GLOBAL MIRE AND PEATLAND CONSERVATION

Proceedings of an International Workshop

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This report summarizes the discussions of the *International Workshop on Global Mire and Peatland Conservation* held in Brisbane, Australia on March 18, 1996 in conjunction with the Sixth Meeting of the Conference of the Contracting Parties to the Convention on Wetlands of International Importance (the Ramsar Convention). This document is produced to help implement multiparty objectives with regard to conservation and wise use of peatland and mire resources, particularly through the Ramsar Convention.

The following organizations have contributed to the production of this report:

- Canadian Wildlife Service, Environment Canada
- Directorate for Nature Management, Norwegian Ministry of the Environment
- International Mire Conservation Group
- International Peat Society
- IUCN Commission on Ecosystem Management
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Brisbane, Australia
March 18, 1996

Compiled by
Clayton D.A. Rubec

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INTRODUCTION TO THE WORKSHOP AND OVERVIEW OF THE GLOBAL PEAT RESOURCE

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Introduction

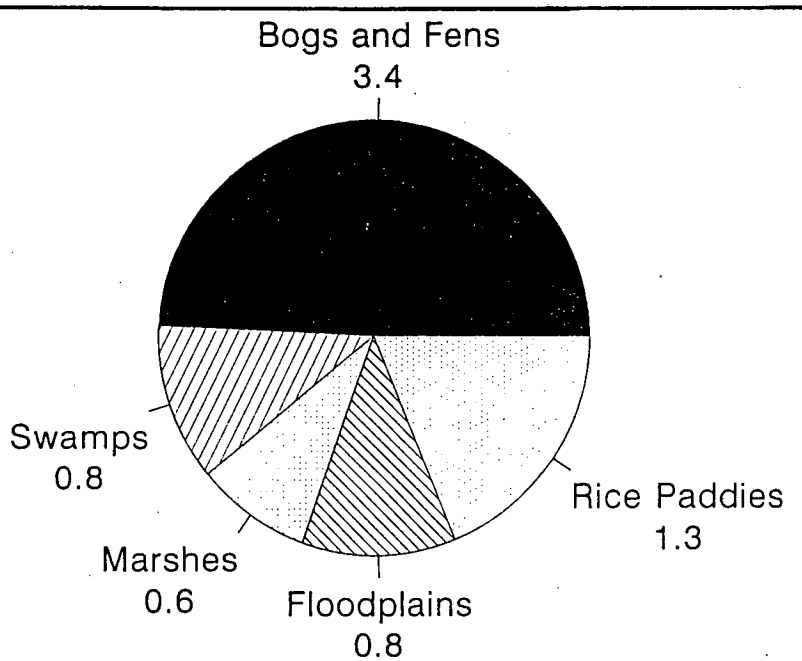
There have been numerous attempts to quantify and describe global peatland resources. Peatlands, also known as *mires*, *muskeg* and a host of other terms in English, *tourbières* in French and *bofedales* in some Spanish-speaking nations, are estimated to be the dominant group of wetland types throughout the World. Peatlands, at least in a Canadian context, are considered a portion of our broad wetland ecosystem. Unfortunately, they remain the poor cousin to many other less distributed wetland types that have been the focus of many national and international wetland efforts.

How much peatland is there in the World? Mitsch *et al.* (1994) report that the total area of wetlands on a global scale is about 6.5 million km^2 of which 3.4 million km^2 are bogs and fens (being the major peatland types) and 0.8 million km^2 are swamps, which also often are wetlands with peat-forming soil conditions (see Figure 1). The 1996 publication of the book *Global Peat Resources* (Lappalainen 1996) indicates the total worldwide peatland area, based on the analysis of available information, is 3.98 million km^2, 62% of the total wetland area reported at 6.41 million km^2. Hence, by several measures it can be stated that peatlands are the predominant form of wetland ecosystems on a global scale.

Peatlands, however, are not uniformly distributed around the World. Figure 2 compares regional distribution of global wetlands by two research studies: Maltby and Turner (1983) and Matthews and Fung (1987). These two studies suggest that boreal wetlands, largely bogs and fens, represent 38% to 50% of the global wetland resource while peatland-dominated subtropical and tropical wetlands (mainly including peatswamp forest and mangrove systems) comprise 30% to 56% of all the wetlands in the World.

Figure 1: Wetland Types Globally

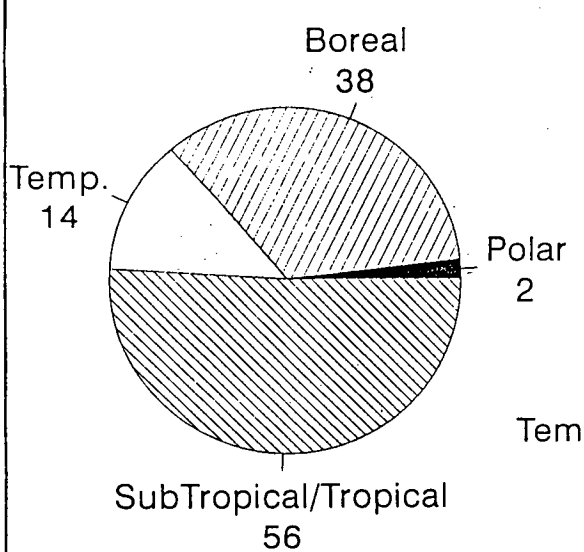
(Area in sq.km.)



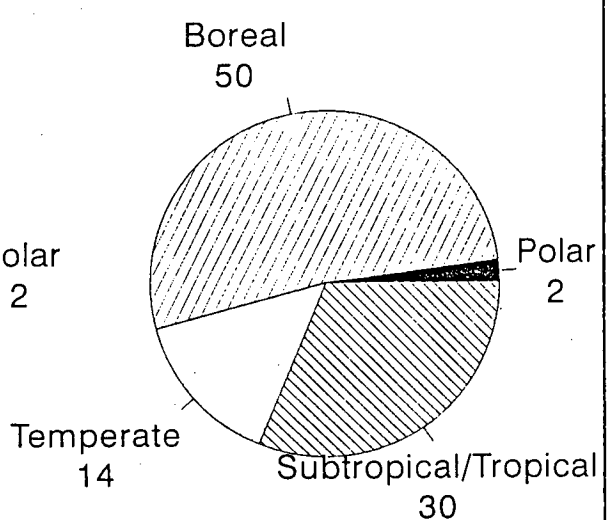
(Mitsch, Mitsch and Turner 1994)

Figure 2: Distribution of Global Wetlands

(% Total Area Occurrence)



Maltby and Turner (1983)



Matthews and Fung (1987)

Ramsar and Peatlands

The *Ramsar Convention Wetland Classification System*, adopted by the Fourth Meeting of the Conference of the Contracting Parties in July 1990, recognizes "Inland", "Coastal and Marine" and "Man-made" wetlands. It further includes four categories of "Inland Wetlands" that are peat-dominated systems: (a) type 10 - Shrub Swamp; (b) type 11 - Freshwater Swamp Forest; (c) type 12 - Peatland; and (d) type 13 - Alpine and Tundra Wetland. Despite these inclusions, peatlands and mires have received relatively little attention under the Convention to date.

The Ramsar Convention has long noted that peatland types are integral to wetlands of interest to the international community, equally with other wetland types. Figures released by Wetlands International for the Ramsar Data Base indicate that, as of December 1995, 75 of the 778 Ramsar sites around the World are dominated by peatland components, the majority (70) being dominantly unforested. Hence, peatlands can be considered under-represented in the global network of protected wetland sites (see Table 1). Only five Ramsar sites appear to have forested peatland as a dominant wetland characteristic worldwide. The Ramsar peatland sites cover about only 3.2 million ha out of the 52 million ha of the Ramsar wetland sites globally designated to date — less than six percent by area.

Table 1: Status of Peatlands and Mires in Ramsar Network of Sites (December 1995)

	Number of Ramsar Sites	Number of Contracting Parties	Total Area (000 ha)
Peatlands are a Dominant Component	75	21	3 179
Peatlands are a Minor Component	155	31	7 592
Total of all Ramsar Convention Sites	778	92	52 000

Source: Frazier (1995)

Global Responses to the Need for Peatland Conservation

To address this issue, the Ramsar Convention in preparing its *Strategic Plan 1997-2002* (Ramsar Convention 1996) responded to concerns brought forward in a series of Ramsar Regional Meetings during 1995. This resulted in actions being included to recognize peatlands as an under-represented wetland type in the Ramsar Network of Wetlands of International Importance. The *Strategic Plan* calls for more peatlands and coastal and coral reef wetland systems to be nominated to the *List of Wetlands of International Importance* under the Convention. This *Strategic Plan* and a more specific Recommendation (No. 6.1) were adopted at the Convention's Sixth Meeting of the Conference of the Contracting Parties in March 1996. This Recommendation also identified peatlands as priorities for increased international conservation effort and specific actions were recommended.

To assist the many interested agencies and the Contracting Parties to the Ramsar Convention in addressing peatland conservation issues, an international workshop was envisaged that would both respond to previous calls for peatland conservation and create a global forum for elevation of the issue to the global conservation agenda. Hence, the *International Workshop on Mire and Peatland Conservation* was held at the Brisbane Convention and Exhibition Centre in Brisbane, Australia on March 18, 1996 immediately preceding the Sixth Meeting of the Conference of the Contracting Parties to the Ramsar Convention.

This Workshop focused on the status of the global peatland and mire resource, bringing together representatives of major international and national government, non-government and industry groups. Participants discussed opportunities for developing an international awareness strategy and action plan for the conservation of the world's peatlands and mires. The Workshop was also an opportunity to discuss Draft Recommendation No. 6.1 proposed for consideration during the Ramsar meetings that followed from March 19-27, 1996.

The Workshop had the following objectives:

(1) Foster international discussion on global peatland and mire conservation and recognition of peatlands and mires, particularly under the Ramsar Convention.
(2) Provide an opportunity for wider discussion of a Ramsar Convention Recommendation on Global Peatland and Mire Wise Use and Conservation.
(3) Promote international cooperation and coordination for peatland and mire initiatives.
(4) Develop the basis for an international action plan on peatland and mire sustainable development, wise use and conservation involving international partners.

The following papers provide a brief look at the global peatlands resource relative to Ramsar Convention interests and needs for conservation action (Rubec, Lindsay); the background leading to this meeting including preceding conferences in Trondheim, Norway and Edinburgh, Scotland (Nord-Varhaug); the role of peatland resource user industries in conservation partnerships (Soppo); the special needs for tropical peatlands (Sugandhy); and the recommendations for an international Action Plan (Lindsay).

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THEMES FOR THE FUTURE: PEATLANDS — A KEY ROLE FOR RAMSAR

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[Note: The following paper was presented on March 26, 1996 during the Plenary Session of the Sixth Meeting of the Conference of the Contracting Parties to the Ramsar Convention — ed.]

Peatlands are profoundly important to a Convention which was created expressly to promote conservation and wise use of the World's wetland resource. Yet peatlands have a problem — they are not popular.

The *International Workshop on Global Mire and Peatland Conservation* held in Brisbane on March 18, 1996, attended by representatives of government agencies, the private sector and environmental interest groups, learned that there is an imbalance in the Ramsar *List of Wetlands of International Importance*. Although peatlands cover some 400 million hectares in total and represent 50% of the World's terrestrial and freshwater wetlands, only 75 sites from the total of 778 Ramsar sites listed by December 1995 have peatland as their dominant habitat. Meanwhile the area totals involved are even more striking, with those same 75 peatland sites amounting to a little over three million hectares, compared with 52 million hectares for all wetland sites listed — 50% of the World's resource but only six percent of the area listed. It could be argued that a simple analysis of the Ramsar *List* is quite likely to generate distortions of various types, but the Workshop felt that this was no artifact. These figures reflect a deeper, more fundamental issue.

The Workshop itself was stimulated by serious concerns voiced by two recent international conferences held in Norway and Edinburgh, and summarized in what have come to be known as the *Trondheim Declaration* and the *Edinburgh Declaration*. In the light of the concerns expressed by these two documents, and in view of the data mismatch in the Ramsar lists, the Workshop participants identified an area that Ramsar can usefully devote particular attention during the next five years.

Although, after 25 years of activity, the Ramsar Convention cannot be said to have failed in its objectives with regard to peatlands, it nevertheless seems to have fallen foul of one of the very problems it has spent the last 25 years trying to overcome. When the Ramsar Convention was in its early stages of development, wetlands in general were still widely seen as rather

useless places, crying out to be drained and turned into productive land. Ramsar has done great things with all wetlands in the last 25 years, but the imbalanced site-list suggests that perhaps it has done rather better with some wetland types than with others — to paraphrase George Orwell — "All wetlands are equal in the sight of Ramsar, but some are more equal than others." Perhaps it is not surprising that peatlands appear to have lagged behind the rest of the field. If wetlands in general were unpopular in those days, peatlands, or mires, languished at the very bottom of the popularity stakes. Unfortunately, in many parts of the World it seems that they still do.

Why is this? It's almost certainly largely because a cultural antipathy which is centuries old has shrouded the World's peatlands in such obscurity that now we have a cultural blind spot about the habitat. At its worst, it has hidden their existence entirely from our consciousness, but it hides them from our thinking in many more subtle ways. To most people, peatlands are still wastelands. They are still dangerous. They should be drained, now that we have the technology to do so and finally turn them into something economic.

We do not even have a vocabulary available from common usage to describe the habitat. There was confusion in the Workshop because there are not adequate terms in different languages to describe certain basic types. There are times when one must envy our grassland and woodland colleagues. How can you conserve something when you do not even have a word for it?

Not even the Ramsar Convention has escaped from this cultural myopia. The Workshop recognized that Ramsar has not done enough to ensure the conservation and wise use of what must be reemphasized is a type which represents 50% of all terrestrial and freshwater wetlands of the World. Furthermore, the Workshop learned that, in addition to being the most extensive single wetland type, peatlands have a functional significance far beyond their actual geographical extent. In particular:

- they often form major components of the local or regional hydrological cycle — for example all drinking water in Scotland is derived from catchments dominated by peat;
- peatlands are major contributors to the biological diversity of regions in many parts of the World, but particularly in the tropics;
- they provide functions, food and other natural resources which can be utilized sustainably to the benefit of local communities and national economies; and
- the carbon stored in peat represents one quarter of the World's soil carbon pool, and between 44% to 71% of all carbon held in terrestrial biota.

These, and other functions, are reflected in the text of Recommendation 6.1, a recommendation derived from the sentiments expressed in the Trondheim and Edinburgh Declarations, and submitted to the Conference by Canada, Norway and the United Kingdom. The Recommendation highlights the fact that peatlands have, in the past, been under-represented in both the site-lists and the actions of Ramsar. But there is an explicit recognition, under Action 6.2.3 of the Ramsar Convention's *Strategic Plan*, of the need for greater effort in this

area. This Recommendation was circulated to Ramsar delegates in draft form in advance of the Brisbane Conference. The final text is included in these Proceedings (see pages 39 to 41).

The Workshop went on to review some specific actions which might be taken to develop the concepts laid out in Recommendation 6.1. It is to the credit of the Ramsar *Strategic Plan* that each and every action proposed during the Workshop already fits comfortably within the various Objectives and Actions of the *Plan*. Details of these proposals are provided in my paper at end of the Proceedings of this Workshop (pages 43 to 53), but to summarize them, they consist of:

(a) information gathering, under General Objectives 2 to 8, comprising traditional survey and evaluation, gathering of information about functions and services, and collation of social, cultural and historical information;
(b) education, under General Objective 3, of societies at all levels, from the local community to national and supra-national decision makers;
(c) communication, under General Objectives 2 to 8, including such activities as cooperation to produce an agreed glossary of peatland terms so that we can all at last be talking the same language thereby creating a definitive source-book. Use of the Internet, and development of an effective cross-sectoral and multi-organizational network are also actions under this theme.

It is hoped that by adopting Recommendation 6.1 and actively pursuing the actions proposed through the measures provided within the *Strategic Plan* (Ramsar Convention 1996), Ramsar can play a pivotal role in finally helping to draw peatlands out from the shadows to take their place — firstly, as one of the most extensive wetland types around the World, and, secondly, as one of the most significant in terms of the services and functions that they provide for the living biosphere of our Planet.

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FOCUSING OUR ATTENTION ON MIRE AND PEATLAND CONSERVATION — THE TRONDHEIM AND EDINBURGH DECLARATIONS

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Introduction

From a Norwegian point of view, we are very happy to see that there now is a golden opportunity to discuss the issue of mire and peatland conservation under the Ramsar Convention.

In this paper, allow me to first briefly focus on the need to conserve mires and peatlands. Following this, we will examine how well mires and peatlands fit under the practical "definition" of wetlands under the Ramsar Convention, as well as under the criteria for identifying Wetlands of International Importance. We will then turn to two main points, namely to inform you about the background for and the contents of: (a) the "Trondheim Declaration — an International Statement on the Global Conservation of Mires and Peatlands" and (b) the "Edinburgh Declaration". Hopefully you will thus understand the background to the Ramsar initiative taken *inter alia* by Canada, Norway and the United Kingdom for the Sixth Meeting of the Conference of the Contracting Parties to the Ramsar Convention.

The Need for the Conservation and Wise Use of Mires and Peatlands

Wetlands cover about five percent of the terrestrial and freshwater surface of the World; of this wetland area, as much as up to 60% is dominated by environments favouring peat-forming processes. These peat-forming environments are found throughout the World, occurring in subarctic and boreal regions of North America, northern Europe and Siberia, in the tropical rainforest regions, and dominating the lowlands of Tierra del Fuego on the southern-most edge of South America. For my own country, Norway, mires and peatlands are a very important part of our natural heritage, in that wetlands and bogs constitute some nine percent of the land area of mainland Norway, while some five percent are freshwater areas.

Most importantly, peatlands provide many of the critical functions of the World's wetland systems, including: (1) provision of rich biological diversity and valuable habitats for flora and fauna; (2) contributing in a major way to the maintenance of water quantity and quality; (3) by being productive systems which may provide food, fibre and livelihoods to people if used

wisely; (4) forming a major component in carbon cycling and long-term storage; and (5) providing an archive and record of cultural, climatic and environmental change.

What should be specifically mentioned is the significance of mire systems in forming major components in global hydrological cycles, either as the headwaters of complete catchments or as major factors within catchments. They are therefore very important in maintaining stable functioning of catchments in terms of both water quantity and quality.

It is against this background that we so regretfully see that we are facing a serious degree of risk to global mire resources and their integrity, and that mires and peatlands are among the World's most endangered ecosystems. In fact, in some nations, as much as 90% or more of these important areas have been destroyed or significantly degraded resulting in a serious loss of the rich biodiversity and natural resources they provide. On a global scale, the World Conservation Union (IUCN) has recently estimated that 50% of these ecosystems have vanished from the face of the Earth. Even more disturbingly, this destruction of mires and peatlands continues at an increasing and alarming rate in all regions.

Therefore, it is extremely important that we keep these values of mire systems in mind, and that we acknowledge the clear benefits of managing such systems wisely. This is not merely on specific sites, but for the widespread and sustainable benefits that we can gain beyond the immediate mire system within the wider catchment, for example with regard to flood control.

However, to date, the activities of the world community with regard to wetland conservation can be said to have been focused too much on non-peatland habitats, with little direct attention given to mire and peatland systems. This will hopefully be improved in the future, on a national as well as on an international level. In this regard, our discussions here as well as during the coming days of the Sixth Meeting of the Conference of the Contracting Parties (COP) to the Ramsar Convention will be important stepping stones for improved and strengthened international efforts for the conservation and sustainable use of mires and peatlands.

Mires and Peatlands and the Ramsar Convention

The Ramsar Convention on Wetlands of International Importance is one of the international instruments available to promote mire conservation. Since 1971, over 90 nations have become Contracting Parties to this Convention. There is not space in this paper to go into detail on the role of the Ramsar Convention; however, the reader should refer to the paper in these proceedings by Clayton Rubec where he provides an overview of the draft Ramsar Recommendation 6.1 on the wise use and conservation of global mires and peatlands.

However, let me take you quickly through two central issues under the Ramsar Convention — (a) the Convention's definition of wetlands and (b) the criteria for identifying Wetlands of International Importance — in order to demonstrate that mire and peatland issues are highly relevant to consider under the Ramsar Convention.

First, how are wetlands defined under the Ramsar Convention? According to Article 1.1 of the Ramsar Convention, wetlands falling under the scope of the Convention are defined 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."*

Second, what are the criteria for identifying wetlands that should be considered internationally important? According to Article 2.2 of the Convention and a number of Ramsar Recommendations adopted at various COPs, a wetland should be considered internationally important if it meets at least one of the criteria given under one of the following three headings:

Representative or Unique Wetland:

- is a particularly good representative of a natural or near-natural wetland, characteristic of one, or common to more than one, biogeographical region; or
- is representative of a wetland which plays an important role in the natural functioning of a major river basin or coastal system, especially where located in a transborder position; or
- is a rare or unusual type of wetland in the biogeographical region.

Wetland for Plants or Animals:

- supports an appreciable assemblage of rare, vulnerable, or endangered species of plants or animals, or individuals of such species; or
- is of special importance for maintaining the genetic and ecological diversity of the flora and fauna of a region; or
- is of special value as a habitat of plants or animals at a critical stage of their biological cycle; or
- is of special value for one or more endemic plant or animal species or communities.

Wetland for Waterfowl:

- has over 20 000 waterfowl;
- has substantial numbers of individuals from particular groups of waterfowl; or
- has one percent of the individuals in a population of one species or subspecies of waterfowl.

It should also be noted that there is today a wide range of international opportunities available to address the conservation and wise use of mires and peatlands. This issue is also addressed in two of the operative points in the Trondheim Declaration.

The Trondheim Declaration — An International Statement on the Global Conservation of Mires and Peatlands

The International Mire Conservation Group (IMCG) is an international network of mire and peatland specialists who advise their national governments and individual scientists who are active in peatland ecology and conservation. The network also aims to provide help and guidance to nation states, organizations or individuals seeking an international perspective on mire conservation. For the last decade, this international network of mire and wetland scientists has been evaluating the ecological values, characteristics and status of mires throughout the World. The IMCG has organized a series of six conferences, entitled the International Conferences on Mire Conservation, towards this end.

The Sixth International Conference on Mire Conservation was held in Trondheim, Norway in July 1994 and was hosted by the Norwegian Directorate for Nature Management, the University of Trondheim, and the International Mire Conservation Group (IMCG). The participants, drawn from 23 countries, were prominent representatives of national wetland, mire and/or nature management programmes, as well as universities and research institutions.

At the Conference, which included a series of lectures as well as an extensive field trip in Central Norway, a more formal declaration was developed for consideration by national governments and concerned organizations or agencies having an international focus. This was called the "Trondheim Declaration". The full text of the Trondheim Declaration is included at the end of this paper as Annex 1.

The preamble of the Trondheim Declaration reiterates what is noted above, *inter alia,* on the many values and functions of mires and peatlands, the threats facing these ecosystems locally as well as globally, and on the importance of international cooperation.

In the Trondheim Declaration, the participants at the July 1994 Sixth International Conference on Mire Conservation, representing the global mire-wetland conservation, science and habitat management community make the following recommendations:

1. An international coordination office and function should be established to facilitate global mire conservation, to be housed with a major international wetland agency based in Europe. This should be funded and undertaken in cooperation with partner agencies and organizations and Contracting Parties to the Ramsar and Biodiversity conventions that have significant mire systems.

2. A series of informative publications should be produced for international distribution on the status of inventory, protection, and management of mires throughout the World. Such regional reports might include: Europe, particularly for countries with economies in transition, as well as tropical regions, Asia, North America, and the Southern Hemisphere.

3. Partner agencies and organizations should proceed with development of global and national Mire Conservation Action Plans. A particular focus area should be European countries with economies in transition. Implementation of the components of these Action Plans should be funded by nations and economic sectors that have historically benefited from mire resource use. The overall objectives of such Action Plans should include:

   (i) promoting the conservation and sustainability of mire functions and values through the implementation of global biodiversity objectives; and
   (ii) facilitating mire conservation commitments made by the nations of the World through their implementation of international and multilateral conventions, treaties and regulations.

4. Ramsar Contracting Parties should ensure that international mire conservation is a focus issue for discussion at, and the resolutions prepared for, the 1996 Sixth Meeting of the Conference of the Contracting Parties to the Ramsar Convention as well as forthcoming meetings of the Contracting Parties to the Biodiversity Convention.

5. Other international conventions, agreements and regulations be used effectively to support international mire conservation and management wherever opportunities arise.

6. Further strengthening of effective international cooperation and information exchange between those involved in mire conservation and resource use issues should be actively supported.

7. A key aspect of the conservation of the biodiversity of the World's mires is proper and thorough understanding of their ecology. Universities and governments world-wide should establish centres of excellence and ensure significant expansion of training experience for development of future generations of experts in all aspects of mire ecology and science.

Recommendation No. 4 in this Declaration is, in many ways, the starting point for a global initiative on mires and peatlands. It is a major reason for organization of the International Workshop on Global Mire and Peatland Conservation and why the Ramsar Sixth Meeting of the Conference of the Contracting Parties will include discussions on future work on the conservation and wise use of peatlands.

The Edinburgh Declaration of the Peatlands Convention

In 1995, the Edinburgh Declaration (Annex 2 to this paper) was adopted by delegates at the Peatlands Convention, which was held in Edinburgh, Scotland in July of that year. This international conference was hosted by the Scottish Wildlife Trust.

As with the Trondheim Declaration, the preamble of the Edinburgh Declaration also emphasizes the many values and functions of mires and peatlands, the threats facing these ecosystems, and the importance of international cooperation.

It should be mentioned, however, that the Edinburgh Declaration was developed largely within a European context. Therefore, let us now concentrate on the more general elements of the operative part of the Edinburgh Declaration. The Peatlands Convention strongly urged all those in a position to influence the future of the World's peatlands to act in five areas:

- support increased peatland conservation action through the Ramsar Convention;
- take the necessary action to secure the long-term conservation of globally important peatlands that are threatened by direct preventable damage;
- recognize the extent of damage to lowland raised bogs throughout the World;
- ensure that the present framework of policies designed to protect raised bogs of conservation importance are operated effectively and enhance these policies where an insufficient number of such protected peatland sites are available; and
- take effective steps to accelerate the research, development and marketing of peat-free growing media through the provision of significant levels of funding for research.

ANNEX 1: THE TRONDHEIM DECLARATION

An International Statement on the Global Conservation of Mires and Peatlands

Preamble

Mires and peatlands are among the World's most endangered ecosystems. These peat-forming environments are found throughout the World, from the subarctic and boreal regions of North America, Europe and Siberia to the tropical rain forests of Costa Rica, Zaire, and Indonesia, to Australia, and to the lowlands of Tierra del Fuego at the southern-most tip of South America. In some nations, as much as 90% of these important areas have been destroyed or significantly degraded resulting in a serious loss of the rich biodiversity and natural resources they provide. On a global scale, the World Conservation Union (IUCN) has recently estimated that 50% of these ecosystems have vanished from the face of the Earth. Destruction of mires and peatlands continues at an increasing and alarming rate in all regions.

Wetlands cover about five percent of the terrestrial and freshwater surface of the World. Of this wetland area, up to 60% is dominated by environments favouring peat-forming processes. Where these processes have not been completely destroyed, these ecosystems are commonly referred to as "mires", although they are also known by many other names around the World. Mires provide many of the critical functions of the World's wetland systems. These functions include provision of rich biodiversity and habitats; protection of water quantity and quality; ensuring provision of food, fibre and livelihood to peoples around the World who are dependent on natural resource-use; forming a major component in carbon cycling and long-term storage; as well as providing an archive and continuing record of cultural, climatic and environmental change.

However, to date, the focus of the World Community with regard to wetland conservation has been on non-peatland ecosystems. Global and national Mire Conservation Action Plans are urgently needed to promote conservation of mire ecosystems through nature protection, sustainable wise use, and management practices.

The Ramsar Convention on Wetlands of International Importance is one of the international instruments available to promote mire conservation. Since 1971, over 80[1] nations have become Contracting Parties to this Convention. The Wise Use Principles of the Convention call on its Contracting Parties to develop comprehensive wetland conservation policies and programmes for the full range of types and functions that wetlands provide. While

[1] 92 nations were Contracting Parties as of March 1996.

few nations have nominated Ramsar sites exclusively because they are mires, many of the wetlands of international importance are in fact wholly, or in part mire ecosystems. Hence, designation of mires as Ramsar sites is both consistent with and should be considered a commitment of the Contracting Parties to the Ramsar Convention.

In addition, a wide range of mire conservation opportunities have evolved through the implementation of other international conventions, treaties and regulations. The Biodiversity Convention in particular is emerging as the most prominent tool for implementation of sustainable development.

For the last decade, an international network of mire and wetland scientists has been evaluating the ecological values, characteristics and status of mires throughout the World. At the July 1994 Sixth International Conference on Mire Conservation held in Norway, the following declaration was developed for consideration by national governments and concerned organizations or agencies having an international focus. The participants in this Conference, drawn from 25 countries, are prominent representatives of national wetland, mire and/or nature management programmes, as well as universities and research institutions.

Declaration

The following declaration, hereafter to be referred to as the *Trondheim Declaration*, was adopted by the participants in the Sixth International Conference on Mire Conservation hosted by the Norwegian Directorate for Nature Management, the University of Trondheim, and the International Mire Conservation Group at Trondheim, Norway from July 4-15, 1994.

Representing the global wetland and mire science and management community, the participants in this international conference:

RECOGNIZING the serious degree of risk to global mire resources and their integrity;

AWARE OF the major commitments made by the World's nations (particularly Contracting Parties to the Ramsar Convention and the Biodiversity Convention) to creation and effective implementation of conservation policies and programmes for all ecosystems including mires;

AWARE OF the significant potential for mire conservation initiatives through programmes under the International Biodiversity Convention; the Ramsar Convention; the Global Convention on Climate Change; the Bonn Convention; the Berne Convention; the European Union's Birds Directive and Habitats and Species Directive; the IUCN Wetland Programme; the International Peat Society Commission on Land Use Planning and Environment; the wetland initiatives of the World Wide Fund for Nature; the Agreement on Conservation of Arctic Flora and Fauna; the UNESCO Biosphere Reserves Programme; and the joint actions of the International Waterfowl and Wetlands Research Bureau, Wetlands for the Americas, and Asian Wetland Bureau; and

CONCERNED FOR the future of wetland and mire programmes in the nations of Europe with economies in transition, in Tropical Regions, in Asia, in North America, and in the Southern Hemisphere; and

WELCOMING the leadership towards global conservation of biodiversity particularly in mire ecosystems as displayed by the Norwegian Directorate for Nature Management, the University of Trondheim, and the International Mire Conservation Group in supporting the Sixth International Conference on Mire Conservation;

RECOMMEND THAT:

1. An international coordination office and function should be established to facilitate global mire conservation, to be housed with a major international wetland agency based in Europe. This should be funded and undertaken in cooperation with partner agencies and organizations and Contracting Parties to the Ramsar and Biodiversity conventions that have significant mire systems.

2. A series of informative publications should be produced for international distribution on the status of inventory, protection and management of mires throughout the World. Such regional reports might include: Europe (particularly for countries with economies in transition), as well as tropical regions, and Asia, North America and the Southern Hemisphere.

3. Partner agencies and organizations should proceed with development of global and national Mire Conservation Action Plans. A particular focus area should be European countries with economies in transition. Implementation of components of these Action Plans should be funded by nations and economic sectors that have historically benefitted from mire resource-use. The overall objectives of such Action Plans should include:

   (i) promoting the conservation and sustainability of mire functions and values through the implementation of global biodiversity objectives; and
   (ii) facilitating mire conservation commitments made by the nations of the World through their implementation of international and multilateral conventions, treaties and regulations.

4. Ramsar Contracting Parties should ensure that international mire conservation is a focus issue for discussion at, and the resolutions prepared for, the 1996 Sixth Meeting of the Conference of the Parties to the Ramsar Convention as well as forthcoming meetings of the Contracting Parties to the Biodiversity Convention.

5. Other international conventions, agreements and regulations be used effectively to support international sustainable conservation and management of mires wherever opportunities arise.

6. Further strengthening of international cooperation and information exchange between those involved in mire conservation and resource-use issues should be actively supported.

7. A key aspect of the conservation of the biodiversity of the World's mires is proper and thorough understanding of their ecology. Universities and governments world-wide should establish centres of excellence and ensure significant expansion of training and experience for development of future generations of experts in all aspects of mire ecology and science.

8. The International Mire Conservation Group (IMCG) should be recognized as an appropriate expert group and international lead organization for the provision of scientific and management advice on the World's mire ecosystems. The IMCG further should work actively to promote and support international and national implementation of mire conservation programmes.

Signed by the participants at the
Sixth International Conference on Mire Conservation,
Trondheim, Norway
July 15, 1994

ANNEX 2: THE EDINBURGH DECLARATION

An International Resolution
Adopted by Delegates to the Peatlands Convention
Edinburgh, Scotland
July 1995

[Note: this text was subject to minor additional editing after the Conference — these changes may not be reflected below - ed.]

Preamble

The Peatlands Convention recognizes that the long-term future of peatlands around the Globe depends on cooperation and collaboration between many different interest groups. It is in the best interests of the World's peatlands for all those with an interest to work together rather than against each other. This is particularly important for the future of raised bogs in the United Kingdom.

The Peatlands Convention recognizes that peatlands are a unique and priceless part of the global ecosystem. They play an essential and irreplaceable role as centres of biodiversity, archaeological treasure houses; paleoenvironmental records; water reservoirs and regulators, and as carbon stores which play a fundamental part in stabilizing the composition of the World's atmosphere — storing carbon dioxide from the air. They are a valuable geological, geomorphological and mineral resource in their own right and are also central to the economic, cultural, musical, literary and artistic traditions of the many countries in which they are found.

Declaration

In recognition of these values, the damage that many of the World's peatlands have suffered and the threats that they now face in some areas of the World, the Peatlands Convention strongly urges all those in a position to influence the future of the World's peatlands[2] to:

(1) support increased peatland conservation action through the Ramsar Convention;

2. Especially international, national and local governments, governmental nature conservation, land-use and research agencies, landowners and managers, forestry and agricultural interests, mineral extractors (including peat producers), archaeologists and non-governmental environmental groups.

(2) take the necessary action to secure the long-term conservation of globally-important peatlands which are threatened by direct, preventable damage;

(3) recognize the extent of damage to lowland raised bogs throughout the World;

(4) ensure that the present framework of policies designed to protect raised bogs of conservation importance are operated effectively and that they are enhanced where insufficient such sites are available. To ensure that this objective is met, we urge governments and the European Commission to provide adequate funding for rehabilitation of degraded sites;

(5) take effective steps to accelerate the research, development and marketing of peat-free growing media through the provision of significant levels of funding for research and, in particular, through financial support from governments and the European Commission;

(6) support the immediate establishment of a *Peatland Forum* for the United Kingdom and Ireland, at which the legitimate interests of conservationists and the peat industry will be recognized and joint conservation strategies will be discussed;

(7) recognize that there are many individuals, organizations and interest groups that have a role to play in the conservation of peatlands and that it must be a central objective of the *Peatland Forum* to extend its discussions to encompass the interests of all these groups[3].

Endorsed by the participants at the
Peatlands Convention
Edinburgh, Scotland
July 27, 1995

3. Including local and national governmental, landowners and managers, local communities, forestry and agricultural interests, archaeologists, geologists, commercial horticulturalists, amateur gardeners, developers and mining companies (such as Scottish Coal).

ROLE OF PEATLAND RESOURCE USER INDUSTRIES IN FOSTERING CONSERVATION PARTNERSHIPS

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Secretariat, International Peat Society
Jyskä, Finland

Introduction

Let me first express my thanks to Mr. Clayton Rubec, chairperson of this meeting, who personally took the initiative to arrange a special mire workshop in connection with the Sixth Meeting of the Ramsar Convention. For the International Peat Society, it was especially important to get an invitation to this workshop, because it gives us the opportunity to meet representatives of important nature conservation bodies, such as the World Conservation Union, the International Mire Conservation Group and, naturally, representatives of the Ramsar Convention and many other peat-related organizations. Our interest is also focused on the Ramsar Convention, because in addition to traditional wetlands, the conservation of peatlands will also be discussed at the meeting. As a C-category member of the UNESCO, we wished to be an Observer in this major conference.

The objectives of this Workshop are well considered because there is urgent need to bring all the organizations dealing with the use and conservation of peatlands closer to each other to discuss the present conditions for the use of mires and peatlands. We are well aware that in many countries the utilization of peatlands for agriculture, forestry and other purposes has been quite extensive and thus has strongly affected mire ecology. On the other hand, there are still huge areas of untouched mires which have, until now, been saved from human disturbance.

Further Cooperation and Research Work is Needed

One major problem which needs to be solved and which makes interdisciplinary workshops important, is the lack of accurate information on the distribution of mires and peat soils, the amount of peat on the globe and carbon fixed in it, the rate of utilization of peatlands, the hydrological and climatic roles of peatlands, and need for their conservation. There certainly are a lot of publications in which the state-of-the-art situation of the World's peatlands is discussed, but this information is, regrettably, in many cases inaccurate and even conflicting.

As an example, let us consider two recent European publications that have been produced. The first one, an extremely valuable publication for everyone interested in the conservation and utilization of peatlands, was printed in Norway last year. The publication,

edited by Asbjørn Moen and entitled *Regional Variation and Conservation of Mire Ecosystems* contains papers presented at the Sixth Symposium of the International Mire Conservation Group, held in Norway in 1994. The other publication, *Northern Peatlands in Global Climatic Change* (Academy of Finland 1996), is the proceedings of an international workshop held in Finland in October 1995. In this book, the results of a five-year long research project *Carbon Balance of Peatlands and Climate Change* are presented.

Because I am not a researcher, my competence is not adequate to evaluate the scientific qualifications of these highly academic publications. However, after a cursory examination, I became very concerned about the conflicting data given in these two publications on the role of peatland utilization on global climate change. In the IMCG publication (Moen 1994), it is claimed that global peatland use is a major source of carbon in the World, whereas the results of the Finnish Academy's project (Academy of Finland 1996) indicate that drainage of peatlands for forestry appears to decrease the greenhouse impact.

This is an example to show that discussion, cooperation and further studies are inevitable in making reliable conclusions. An indispensable condition for the proper management of mires and for the consideration of different interests in their use is the necessity of absolutely neutral and unbiased scientific research work.

Discussion in Place of Campaigns

Let us examine another example which reflects the effects of inaccurate data largely given in the publicity on peatland utilization. The peat industry during the last few years has been an object of critical concern, especially in certain Central-European countries. Public discussion has to a great extent been focused on the peat industry, although its share in the utilization of peatlands is in most countries minimal in comparison with other uses of peatlands. There are many examples of anti-peat campaigns arranged in different countries, my homeland included, which have created a lot of myths especially with the public about the effects of peat extraction.

For instance, when industrial peat development was initiated in Finland in the early 1970s, owing to an effective anti-peat campaign, a fear quickly spread over the general public that the peat industry would destroy all the Finnish peatlands. The peat industry was regarded as a problem in the country where the original peatland area had been 10.4 million hectares, of which over five million hectares had been drained for forestry and nearly one million hectares drained for agriculture. In comparison, an area of only about 55 000 hectares is used for the peat industry even today, 25 years after the start of the peat development program.

Attacks against peat mining may negatively affect the industry, although peat extraction could bring, if objectively considered, in some cases positive contributions even from the mire conservationists' point of view. In Denmark, for instance, where reclamation of peatlands for agriculture has lasted centuries and destroyed almost all natural mires, as in many other Central-European countries, extraction of peat is regarded as the only way to restore the peatlands into

a natural mire again. An effective anti-peat campaign may, in the worst case, lead to uncontrolled closing of peat operations, when the alternative use of cutover areas (e.g. for restoration) may be permanently lost.

Anti-peat campaigns and the measures of nature conservation authorities have, on the other hand, positively influenced the thinking of peatland users and forced them to take environmental issues seriously into account. The knowledge of the peatland users in relation to mire conservation and protection of the environment from harmful emissions has remarkably increased and dialogue between the users and nature conservation bodies has increased.

A good example of positive progress for instance is Canada, where an exemplary preservation and reclamation policy for peatlands has been developed jointly with the regulatory authorities and the users of peatlands. In Finland, allocation of peatland resources became embodied in the *EYR Agreement*, that was drawn up by energy and environmental authorities and the peat industry in the beginning of the 1980s. The signing of this agreement has resolved major problems of peatland protection between the industry and conservation organizations in our country. A peatland forum has been recently established in the United Kingdom, in which voluntary bodies, the industry and other interested parties, can discuss ways in which to develop joint conservation strategies and to promote research, while at the same time recognizing the legitimate interests of conservationists and the peat industry.

Today in many countries, sites of special scientific interest are legally protected from all kinds of disturbance including industrial utilization. Peat production is carefully managed and the environmental impacts of peat mining are, at least in major peat producing countries, strictly controlled by the producers and the public authorities. An environmental impact assessment is a requirement for peat extraction in many countries. The "wise use of wetlands" concept of the Ramsar Convention is generally adopted by the peat industry and much attention is being paid to careful after use of cutover areas, restoration included.

The Role of the International Peat Society

Let me briefly tell you about the goals and activities of the International Peat Society (IPS). The IPS was constituted in Quebec, Canada in 1968, so it is about to celebrate its 30th anniversary. The Secretariat of the Society is located in Jyväskylä, Finland. The IPS is an international, non-governmental organization, which links scientific, technical and commercial organizations interested in the study and utilization of peat and peatlands. Its principal aim is to promote cooperation between universities, research institutions, industry, governmental and other organizations and individuals dealing with the study, conservation, restoration and use of peat and peatlands for agriculture, forestry, horticulture, energy, environmental protection, balneology, medical and other purposes. As of January 1, 1996 the IPS had 1237 members in 32 countries.

The IPS promotes international congresses and symposia and produces publications in related fields. The next event, the 10th International Peat Congress, is being held at the end of May, 1996 in Bremen, Germany. The 11th International Peat Congress will be held in Quebec City, Canada in August 2000 and the 12th Congress will likely be held in Finland in 2004. Between the congresses, some smaller symposia and workshops will be arranged. The next one — an international conference on "Peat in Horticulture" — will be held in Amsterdam, The Netherlands in November 1997.

The International Peat Society is often identified with the peat industry, which is only partly the case. It is true that the peat industry plays a central role in the financial status of the Society because of the industry's better financial capacity. This does not mean, however, that the Society is the same as the peat industry. The six Commissions of the IPS deliver its activities. Only one commission represents the peat industry and the others are managed by universities and research institutes representing geology, ecology, conservation, agriculture, forestry, chemistry, physics, land use planning, medicine and balneology.

Utilization of peatlands has occurred throughout historical times and peatlands still will be exploited for different purposes in the future. It has been demonstrated to be useful to discuss at the same forum all the problems related with peatlands. The Society prefers this model to separating each interest group from one another without having any contacts, because such an approach is harmful for everyone and ultimately causes damage to the common goal of wise use of peatlands, conservation included.

Global Peat Resources

Earlier, it was noted that there is a lack of accurate data on peatlands. Another difficulty is that available information is dispersed in many publications. This is why IPS started in January 1993 a project to collect peat and peatland information into a unique publication. Now this project is in the final stage; the book entitled *Global Peat Resources* (Lappalainen 1996) is at press. The creation of the book is a joint effort of over 60 peat and mire experts from all over the World. The project has been completed within the framework of Commission I of IPS. The Editor-in-Chief is the State Geologist for Finland, Dr. Eino Lappalainen of the Geological Survey of Finland. [The book was released at the 10th International Peat Congress in Bremen, Germany in May of this year — ed.]

The 10th International Peat Congress in Bremen will be open to all interested persons. Continuation of the Global Peat Resources Project presents another opportunity for the useful concentration of intellectual capacity. We know that the book *Global Peat Resources* will be by no means the last word in relation to mire information. There is need for standardization of terminology and concepts and also collection of more detailed data on peatlands. This can be reasonably done only by the aid and efforts of many contributors. The aim is to continue the Global Peat Resources Project as far as possible to supplement our data bank and update the information collected during the next four years. The next examination of the results will take place in 2000 at the 11th International Peat Congress in Quebec.

Conclusion

The IPS is open for cooperation with every organization interested in the study and use of mires whatever their purpose may be. The Society does not claim that all the wisdom on peat and peatlands is concentrated within the IPS. However, cooperation is needed to coordinate research activities in a way that saves time and money. By the joint efforts of different interest groups, we get stronger financially, which is necessary in such a large task as charting the global peat resources. The closer peatland user organizations and conservation bodies work together, the quicker we can establish national and international principles of wise use of peat and peatlands.

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INTEGRATED CONSERVATION AND SUSTAINABLE UTILIZATION OF TROPICAL PEATLANDS IN INDONESIA

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Introduction

One of the natural assets utilized for national development is the biological resources known as biological diversity. Biological diversity is one of earth's most valuable assets, the foundation of sustainable development. The genes, species and ecosystems that comprise biological diversity underpin economic development and human well-being everywhere. As the World's economic development continues to accelerate, natural habitats and biodiversity are being eroded directly or indirectly. Existing programs have identified many conservation needs and constraints but have so far failed to appreciate the value of biodiversity and give result to the loss of biodiversity. Much of the biodiversity loss in developing countries is due to economic policies that encourage rapid, rather than sustainable, exploitation of biological resources. Both international and national economic development policies (such as international trade tariffs and government subsidies for extensive agriculture) lead to depletion of biodiversity.

Within various wetland classification systems, peatlands have been categorized into freshwater wetlands under the palustrine group. Indonesian peatlands consist of emerged peatland, including acidophilous, ombrogenous or saligenous mires, covered by moss, herb or dwarf shrub vegetation; fens of all types; and forested peatlands including peatswamp forest. The leaf litter in this type of forest has accumulated to form a layer of peat, sometimes up to 20 metres thick. The peat is acidic and its surface form is often dome-shaped, so that the only input of water is from precipitation. The peatswamp forest has a relatively high diversity of tree species compared to mangrove forest. It has an average of 30 to 55 tree species per hectare. The wildlife on these ecosystems remain rather poorly known.

Peatlands are important as watershed areas. Extensive areas of peatland forest and melaleuca forest create natural reservoirs that can absorb and store excess water and reduce flooding in adjacent areas. Peatlands and other types of wetland areas, have long been undervalued. Communities and government simply gave them away for other purposes or other types of land use, without conducting proper assessment on actual or potential adverse impacts on the environment. Primarily, this has been for conversion to fulfil the growing population demand for dry, arable land occurring in wetland areas. Drainage, reclamation, and landfills are

common practices resulting in wetland conversion. These practices of land use, if uncontrolled on a non-sustainable basis, may cause serious problems to the environment and the quality of life of all communities.

Recently, peatlands have received considerable attention, especially regarding the issues of expansion and intensification of agricultural land uses, development of settlements for the transmigration program, and utilization of peat as an energy resource. Agricultural development requires land conversion in order to fulfil the ever-growing demand for arable land for cultivation. Population growth also requires more land conversion to provide housing or settlement, space for social activities, space for movement, and other public facilities as well as industrial areas.

Peatlands and the Importance of their Existence

Ecosystems, Functions, Products and Attributes

Peatland ecosystems maintain the sustainability of various lifeforms and contain many invaluable genetic resources for agricultural needs, food crops, horticulture, timber, fisheries, livestock, and for other biotechnological progress. Peatlands have been providing goods and services for traditional communities to fulfil their daily or basic needs. Peatswamp and peatlands have also long been hunting grounds and fishing areas providing food and other livelihood needs. In the boundary area of peat domes for example, subsistence dry land cultivation has been carried on by traditional communities for generations. Timber estates also arose in the peatland areas in Sumatera, Kalimantan and Irian Jaya, providing employment, local income, new jobs or business opportunities and contributing to the national stock of foreign exchange. Some traditional communities, as in Sumatera and Sulawesi, live in harmony with peatland ecosystems.

The importance of peatland ecosystems can be valued according to their functions, products and attributes. Peatland functions are either direct or indirect. Direct functions of peatlands are their role in water flow regulation, protection from natural forces, recreation and education, and as production areas for traditional communities to obtain food and other needs. Indirect (ecological) functions of peatlands are their role in sediment retention, nutrient retention, and microclimate stabilization. Peatland products include: (a) provision of water supply to other ecosystems; (b) forest resources ranging from fuelwood, timber and bark to resins and medicines; (c) habitat for wildlife resources; (d) agricultural resources; and (e) energy resources.

Attributes of peatlands are the values of these peatlands for products other than those that can be derived directly from functions that closely relate to the maintenance of environmental quality. Such attributes of peatlands are: (a) biological diversity (i.e. peatlands are also important as genetic reservoirs for certain plant species, especially those that are related to food crops); (b) uniqueness to culture and heritage; and (c) habitat for the lifecycle of flora and fauna.

Peatland Distribution

The areal extent of Indonesian peatlands is between 16.5 to 27 million hectares. This range in estimated area is partly due to application of different definitions of peat (in relation to peat thickness). Peatland and peatswamp are dominant landscapes in Sumatera, Kalimantan and Irian Jaya (see Figure 1). The areas of peatland on these islands make up to 99.5% of the total peatland area in the country. Sulawesi has 34 000 hectares or 0.2% and the Maluku Islands have 42 000 hectares or 0.25%. In Sumatera, this ecosystem (4.6 to 7.4 million hectares) is found mainly on the east coast of North Sumatera down to South Sumatera. In Kalimantan, this ecosystem covers 3.5 to 5.6 million hectares, mainly along the west coast of Kalimantan, the central part of Kalimantan Tengah and in some parts of Kalimantan Timur. In Irian Jaya, peatlands occur mostly on the south coast and some fringes of the southwest coast with a total area of 8.7 to 13.9 million hectares.

Aspects of sustainable management of peatlands consist not only of the physical distribution of surface area of the peatlands, but also the distribution of peatland resources (i.e. biological resources, human resources, knowledge, technology and financing and/or investment). The increasing importance of the management of these ecosystems is the focus of guideline principles of a national strategy on the management of biodiversity.

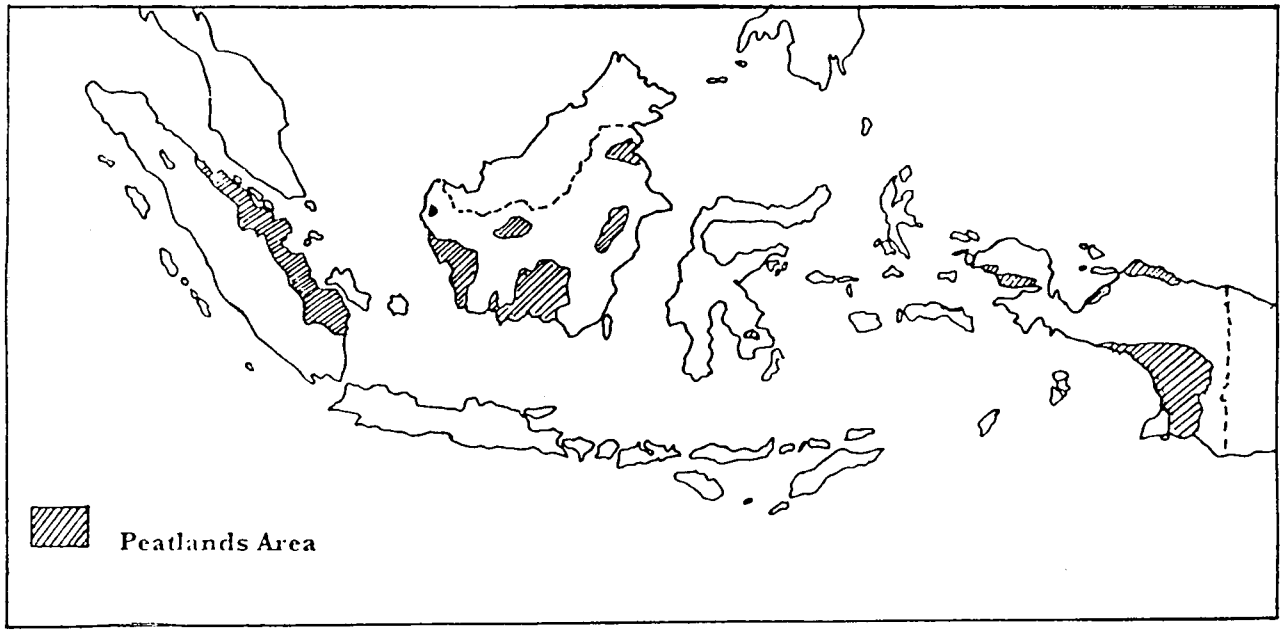

Figure 1: Peatland Distribution in Indonesia

The Need for Environmentally Sound Management of Tropical Peatlands in Indonesia

The Potential of Tropical Peatland

The major wildlife species existing in peatland ecosystems usually dwell in the forested area or the peatswamp. The forest and peatswamp are home to many rare and endangered wildlife species such as sumateran tiger *(Panthera tigris sumateranus)*, tapir *(Tapirus indicus)*, asian elephant *(Elephas maximus sumateranus)*, asian two-horned rhino, one-horned lesser rhino, otter-civet, kalimantan honey-bear, wild boar, swamp cervus, orangutans and hundreds of bird species, including cassowaries, megapodes and hornbills.

Peatland forests are also an important source for sustainable forestry with many commercially valuable timber products. The commercial timber species of peatland forests include ramin (*Gonystylus* spp.), meranti (*Shorea* spp.), and local timber such as cratoxyllum and innophyllum. Other important non-timber products of these ecosystems are rattans, resins, scented woods and fruits (e.g. durians). Because of the high acidity of peat soil and problems encountered in drainage and other land preparation, peatland is of only limited agricultural use.

Peatland ecosystems play an important role in the hydrology of a river catchment area. Peat has superior water-holding capacity, as much as 300% to 800% of its dry weight. Therefore, its water-losing capacity is also quite high. In this context, the existence of peatland in every river catchment area, especially where peat thickness is more than three metres, is very important to water preservation. Moreover, there are cities in the outlet regions of these river catchment areas. Any alteration to the peatland land use in the upper part of such a river catchment area can lead to serious problems downstream on the stability of these cities.

Potentially, the peat biomass of Indonesian peatlands holds an energy resource estimated to equal 65 thousand million barrels of oil. This energy potential places Indonesia at the forefront of countries having peat resources for energy. In Indonesia, preliminary experiments have been conducted to mine and utilize peat as a fuel for power plants and a medium for transplantation in nursery of agriculture and forestry species.

Common Practical Problems

The future holds a great and complex challenge as a result of population growth that will create a need for more food and other basic needs. More arable land will be needed to support the increase of food production and raw materials for industry. In addition, there is also more land becoming infertile as a result of negligent practices of cultivation and ignorance of environment function. This infertile land (commonly known as degraded or marginal land) is ever increasing in number and extent. Estimates of total area of marginal land in 1984 in Indonesia were 10.3 million hectares and expanding at an annual rate of 150 000 hectares. In contrast, the rehabilitation program can only cover 250 000 hectares annually. Sometimes this degraded cultivated land is still more fertile than peatland; with proper management these lands

could regain their original productivity. However, ownership and land tenure problems sometimes become major obstacles in reutilizing this land to meet the demands for the extension of cultivation and transmigration areas.

Alteration of peatlands by removing vegetation cover (as in the development of agriculture land, preparation of transmigration settlements, clear-cutting practice, provision of public facilities, and development of industrial areas) can cause more serious effects to the surrounding ecosystem than comparative removal of vegetation on relatively dry terrestrial ecosystems. A change in microclimate, such as an increase of the evaporation rate, or change in the biomass decomposition, water content or acidity of peat, may have more adverse or negative impacts than the expected benefits. The organic and inorganic waste washed out to the drainage system may cause considerable environmental pollution. The most serious pollution is biocide intervention to the hydrological systems as a result of improper cultivation and production practices. This biocide is easily transferred and retained in the biomass of peat and can enter the human foodchain system.

There are many interests concerned with wetlands in Indonesia, including the government, private and public sectors. The existing policies and legislation do not cover ownership and right of access. This situation has caused the uncontrolled utilization of wetlands in the country. Other conflicts of interest also occur in the context of utilization versus conservation (in terms of benefits) and exploitation (e.g. through direct benefits such as money). The lack of knowledge and information and the important value of wetlands in their natural condition is the main cause of this situation.

Analysis of Status and Trends

Up to now, there has been no attempt to study the background and history of Indonesian wetlands. From the human point of view, such as demography, there has been no study related to the status and trends of wetlands. Even further behind, there are no analyses from the point of view of economic status, human capacity, natural resources management and delegation of responsibilities.

Except for those wetlands located in the protected areas, there is no assurance that wetlands will be wisely used. There is even a tendency to the view that the rights of utilization are determined by the power of the constituents. As is noted above, there are no specific policies and legislation that regulate the conservation and utilization of Indonesian wetlands.

Peoples' attitudes, the level of their knowledge of biodiversity and its management, and their awareness of the values, consequences and impacts of their activities and lack of proper management, are among the major threats that endanger the sustainability of biodiversity of all levels. The alteration of certain habitats into other uses, such as from forest into resettlement or agricultural areas, from wetlands into industrial areas, and from agricultural land to golf courses, in many cases has not taken the existing biodiversity into consideration. Consequently, many of the resources are threatened with degradation. These problems are not simple to solve

since this matter will involve many sectors and aspects — government policy, and private or business and peoples' attitude.

Criteria for Conservation and Sustainable Utilization

In its implementation, the management of biological resources and their ecosystems will require effort to ensure their sustainability. This can be partially done by monitoring the threats that endanger the sustainability of biological resources and their ecosystems. The kinds and sources of threats have to be determined, such as the excessive and uncontrolled utilization, alteration and damage to the environment or habitats, *inter alia* by pollution and conversion of land use due to policy uncertainty and so on. The causes of each threat have to be determined so that further consequences can be expected, a plan for facing the problems can be anticipated, and the remedy can be formulated.

Methods for sustainable utilization have to be developed that will guarantee the continuous provision of available assets. In these methods, a controlled rate of utilization is the key to their success. The use of economic incentives to promote conservation of biological resources and particular ecosystems at the community and national levels have been discussed at length by some experts. The Indonesian national strategy with action plans has been used as the principles for this method of utilization. Sustainable utilization and the fair and equitable sharing of the benefits of biodiversity components will come to realization through the commercialization of these assets, because this is one of the most realistic and sensible ways to proceed.

We realize that our knowledge of Indonesian biodiversity is not comprehensive. For better results and for implementing the sustainability of utilizing biodiversity assets, there are aspects that have to be explored. For Indonesia, these include: components that have been and are being presently utilized, how these are being utilized, the status and condition of these components, the problems being faced, and how these components of biodiversity are being managed. Knowing the situation is important because this will determine the right institutions and the mechanisms for the improvement in the management of biodiversity, especially for sustainable commercialization.

A Strategy for Environmentally Sound Management of Indonesia's Tropical Peatlands

Concepts for the Strategy

A strategy for the management of wetlands including peatlands therein, is a general policy instrument, as one of the steps in the process of planning the preservation, understanding and sustainable use of wetlands. This strategy is a guideline for achieving the goals and objectives of sustainable management. However, the strategy does not stand by itself. It has to be complemented with action plans that are specific frameworks for the implementation of the

strategy. Therefore, action plans should be designed to be comprehensive, achievable, integrative, dynamic and explicit as a statement of commitment.

The guiding principles of the strategy are:

(a) *Science and technology* — sustainable utilization and development of biodiversity and its components have to be based on the support of science and technology.

(b) *Diversification of utilization* — biodiversity resources will enable the expansion of utilization on the broad foundation of genetics.

(c) *Integrated management* — every executing activity has to do its duty and function at the maximum level and do its best to act optimally in relation to other activities in coordinated ways.

A strategy on the management of peatlands should be formulated to cover the following points:

- The strategy on the management of peatlands should be in accordance and refer to the *National Strategy on the Management of Biodiversity* and the *National Strategy on the Management of Wetland Ecosystems*, as one step in the process of planning the preservation, understanding and sustainable use of wetlands.
- The objectives of this strategy should be comprehensive, reflecting all national aspirations, yet be consistent with the goals and objectives stated in national laws and policies, and international agreements.
- This strategy has to be followed with action plans which are specific frameworks for the implementation of the strategy.
- Both the strategy and its action plans should imply the general processes that are applicable at a regional/provincial and local context to cover all levels of users (communities, private company, and local government), and all ecological types and regions.

The strategy and action plans have to define specific objectives and determine firm boundaries, and these objectives and boundaries have to be realistic options faced by policy makers. The strategy and action plans should also identify the current status and trends, analyze key problems and opportunities, draft various options for action, and conclude with a set of proposed actions that are deemed most likely to succeed in meeting the stated objectives.

National Policy and Regulation

Article 33, Paragraph 3 of National Constitution (1945) states that "Land and water and natural resources contained therein, are owned by the State and to be used for the utmost of the people's welfare." In the Sixth Five-year Development Plan, environment, with the natural resources (including biodiversity), received ample attention for its management and conservation. Sustainable development are the key words for Indonesian environmental management. Development can only be carried on if the sustainable functions of the ecosystems are guaranteed. It is thus the government's policy that environmental development is aimed at improving its quality, and promotes sustainable utilization, rehabilitating damaged environments,

and controlling pollution. Efforts on the conservation of forests is continually improved to protect biodiversity contained therein. Spatial arrangements are developed to harmonize the use of land, water and other natural resources. To attain these objectives, peoples' awareness has to be enhanced as well.

However, for the management of wetlands as natural resources, there has not been any specific law or other legal instrument established. Indonesian *Act Number 4 of 1982 on the Basic Provision for Environmental Management* envisaged that, in principle, the management of the environment is based upon the sustenance of the capability of the harmonious and balanced environment to support sustainable development for improvement of human welfare. Since the National Constitution and laws for the management of natural resources are not specifically established for wetlands, including peatland therein, sustainable utilization of these ecosystems is still under the same policies of the environmental law.

The conservation and utilization of living (biological) resources as integral parts of environment are regulated by *Act Number 5 of 1990 on the Conservation of Biological Resources and Living Ecosystems*. The term "conservation" in this *Act* consist of three meanings: preservation, protection and sustainable utilization. "Preservation" means that genetic resources contained in the wild relative of a cultivated plant should be preserved within its natural ecosystem (*in situ*) to ensure the safe propagation and sustainability of products. "Protection" means that any ecosystems that have important and key roles in maintaining environmental quality should be preserved and gazetted as protected areas where no production activities other than sustainable practices are allowed. "Sustainable utilization" means that the present and future generation should benefit from the utilization of biological resources and their ecosystems equally to foster national development. Therefore, the peatland ecosystem as a biodiversity component should be managed in accordance with the provisions envisaged by these Acts.

The regulation specifically controlling the utilization of protected areas is *Presidential Decree Number 32 of 1990*. In this decree the criteria for the designation of peatlands as protected areas are explicitly mentioned. Peatlands with peat thickness more than three metres, located on the upper part of river systems and/or in swampy areas that outflow to river systems running through cities or other important sites, should be designated as protected areas.

The Government has issued several policies that support the sustainable management of biodiversity. The *Indonesian National Strategy on the Management of Biological Diversity*, the *Biodiversity Action Plan*, the existing acts and regulations on forestry, agriculture and the components of biodiversity, the *Integrated Protection Areas System Programme* and other programs that cover education, research and development and human resources development, have slowed down the pressures on the unwise utilization of biodiversity. Efforts on sustainable utilization of biodiversity have been the growing policy of the Government. This policy will embrace all sectors to work hand-in-hand to manage the country's wealth properly. In many cases, these efforts have gone beyond expectations. Instead of only maintaining ecosystems, activities have expanded to rehabilitation. Rehabilitating the damaged environment has been the campaign promoted by government as well as non-government organizations.

National Institutions

As far as environmental quality improvement is concerned, the Government has been deeply committed. The establishment of the State Ministry of Environment (that was organized out of the Ministry of Development and Environment through the Ministry of Population and Environment) has proven that the Government is giving serious concern for the management of the country's environment. However, some factors mainly rooted in people themselves (e.g. the level of education, economic level) and the industrial sector (that tend to violate or at least neglect the laws and regulations), have perpetually caused a great number of problems for environmental, including biodiversity, management.

The Department of Forestry is in charge of the management of forest biodiversity, including wild species and ecosystems, and is responsible for the sustainability of the forest and its resources. The Department of Agriculture in biodiversity management is specializing in the conservation and utilization of the genetic resources of domesticated and cultivated plants and animals. The Department of Home Affairs is in charge of the national administration and development as well as at the regional level. Since the actual implementation of the programs takes place at the local level, this department is also involved in the management of biodiversity at the local level and is, thus, responsible for the safety of biodiversity found in the regions under its jurisdiction. Other institutions within the government sector that are responsible for the management of biodiversity are the local governments dealing with biological resources and area/spatial management where biodiversity is located. The National Development Planning Board is also responsible for the management of biodiversity in the aspects of planning, coordination and budget allocation.

Considering many parties are interested and involved in the utilization of wetlands, and many conflicts of interest have been raised, a Committee for the Integrated Management of Wetland Ecosystems has been established under the auspices of the Minister of Forestry. This committee has a mandate to coordinate activities, with members from the government sector and non-government organizations. This committee is empowered by the Minister of Forestry, through the Directorate General of Forest Protection and Nature Conservation to coordinate measures in solving the problems arising from the utilization of natural resources and ecosystems of wetlands. This includes the surrounding areas that have influences on wetlands. The committee also develops and determines criteria for the management of natural resources and ecosystems, according to the National Strategy. Further, it develops and determines procedures on the management and control of the conservation and utilization efforts, and examines the problems and gives guidance/direction to solve the problems from the utilization of wetlands.

The State Ministry of Environment as a coordinating body, together with related departments, government institutions and non-government organizations with expertise in the management of wetlands, is now in the process of finalizing a *National Policy and Strategy on the Management of Wetland Ecosystems* and *Action Plans*.

Conclusions

1. Peatland ecosystems maintain the sustainability of various lifeforms and contain many invaluable genetic resources for agricultural needs, food crops, horticulture, timber, fisheries, livestock, and other biotechnology progress. Peatlands have been providing goods and services for traditional communities to fulfil their daily and basic needs. Peatswamps and peatlands have long been hunting grounds and fishing areas providing food and other livelihood needs.

2. The major wildlife species existing in peatland ecosystems usually dwell in the forested area or the peatswamp. The forest and peatswamp are home to many rare and endangered wildlife species. The unique peatland ecosystem holds the wealth of genetic resources capable of accommodating severe limited environmental stresses. These genetic resources are very important as a genetic material reserve for the development of plant and livestock in marginal areas.

3. The existence of peatlands in every river catchment area, especially where peat thickness is more than three meters, is very important to be preserved. Moreover, there are cities in the outlet regions of these river catchment areas. Any alteration to the land use in the upper part of these catchment areas can lead to serious problems for the stability of these cities.

4. Scientific and technical knowledge should be established as the basis for peatland conservation and sustainable utilization. Technology for peatland management should be developed by the integration of multidisciplinary sciences, so that peatlands can be addressed properly as ecosystems and resources. Experience from other countries that already are acquainted with utilizing peatlands should be studied and explored continuously through institutional linkages and directed programs for cooperation.

5. The management of peatlands and peatswamps that are marginal and fragile ecosystems, requires careful planning, utilizing and applying appropriate technology, land development in balance with the surrounding environment, and suitable soil and water management. Spatial planning and environmental impact assessment should be conducted carefully and thoroughly before any activities that can lead to the alteration of the natural conditions of these peatlands, carried out inside peatland ecosystems or in the surrounding area.

6. Since the National Constitution and laws for the management of natural resources are not specifically established for wetlands, sustainable utilization of these ecosystems is still under the same policies for other environmental provisions. The legal basis for the management of biological resources contained therein is under the *Act on the Conservation of Biological Resources and their Ecosystems*.

THE RAMSAR CONVENTION RECOMMENDATION ON GLOBAL MIRE AND PEATLAND WISE USE AND CONSERVATION

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Introduction

As part of the deliberations for the Sixth Meeting of the Conference of the Contracting Parties to the Convention on Wetlands of International Importance, a Conference Recommendation (No. 6.1) was adopted at the meetings in Brisbane, Australia in March 1996. This text was jointly submitted by the Governments of Canada, Norway and the United Kingdom. Drafts of the text of this Recommendation were developed by the three governments with specific reference to the previous conferences on peatland interests held in Norway (International Mire Conservation Group 1994), Belgium (International Peat Society 1995), and Scotland (Scottish Natural Heritage 1995) (as discussed in these Proceedings in the paper by Nord-Varhaug).

The final text which follows was discussed at the International Workshop on Global Mire and Peatland Conservation held in Brisbane, Australia on March 18, 1996 and subsequently underwent minor revisions at the Ramsar Meetings in the following March 19-27, 1996 period.

RECOMMENDATION NO. 6.1 ON THE CONSERVATION OF PEATLANDS
(submitted by Canada, Norway and the United Kingdom)

CONVENTION ON WETLANDS OF INTERNATIONAL IMPORTANCE
ESPECIALLY AS WATERFOWL HABITAT
Sixth Meeting of the Conference of the Contracting Parties
Brisbane, Australia: March 19-27, 1996

1. CONSIDERING that peat-dominated wetland systems, known as "peatlands", including bogs, carrs, mires, "bofedales", peatswamp forest, and other similar terms are important wetland types hitherto under-represented in the work of the Convention;

2. RECALLING that peatlands are included in the Ramsar Convention *Classification System for Wetland Types* (Annex 2B to Recommendation 4.7) under several Inland Wetland types;

3. AWARE of significant international interest in promotion of the wise use and conservation of peatland ecosystems and their associated natural resources, as exemplified by the Trondheim Declaration of the 1994 Sixth Symposium of the International Mire Conservation Group held in Trondheim, Norway; the 1994 International Peat Symposium sponsored by the International Peat Society held in Brussels, Belgium; and the Edinburgh Declaration of the 1995 Peatlands Symposium sponsored by the Scottish Wildlife Trust held in Edinburgh, United Kingdom;

4. RECOGNIZING that peatland resources and associated peat products are of significant environmental and economic value to many nations in all regions of the world;

5. FURTHER RECOGNIZING the significant contributions to global peatland conservation by international groups such as the IUCN Ecosystem Management Group, Wetlands International, and the International Mire Conservation Group;

6. WELCOMING national policy documents that incorporate the principles of wise use of wetlands and sustainable development as well as letters from several Contracting Parties (including Norway and Canada) transmitted to the Ramsar Bureau supporting the need for international action on the wise use and conservation of peatlands;

7. FURTHER AWARE of concerns for ongoing degradation and destruction of peatland systems in many areas of the world due to a wide range of land uses, including agricultural and urban development, forestry, energy development and horticultural harvesting of peat; and

8. NOTING the proposal to identify peatlands in the Ramsar Convention's *1997-2002 Strategic Plan* (Action 6.2.3) as 'under-represented wetland types' in the global network of wetlands of international importance;

THE CONFERENCE OF THE CONTRACTING PARTIES

9. CALLS ON Contracting Parties to maintain or give priority to the inventory and evaluation of peatlands in their territories and, where appropriate, to nominate additional peatland ecosystems as Ramsar sites consistent with Resolution 5.6, Section II.1 on wetland inventory as adopted at the Kushiro Conference;

10. URGES the development, adoption and implementation of regionally based peatland management guidelines such as the *IUCN Guidelines for the Sustainable Utilization and Integrated Management of Tropical Peatlands*;

11. RECOMMENDS that the *Wise Use Guidelines* of the Ramsar Convention, particularly development and implementation of national policies for wetland conservation, the evaluation of measures taken, the regular monitoring of the status of these ecosystems, as well as the promotion of scientific research, be fully applied by Contracting Parties for all their wetlands, including peatland types within their borders and such wetlands shared along international borders, particularly in boreal, temperate, and tropical latitude biogeographical regions;

12. FURTHER RECOMMENDS the expansion of international mechanisms for coordination and cooperation for peatland conservation initiatives and programmes by Contracting Parties; and

13. ENCOURAGES support by Contracting Parties for research programmes particularly on peatland functioning and on restoration of degraded peatland ecosystems, for international networks for peatland training and education, and dissemination of the results of research on peatlands to Contracting Parties.

INTERNATIONAL COORDINATION NEEDS AND CONCEPTS FOR A GLOBAL ACTION PLAN ON MIRES AND PEATLANDS

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Introduction

The Ramsar Convention is concerned, first and foremost, with wetland *protection* and *wise use*. Given this focus, and before considering the particular relationship between Ramsar and the World's peatlands, or mires, it is probably therefore worth looking at some areas which are, arguably, better protected from future development than almost anywhere else in the World. Perhaps there are lessons to be learned from these places. They are safe, and speculators or developers know they are safe, even though the potential development value of such areas in monetary terms may represent some of the most valuable real estate in the nation.

Hyde Park is one of the great open spaces of London, and yet properties which adjoin it in Mayfair have small flats which can cost more than £1 million for only a five-year lease. The theoretical development potential of Hyde Park probably runs into billions of pounds, yet it shares with places such as Central Park in New York and Tiantan Park in Beijing a degree of security from urban or industrial development that would be the envy of many wildlife reserves around the World. Even in times of great economic gloom, or boom, it would be difficult to imagine any Mayor of New York running for re-election under the slogan "Down with Central Park! Up with office blocks!"

The reasons for the original establishment of many of the World's great city parks are complex and generally rooted in early legal statute or ancient custom, but an explanation for the long-term security which they continue to enjoy can be found in a few basic factors. These factors have much of relevance to the problems of peatland, or mire, conservation throughout the World today, and it is thus worth examining them further.

City parks, such as Central Park or Tiantan Park, are probably safe for at least the foreseeable future from all the dynamic urban development going on around them because: *firstly*, they are important to many people in a direct way:

- Some, such as the gardeners and stall vendors, make their living directly from the park, but the number involved is often quite small.
- A very much larger number use the park for recreational or "non-office" purposes; there

are the joggers, the *tai-chi* exercisers, the sunbathers, or even the business people who simply want a change of scene from the office to help stimulate an informal discussion or business meeting.

secondly, these parks provide a number of indirect services:

- they have long been known as the "lungs of the cities", providing havens and tranquil green spaces in which to get away from the more concentrated levels of noise and atmospheric pollution in the city;
- often these parks will lie relatively empty for long periods of the day, or even for several days at a time, but it is nevertheless important for many people to know that they are there and that they can be visited — as I believe Ralph Waldo Emerson observed: *"wilderness is important to us, simply to know that it exists."*

finally, but by no means least, these places are part of the city's culture:

- Central Park is as much a part of New York as are the Statue of Liberty and the Empire State Building; the Temple of Heavenly Peace in Tiantan Park is one of the famous symbols of Beijing; the Serpentine in Hyde Park is one of the focal points of a hot London summer.

It is almost unthinkable that permission would be granted to destroy such places either for private gain or even for the public good, so popular and highly regarded are these places. People are fond of their parks.

What a contrast to the traditional view which we find in relation to peatland biotopes. Unlike lakes, rivers and shorelines, the bogs, fens and swamps of the World have featured in the culture of western economic development only as "waste" land which is uneconomic, dangerous, or both. This has occurred to such an extent and for so many centuries that a cultural "blind spot" has developed around peatlands, a blind spot which has only shown signs of disappearing since the early 1980s.

As recently as 1984, a colleague in the official conservation agency for Britain explained that he had "been through Caithness and Sutherland on the train" and saw little of conservation interest in the area. Yet by 1991, Finlayson and Moser (1990) were listing the peatlands of Caithness and Sutherland as one of the "major wetlands in Europe and the Mediterranean", while the 1995 Dobris *Assessment of Europe's Environment*, produced by the European Environment Agency, identifies the peatlands of Caithness and Sutherland as one of the largest "internationally important peatland sites in Europe". Surprising though his comments may seem now, my colleague was merely and accurately reflecting the widely-held beliefs of the time — that peatlands were generally rather uniform, extensive, and of limited nature conservation value.

Even such wetland-oriented instruments as the Ramsar Convention have not escaped from this cultural myopia. Although peatlands feature explicitly in the earliest origins of the Ramsar

Convention, and peatlands represent a relatively high percentage of the World's wetland ecosystems, the percentage of Ramsar sites which have been put forward for their peatland interest is surprisingly low. Although some Contracting Parties have designated significant numbers of peatland sites, overall the tendency has been to under-represent peatlands compared with other wetland interests. This anomaly is acknowledged in the Ramsar *Strategic Plan* (Action 6.2.3).

The mechanisms are there in Ramsar; it is simply necessary to remove these old cultural blinkers and refocus attention and actions more onto peatland systems until the current historical imbalance is corrected.

This is easy enough to say, but what does it mean in practice? In fact all the ingredients needed for a successful peatland program are already contained, in one form or another, within the proposed Ramsar *Strategic Plan* for 1997 through 2002. Taking each of these ingredients in turn, we have *Inventory* (General Objectives 5 and 6), *Local Involvement* (General Objectives 2, 3, 4 and 5), and *Communication* (General Objectives 4 and 5).

Inventory

Inventory of some form is fundamental to almost all conservation. In order to decide just how valuable a particular place might be, or judge to what extent it may be changing, it is usually necessary to place the area into some sort of context. This context can then demonstrate the rare or unique nature of such a place, the degree to which it is characteristic of its region, or highlight the degree to which it has changed.

Unfortunately, the historical antipathy to peatlands has meant that descriptive and classification systems for the habitat have tended to lag behind those developed for other biotopes. As a result, in many languages, though perhaps especially in English, an adequate store of established terms and concepts has not existed in common parlance from which the scientific community has been able to draw and subsequently construct robust and effective descriptive systems. Even today, some of the most fundamental terms in peatland science are subject to much ambiguity and are consequently the subject of continuing scientific debate.

Furthermore, as indicated above, peatlands have until recently tended to be accorded lower priority when allocating funds for inventory programmes. Consequently information about both the natural distribution and the range of ecological variation for the habitat is often at best patchy, if not entirely absent.

Few Ramsar Contracting Parties can claim to have comprehensive inventory information for their peatland systems, although most are currently actively engaged in such programs. For example in the United Kingdom, volumes from the National Vegetation Classification program have recently been published both for mires and for swamps, while the National Peatland Resource Inventory is engaged in a program of mapping the one million hectares of blanket bog

which occur in Scotland. Meanwhile in Latvia, a preliminary mire inventory has been established with the help of funding from the Ramsar Bureau, and the results of this work will be available at the end of this year.

The forthcoming International Peat Society (IPS) publication, *Global Peat Resources* (Lappalainen 1996), about world peatland resources will be of considerable value in establishing, for the first time since the IPS Conference of 1968, a broad picture of the global pattern of peatland distribution and variation. Meanwhile the International Mire Conservation Group (IMCG) has begun a program which harnesses the efforts of those responsible for government-sponsored peatland inventory programs. The results of this work will provide a comprehensive picture of the peatland resource in Europe — its present distribution, condition and conservation status (Lofroth and Moen, in preparation).

There are several specific areas where issues relating to inventory can be addressed through the Ramsar *Strategic Plan*. These are examined below.

Biogeographic Regions

Criterion 1(a) from the list of criteria used to identify potential Ramsar sites makes explicit reference to a site being a good representative of its biogeographical region. The concept of biogeographic region is particularly important for peatlands because a large proportion of such systems, notably the ombrotrophic bogs, are completely dependent upon climate not merely for their formation and continued survival, but also for the expression of their character.

Broad biogeographic regions have been defined for many parts of the World — for example the Dobris *Assessment of Europe's Environment* acknowledges two such maps for Europe. However, many countries are also engaged in producing such maps for their own territory. In the United Kingdom, these have already proved valuable in the selection and characterization of peatland sites for a range of conservation purposes.

General Objective 6 of the Ramsar *Strategic Plan* provides a series of Operational Objectives appropriate to the development of national and supra-national biogeographic regions which can then be used to inform Contracting Parties and the Ramsar Scientific and Technical Review Panel (STRP) in the process of site identification. These would be of particular value for peatland ecosystems, and it is proposed that <u>those nations, that have not yet identified biogeographic regions, should consider initiating a program designed to generate such information, involving consultation with adjoining nations where appropriate.</u>

Natural Distribution and Natural Range of Ecological Variation

Having established a range of biogeographic regions for an area, in order then to identify "characteristic" sites, it is necessary firstly to identify how the peatland resource distributes itself

naturally across these regions, and secondly to determine the natural ecological variation displayed within this distribution. Clearly this process is what habitat inventories have traditionally focused upon.

General Objective 6, and particularly *Operational Objective 6.1*, emphasize the intention of all Contracting Parties to carry out such work, but it should be emphasized that under-representation of peatland sites in the Ramsar list is partly a reflection of the lack of survey. How many examples of important sites such as the Flow Country are still awaiting discovery in various parts of the World?

General Objective 6.3 recognizes the need to keep the criteria for internationally important sites under review (though tempered by Recommendation C.4.2). Such a process is likely to be an iterative exercise linked to *Operational Objectives 6.1.1 to 6.1.3*, because it is only through further inventory work that a better understanding of the necessary criteria can be obtained. The results of *6.1.1 to 6.1.3*, combined with, and, where appropriate, supporting, the descriptive and coordinating work of bodies such as the International Peat Society (IPS), the International Mire Conservation Group (IMCG) and the European Union's CORINE Working Group, can then be fed back to the Ramsar Scientific and Technical Review Panel (STRP) for consideration. That group may then consider it appropriate to suggest particular guidance for the selection of peatland sites, based on the greater degree of knowledge and understanding so obtained.

It is therefore proposed that Ramsar Contracting Parties, the Ramsar Scientific and Technical Review Panel, the Ramsar Bureau and Partners, as appropriate, should review the extent and quality of peatland survey around the World, and identify those areas which would benefit from further inventory effort.

Key Ecosystem Dynamics

Maintenance of the ecological character of a site generally requires an understanding of the ecological processes which control the character of the site. However, many of the most basic elements of ecosystem dynamics in peatlands remain poorly understood. In part this appears, again, to be a reflection of cultural attitudes which have, perhaps in quite subtle and subconscious ways, influenced research programs towards other ecosystems and away from peatlands.

General Objective 5 seeks to ensure that all sites on the Ramsar list are conserved, while *Operational Objective 5.1* seeks specifically to maintain the ecological character of Ramsar sites. At present it would not be possible to give such an undertaking on many peatland sites because the mechanisms necessary to maintain the ecological character are, to greater or lesser degrees, not understood.

The listing here of specific possible research areas would be tedious and unproductive, but using *Operational Objective 5.1* it would be valuable to make an assessment about where

future research priorities might lie. It is therefore proposed that a review of existing peatland ecosystem understanding should be carried out, with the specific objective of identifying priority areas for further research designed to assist in the maintenance of the ecological character of Ramsar peatland sites.

Objectives 4.1, 4.2 and 7.2 can also be used to encourage a wide dissemination of these various classification developments and descriptions of regional context as quickly and efficiently as possible, while *Objectives 5.3 and 5.4* ensure that such information is collated into the Ramsar database. *Objectives 8.2.3, 8.2.5, 8.2.6 and 8.4* can, and already do, assist by providing funding mechanisms for these various activities.

Local Involvement

Peatland conservation is, in some ways, easier than for many habitats, but in others far more difficult. It is easier because the traditional view of peatlands as wastelands, or dangerous places, has tended to protect such areas by default — there has been little direct human involvement and thus protection of such areas means little disruption to local communities. Though still true of many places, increasing industrial and engineering technology has made it possible to begin altering and exploiting these formerly intractable places in dramatic ways. Such developments, or the possibilities of such developments, have since made the process of peatland conservation much more difficult because local people find it so hard to understand why an area traditionally regarded as appalling wasteland can possibly be of national or international importance.

In many cases, these same people have been benefiting from a series of functions provided naturally by the ecosystem, but because the ecosystem has been dismissed as "useless", the benefits have been received unknowingly and the value of such a place to the local area has gone unrecognized. Only when the peatland is lost, and these functions are no longer provided, does such value become apparent but by then it is too late.

Effective long-term conservation of peatlands must break through this cultural barrier of peatlands as dangerous wastelands. For a long period of human history such areas were clearly regarded as special, perhaps at times even holy ground, as suggested by the number of votive objects and even human sacrifices found in peat bogs. As recently as the 17th Century in Britain the great East Anglian Fens were seen as a rich source of livelihood for the Fenlanders, providing vast quantities of fish and waterfowl for both home consumption and the markets of London and outlying towns.

Increasing conservation effort is now being put not just into the identification of functions and values provided by wetland systems, but also into the work of educating local communities about the character and value of such systems. This work is particularly important for peatland ecosystems because it is only through this kind of exercise that the long-established cultural barriers will finally be broken down.

The Ramsar *Strategic Plan* identifies such work as a major objective, and much of *General Objective 3* can be used to address the specific problem facing peatlands.

Education and Interpretation for Peatland Habitats

Around the World, a number of initiatives designed to raise the awareness and understanding of local people about peatland ecosystems have already been running for several years or are in various stages of development. For example in Ireland, the Irish Peatland Conservation Council (IPCC) has a long-established education program linked to the schools' curriculum. Its training courses for teachers are immensely popular, and schools' competitions about peatland subjects have stimulated huge responses.

The IPCC has also collaborated with conservationists in The Netherlands to create a travelling exhibition which celebrates the character, value and human involvement with boglands. The exhibition has travelled throughout Ireland and The Netherlands, and has drawn large numbers of visitors.

Adopting the same principle but with a more focused objective, managers of the Xiang Hai Nature Reserve in northeast China have constructed a travelling exhibition bus, which tours round local communities in the Xiang Hai region to educate and explain to local people the importance of maintaining the reserve in its present state.

Another slightly different approach can be seen in Hokkaido, Japan, where Kushiro City has effectively "adopted" the Kushiro Marsh Ramsar site, which lies on the outer fringes of the city. Interest stimulated by the Fifth Meeting of the Conference of the Contracting Parties to the Ramsar Convention held there has helped the city to encourage a wide range of educational and cultural centres, and even local businesses, to become involved with the marsh, thereby helping to promote a sense that Kushiro Marsh is an integral part of the city's culture, rather than being seen as a useless swampland limiting possible future economic growth.

In the United Kingdom, a major exhibition about Scottish boglands is currently being developed in conjunction with a number of public bodies. This will be centred around a large exhibition within a museum setting, but will be accompanied by a smaller touring exhibition which will visit local communities throughout Scotland. The two parts to the exhibition will be designed to both raise awareness and encourage an understanding of the value of Scotland's boglands to local communities.

Operational Objectives 3.1 and 3.2 identify precisely these sorts of activities for priority action at both an international and national level. In the past, general presentations or discussions about "wetlands" have necessarily restricted the amount of attention devoted to peatland issues because a wide range of other wetland types also required description.

However, the scale of the cultural barrier which must be overcome for peatlands is considerable, and acknowledgement of the need for a greater focus on peatlands is explicitly

stated in *Action 6.2.3*. It is therefore proposed that a series of specific, peatland-related education and interpretation initiatives be established, both internationally and nationally. More particularly, it is proposed that initial feasibility studies for peatland ecosystems are carried out by each Ramsar Contracting Party, where appropriate with the support of suitable organizations and funding, to consider the possible options and information available for:

(a) links to existing education programs and curricula; and

(b) educational and exhibition proposals which can bring greater understanding and appreciation of the benefits and value of local or regional peatland systems to local communities.

These proposals have the potential not only to encourage new understanding within local communities about such areas, but they can also encourage greater local involvement, and can also be used as an opportunity to encourage local communities themselves to begin identifying and cataloguing the benefits which they receive from local peatland systems.

Communication

A very considerable number of actions listed within the Ramsar *Strategic Plan* are concerned with communication — 31 in all. Perhaps not surprisingly, given the under-representation of peatlands in most things, although the number of wetland groups around the world is quite large, the range of available organizations or networks through which peatland scientists and conservationists communicate is both small and somewhat patchy.

Probably the two most active international groups at present are the International Peat Society (IPS) and the International Mire Conservation Group (IMCG). The former encompasses a wide range of peatland interests but with particular emphasis on the commercial peat industry, while the latter represents the network of peatland specialists who are official advisors to their national governments on peatland conservation matters. Between the two of them, they encompass a high proportion of those actively engaged in peatland issues at present around the World.

With the help of partner organizations such as IPS and IMCG, and other organizations and parties, it should be possible to establish a significantly more effective communication framework than currently exists:

(a) Under *Action 3.3.4*, set up an e-mail "Peatland Home-Page" on the Internet, which would represent a clearing house for information on all matters relating to peatland ecology, conservation and wise use;

(b) Contributing to *General Objectives 2 to 8*, establish a publication similar to that provided by the Wader Study Group on behalf of Wetlands International, but in this case for

peatlands, which would then act as a more structured forum for news than the e-mail home-page, and would also provide a publishing vehicle for much peatland work concerned with inventory or monitoring, which is of great value to conservation interests, but which is now generally considered inappropriate for many of the more formal scientific journals.

(c) Under *General Objectives 2 to 6*, establish an electronic bibliography of literature relevant to peatland conservation. Several such bibliographies exist but are generally skewed towards particular research topics or are maintained by private individuals. There is currently no formally-maintained single source of international literature which has peatland conservation as its major focus and which is generally available to all users.

(d) Contributing to *General Objectives 2 to 8*, publish an up-to-date Peatland Glossary of Terms, ideally in several languages, providing the latest agreed upon definitions of terms which are relevant to peatland conservation. The IPS published such a document several years ago, but there has been considerable development of peatland conservation science and terminology since then. A new version of such a publication, with particular emphasis towards peatland conservation, would greatly aid the achievement of Ramsar's objectives.

(e) Supporting achievement of *General Objectives 4, 6 and 7*, identify a network (which could be as formal or informal as considered appropriate) of peatland specialists who can provide guidance and advice about best practice, whether this is for establishment of inventory, preparation of project proposals, monitoring techniques, or a wide range of other issues relating to peatland conservation.

Conclusions

This paper reviews the problems that have hindered peatland conservation in the past and gives recommendations for action. The objective was to present information and stimulate thought for this Workshop. The Workshop was able to identify a number important ways in which the Ramsar Convention can make significant progress towards improved conservation and wise use of the World's peatland ecosystems. This could represent a major step forward out of the shadows for this habitat, towards a worldwide recognition of how important peatlands and mires are, and always have been, for all of us.

Summary of Recommended Actions

Five Recommendations for a *Global Action Plan on Mire and Peatland Conservation* are made in this paper, as follows:

1. **Those nations, that have not yet identified biogeographic regions, should consider initiating a program designed to generate such information, involving consultation with adjoining nations where appropriate.**

2. **Ramsar Contracting Parties, the Ramsar Scientific and Technical Review Panel, the Ramsar Bureau and Partners, as appropriate, should review the extent and quality of peatland survey around the World, and identify those areas which would benefit from further inventory effort.**

3. **A review of existing peatland ecosystem understanding should be carried out, with the specific objective of identifying priority areas for further research designed to assist in the maintenance of the ecological character of Ramsar peatland sites.**

4. **A series of specific, peatland-related education and interpretation initiatives be established, both internationally and nationally. More particularly, it is proposed that initial feasibility studies for peatland ecosystems are carried out by each Ramsar Contracting Party, where appropriate with the support of suitable organizations and funding, to consider the possible options and information available for:**
   - **(a) links to existing education programs and curricula;**
   - **(b) educational and exhibition proposals which can bring greater understanding and appreciation of the benefits and value of local or regional peatland systems to local communities.**

5. **With the help of partner organizations such as IPS and IMCG, and other organizations and parties, establish a significantly more effective communication framework than currently exists by:**
   - **(a) Under *Action 3.3.4* set up an e-mail "Peatland Home-Page" on the Internet;**
   - **(b) Contributing to *General Objectives 2 to 8*, establish a publication similar to that provided by the Wader Study Group on behalf of Wetlands International, but in this case for peatlands;**
   - **(c) Under *General Objectives 2 to 6*, establish an electronic bibliography of literature relevant to peatland conservation;**
   - **(d) Contributing to *General Objectives 2 to 8*, publish an up-to-date Peatland Glossary of Terms, ideally in several languages, providing the latest agreed upon definitions of terms which are relevant to peatland conservation; and**
   - **(e) Supporting achievement of *General Objectives 4, 6 and 7*, identify a network (which could be as formal or informal as considered appropriate) of peatland specialists who can provide guidance and advice about best practice.**

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APPENDIX 2: AGENDA OF BRISBANE WORKSHOP

International Workshop on Global Mire and Peatland Conservation

Time/Location:

Brisbane Convention and Exhibition Centre
Brisbane, Australia, March 18, 1996

Theme:

Peatlands and mires have been recognized as among the most widely distributed but least protected wetland types in the World. This workshop will focus on the status of the global peatland and mire resource bringing together representatives of major international and national government, non-government and industry groups. We will discuss opportunities for developing an international awareness strategy and action plan for conservation of the world's peatlands and mires.

Sponsors:

- Government of Canada
- Government of Norway
- International Mire Conservation Group
- International Peat Society
- IUCN Commission on Ecosystem Management
- North American Wetlands Conservation Council (Canada)

Objectives:

(1) Foster international discussion on global peatland and mire conservation and recognition of peatlands and mires under the Ramsar Convention.
(2) Provide an opportunity for wider discussion of a Ramsar Convention Recommendation on Global Peatland and Mire Wise Use and Conservation.
(3) Promote international cooperation and coordination for peatland and mire initiatives.
(4) Develop the basis for an international action plan on peatland and mire sustainable development, wise use and conservation involving international partners.

Agenda of Brisbane Workshop

9:00 *Welcome and Outline of Workshop Objectives*, Clayton Rubec (Canadian Wildlife Service)

9:10 *Focusing Our Attention on Mire and Peatland Conservation, the Trondheim and Edinburgh Declarations*, Olav Nord-Varhaug (Directorate for Nature Management, Norway)

9:30 *Role of Peatland Resource User Industries in Fostering Conservation Partnerships*, Raimo Soppo (Secretariat, International Peat Society)

9:50 *Peatland Resource Issues in Southeast Asia*, Aca Sugandhy (Ministry of Environment, Indonesia)

10:30 *Development of Global Peatland Policies and Initiatives*, Edward Maltby (IUCN Commission on Ecosystem Management)

11:00 Discussion

11:30 *Overview of the Ramsar Convention Recommendation on Global Mire and Peatland Wise Use and Conservation*, Clayton Rubec (Canadian Wildlife Service)

11:45 Discussion

12:15 Lunch Break

13:30 *International Coordination Needs and Concepts for a Global Action Plan on Mires and Peatlands*, Richard Lindsay (Consultant)

14:00 *Towards Development of an Action Plan and Partnerships*, Group Discussion

14:45 Continuation of Discussion

16:00 Conclusion