conservation of that wetland. Factors that can cause a change in the ecological character of wetlands are many. Contracting Parties have listed such factors in the routine course of describing their sites. These data too, are often without details of the extent, intensity and duration of the impact.

In 1996, COP Resolution VI.13 requested that the analysis of threats recorded in the Ramsar Database be further developed. While the overall quantity and quality of Ramsar site information has improved markedly since 1996, the specific information now available on threats would not yet appear to support significantly more-definitive results. The current presentation of information on change factors has been based on a revised (computer program) analysis, but essentially the structure of the data, and the breadth of information that it conveys has remained the same. In the course of creating a new Ramsar Database application, a module for handling adverse factor data in a structured (hierarchical) way is being developed. This will facilitate management of these data but only an improvement or diversification of the information itself, will support a more comprehensive analysis of these factors of change operating in Ramsar sites. The issue of adverse change is so important that development of a specifically funded project to address it, merits serious consideration.

**Salt gathering, Senegal.** PHOTO: NICK DAVIDSON.

The Convention of Wetlands has developed the mechanisms of the Montreux Record (a list of priority Ramsar sites for *positive* national and international conservation attention) and the Management Guidance Procedure (formerly Monitoring Procedure) to address threats at Listed sites. Individual Contracting Parties have also initiated various restoration and rehabilitation measures at their Ramsar sites. (See "*The Ramsar Convention Manual",* Ramsar Convention Bureau, 1997, and the previous *Overview,* Frazier, 1996a, for a detailed treatment of these subjects).

The issue of wetland loss and degradation in general was addressed at the 6th COP in Brisbane Australia, 1996, with a presentation in Technical Session B entitled "*A global review of wetland loss and degradation*" (Moser *et al.*, *in* Ramsar Convention Bureau, 1996). This highlighted the fact that while data are incomplete, wetlands in general are under threat. The Brisbane Conference also saw an initiative born with a pledge of funding from the government of the United Kingdom toward a Ramsar Strategic Plan call to "begin quantification of global wetland resources, as baseline information for considering trends in wetland conservation or loss." The resulting project, entitled "*A global review of wetland* resources and priorities for wetland *inventory*" was conducted for the Ramsar Bureau (with additional funding from the Netherlands government) by Wetlands International and its Wetland Inventory and Monitoring Specialist Group, in association with the Environmental Research Institute of the Supervising Scientist of Australia. A report on the findings of this project, which has examined the status and coverage of national wetland inventories worldwide, will be released at the 7th COP, in San Jose, Costa Rica, May 1999. The report summarizes current knowledge of the extent and status of the world's wetlands, and recommends priorities for future wetland inventory to address the most pressing gaps in quality and coverage.

The challenge of Ramsar Contracting Parties is to maintain the ecological character of their listed sites and all their wetlands through conservation and wise use. These mechanisms are not contradictory but complementary. There is probably no viable alternative to this approach for maintaining ecological character. More fundamental than meeting Convention obligations, wise use is necessary to maintain the values, benefits and functions of wetlands that directly and indirectly support the livelihoods of people and their economies.

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WATC is the centre through which the RIZA makes its experience with wetland management and restoration available for international co-operation. The necessary staff are drawn from the divisions of RIZA and from other institutions.

WATC

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# INTERNATIONAL COURSE ON WETLAND MANAGEMENT

RIZA's International Course on Wetland Management provides wetland managers with the knowledge and skills they need to manage wetlands sustainably. During the six week course, participants learn how to assess wetlands' ecological and socio-economic values, involve stakeholders in the planning process, set management objectives, and translate these into relevant measures. At the same time they produce a draft management plan for their own wetland.

The course is structured in such a way that the participants learn, not only from specialists from RIZA and other institutions, but also from the rich experience of their fellow participants. The multi-faceted course utilises interactive lectures, group work, case studies, field work, excursions, poster presentations, panel discussions, role playing and other games, to facilitate group exchange and transfer of knowledge.

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Ministry of Transport, Public Works and Water Management
Directorate-General of Public Works and Water Management
Institute for Inland Water Management and Waste Water Treatment RIZA

## This Publication:

Presents a thematic and graphically illustrated analysis of the world's Wetlands of International Importance at 31 December 1998, including information on:

- the regional distribution of Contracting Parties to the Convention on Wetlands and their designated Ramsar sites
- the kinds of wetlands represented in the Ramsar List of sites
- the reasons why these wetlands have been designated as internationally important
- the principle of "wise use of wetlands" and the land uses recorded in Ramsar sites, and
- the factors of change challenging these and other wetlands

These analyses are derived from information provided to the Ramsar Convention Bureau by Contracting Parties to the Convention on Wetlands, and compiled in the Ramsar Sites Database. The Ramsar Database is managed by Wetlands International on behalf of the Ramsar Bureau.

This publication was made possible by a generous grant to Wetlands International from the Netherlands Institute for Inland Water Management and Waste Water Treatment RIZA, of the Dutch Ministry of Transport, Public Works and Water Management.

Ministry of Transport, Public Works and Water Management
Directorate-General of Public Works and Water Management
Institute for Inland Water Management and Waste Water Treatment RIZA

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