

# A Watertight Case

decision time  
for the world's wetlands

A *Bulletin* special report  
compiled by  
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and  
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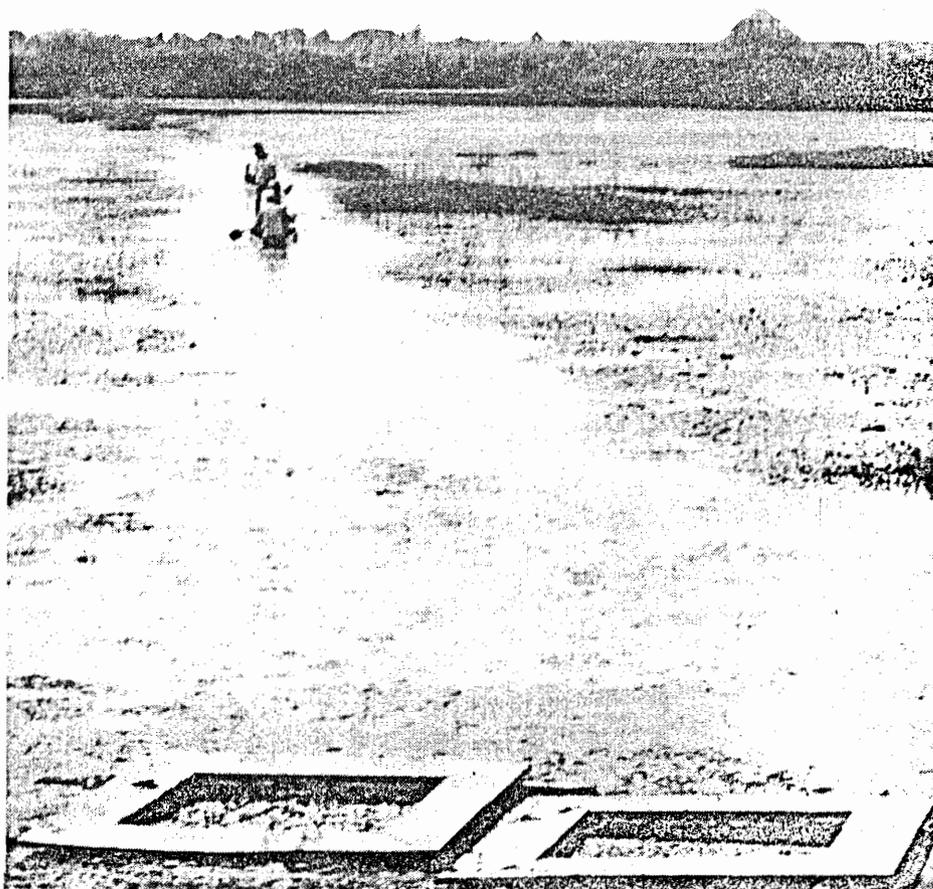
Wetlands are geologically very young — and ecologically very fragile. They occur in all climates on all continents, yet change perpetually with time and season. 'Breakthrough' civilisations like pharaonic Egypt evolved in antiquity round ways of using surplus wetland resources; many small-scale yet highly evolved societies in today's developing regions still depend on the same resources.

Modern agriculture and industry have persisted in harnessing or converting wetlands to economic uses they did not evolve to serve — with the result that 50% of the pre-industrial world's wetlands have simply been eliminated, amid general acquiescence.

But now acquiescence is being replaced by doubt and anxiety. More and more, research shows that natural functions served by the world's wet places crucially uphold other ecological systems, economic systems in all phases of their development and the quality of our everyday lives.

Of all global ecosystems, wetlands are posing some of today's most contentious and politically sensitive environmental questions. Increasingly, their future seems to hang on trends in economic, social and political development and the outcome of legislative debate rather than on any processes or norms at work in the natural world. Can conservation close this gap while there's still time?

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# The Wetlands Challenge

We hear almost daily of nations struggling to expand industrial and agricultural production, to fend off economic stagnation and runaway debt. Many turn to wetland conversion or very intensive use of wetland resources as a way out of the trap. Here is a trend which presents the conservation community with a massive challenge. Can we identify (and persuade developers to implement) measures which realise the value of wetlands as renewable supplies of goods and services and as hubs of larger ecological and economic cycles, *without* damaging or destroying the natural resource itself?

## Wetlands on the brink

Unlike several other ecosystems of world importance, such as the tropical rainforests or the arid rangelands of Africa, wetlands have received remarkably little recent attention as causes for general concern. Indeed, many development managers still see wetlands as *obstacles* to progress.

This special report sets out to show that wetlands are among the world's most valuable — and vulnerable — environments. Pastures, fisheries and other wetland resources have already been destroyed throughout the world's developing regions, for want of alert management. Short-term need often compels people to destroy wetlands. Yet those same wetlands, given proper care, could have freed millions of rural people from hunger and poverty in the long term.

Similarly, the power-generating potential and ecological services provided by riverine wetlands are being lost. Watershed deforestation is causing sedimentation of once productive rivers. The resulting fallout of silt reduces the lifetimes of reservoirs supplying water and hydroelectricity. Floodwaters, no longer retained in river basin wetlands, routinely devastate settlements and crops downstream.

Elsewhere vast areas of natural wetlands are being lost, with consequent loss of genetic diversity, individual plant and animal species, population mix and structure. Still more wetland species or species groups are being lost as a result of over-exploitation, introduction of exotic competitors or predators, and changes in water quality or flow rates.

## IUCN and wetlands

IUCN's concern for wetlands goes back many years and has given rise to many solid achievements.

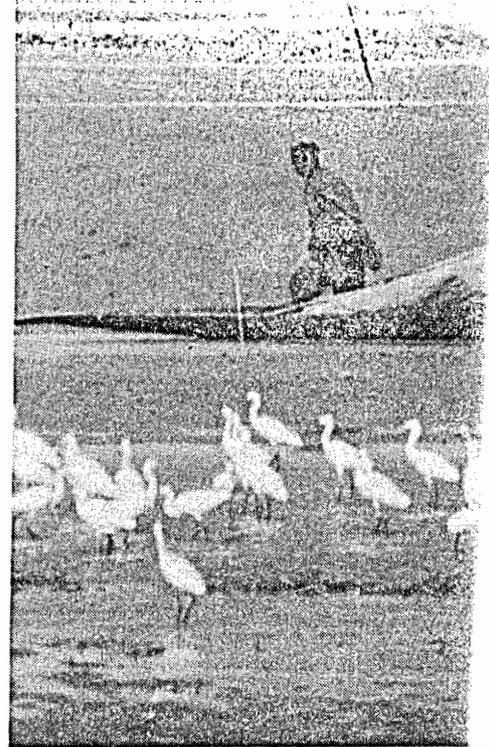
- In partnership with World Wildlife Fund, the Commission on National Parks and Protected Areas has supported the establishment of protected wetlands such as Lake Nakuru in Kenya, the Coto Doñana in Spain and the Banc d'Arguin in Mauritania.
- IUCN provides Bureau services for the Ramsar Convention: the Commission on Environmental Policy, Law and Administration has played a leading role in developing the Protocol to the Convention

- The Species Survival Commission has numerous specialist groups which deal with species inhabiting wetlands, ranging from crocodiles to freshwater crustaceans.
- The Education Commission has prepared publicity materials on the values of wetlands and supported training projects for wetlands officers in several countries.
- The Commission on Environmental Planning has prepared guidelines for assessing environmental impacts of major development projects.
- The Ecology Commission has produced fundamental papers on mangrove management, estuaries, and related wetlands topics.

Even so, IUCN's wetland conservation measures have so far been intermittent and have lacked an integrated approach. Most importantly, they have not taken full advantage of the potential contribution of IUCN's members — many of whom have major wetlands programmes of their own and spend more on them each year than IUCN has spent in its entire history!

## The IUCN Wetlands Programme

To remedy these shortcomings and spark off new efforts to conserve wetlands around the world, IUCN is now engaged in a vigorous initiative to bring the conserva-



*Plenty of space for fishermen and egrets in Mali's Niger Delta: but times are changing.*

Photo: J. Skinner

tion of wetlands to the urgent attention of the world's conservation practitioners and people at large. Practitioners will naturally judge for themselves where they can be most effective. But, as in all its programme development work, IUCN will seek to specify and rank feasible activities in a logical order of priority, in view of all the theoretical and practical criteria that are known to operate in wetland conservation, so as to help draw everyone's efforts to the most promising points of impact.

Thus IUCN's Wetlands Programme accords priority to activities which will tackle causes rather than symptoms; seek prevention now rather than cure later; solve more than one problem at a time; shed light on similar problems elsewhere; benefit local people and build local institutions through

## WHAT MEMBERS ARE DOING NOW

- In the United States The Nature Conservancy has a budget of some \$50 million to help purchase wetlands.
- In Venezuela, the *Fundación para la Defensa de la Naturaleza*; in Brazil IBDF and FBCN; in Zambia, the Wildlife Conservation Society; in China, the China Wildlife Conservation Association; and many WWF NOs throughout the world have launched Wetlands Campaigns.
- In the United Kingdom, the Royal Society for the Protection of Birds has developed a number of wetlands activities, including educational materials for schools, to coincide with the Wetlands Programme.
- The United States Fish and Wildlife Service will work with WWF to support a wetlands training course in the Brazilian Pantanal in 1986.
- Canada, a State member of IUCN, will in 1987 host the next meeting of Parties to the Ramsar Convention and help provide financial support for participants from the developing world.
- For its 1985 Conservation Programme New Zealand has taken the theme *Water Means Life*.
- The Wildlife Clubs of Kenya have taken the theme of Wetlands for their annual creative arts competition.



an emphasis on training and self-help; line up with existing state and aid projects; and give rise to further work and funds for it.

## The network opportunity

The success of this initiative will depend on the entire IUCN network. While the Secretariat can mount a certain number of priority activities with the generous help of WWF and other fund-administering partners, this foundation work must be seen as but a fraction of the whole Programme. Every part of the IUCN network, from council and commission members to governmental and non-governmental member organisations and to collaborating institutions in academe and elsewhere, are called on to support and supplement these activities. The network is already working hard for wetlands conservation (see box, opposite) but many more opportunities exist and need to be seized if wetland conservation is to succeed on a large scale.

As Tom Stael points out in his contribution to this report, all IUCN members — but especially NGOs — can work to make sure the allocation of development finance in wetland areas is diverted from unnecessarily destructive projects. Similarly, conservation NGOs can lead the fight to prevent ill-conceived drainage of wetlands in Europe, North America and Australasia, a struggle in which many of them have already played a historic part. And IUCN members throughout the world can greatly advance the cause of wetlands conservation simply by taking the trouble to share their unique experience with one another. There is a wealth of knowledge in many industrialised countries concerning wetlands management, legal mechanisms for conserving wetlands and educational and communications techniques for spreading the wetland conservation message. The opportunities to exchange such experience are many and are growing. For instance, IUCN members in the geopolitical North can directly boost the chances of wetlands conservation in

developing regions by reserving a small portion of their revenues, often less than US\$2000 or its equivalent, to fund visiting conservationists to see and study management techniques in long-established wetland reserves, or to send members of their own personnel to discuss management of tropical wetland sites or participate in training courses on the spot.

## The challenge

Wetlands conservation is a complex business. If it is to truly succeed in implementing a Wetlands Programme, IUCN cannot afford to gloss over this complexity.

Yet IUCN's Secretariat and Commissions alone cannot hope to do justice to the whole array of wetland conservation needs. Here is a wide-open area where IUCN's members can show their paces. Wetland conservation provides perhaps more opportunities for membership participation in the collective work of IUCN than any other single programme objective. Together, the members of IUCN have the resources and the openings to achieve a spectacular joint success. The central offices and facilities of the Union can work as a catalyst, stimulating and backing members as they pursue their own initiatives in the field and in the political arena, where combined influence can be brought to bear on governments and aid agencies — the major wetland developers.

Only through this degree of partnership can the Union mobilise the resources necessary to achieve the aims of the Programme and deliver the prescriptions of the *World Conservation Strategy* for wetland habitat conservation. The challenge and the opportunities are there. The IUCN Wetlands Programme provides the starting point and the framework: the rest is up to the IUCN members as a whole and to their interest in proving that the word 'union' means what it says.

## Brazil and China Lead

Brazil and China are two of the world's largest nations and embrace some of its most important wetlands. There are signs that conservationists in both countries today regard wetlands as a top priority for action and are working to increase national and international support for such action. Responding to this encouraging trend, IUCN has placed the cases of Brazil and China at the focal point of its Wetlands Conservation Programme and will, with the support of WWF, spend more and more time and effort through 1986 on promoting wetlands conservation efforts there. However the great differences between the two countries require two very distinct approaches.

There are already ten IUCN Members in BRAZIL; six government agencies and four NGOs. All have a part to play in the Programme. There is a yet greater number of non-member state and federal environmental agencies active in work affecting wetlands. The situation offers IUCN a golden opportunity to unite a wide spectrum of interests into a coordinated force for wetlands conservation in Brazil, setting an impressive example for other countries in Latin America.

The *Instituto Brasileiro de Desenvolvimento Florestal* (IBDF) has, since mid-1985, been working to establish a preliminary ranking of national wetlands priorities. Drawing on the experience of all fellow organisations concerned with the conservation and development of wetlands, IBDF has sought to identify the major problems in wetlands conservation in Brazil, what steps are needed to address them and how international organisations can assist in the process. As a first step in support of this work, the Programme and Policy Division of IUCN has worked with IBDF to develop project proposals for WWF-supported work in the Pantanal. The association was sealed when IUCN's Director General attended the launch of the Wetlands Campaign in Brasilia on 17 September.

During 1986, the Secretariat will work with all IUCN members and associates in Brazil to build on these beginnings.

Unlike Brazil, CHINA has only two IUCN members, both NGOs. Even so, the Secretariat is working from the outset with these members as flag-bearers for a nationwide programme of wetlands activities. A visit to China by IUCN's Wetlands Programme Officer resulted in a series of project proposals put forward for WWF support. These proposals for modest funding inputs seek to augment the already sizeable investment China has made in wetlands conservation; more than US\$1M has been spent on one reserve. Training, education, and acquisition of basic items of equipment not readily available in China will be for WWF prominent spending targets.

# The Front Line

For more than a year now IUCN has been working closely with the WWF family and other IUCN members, partners and advisors, to develop a global wetlands conservation programme. Drawing on the resources and knowledge of this network, IUCN began by trying to catalogue and systematise what is already being done to save wetlands. An IUCN Wetlands Programme Officer was appointed, thanks to WWF funding, to set this work in motion. Funds are now being sought to convene a Wetlands Programme Advisory Committee, an international group of wetlands specialists competent to map out and review all the wetlands work of IUCN and WWF. The Secretariat has also cultivated common ground with partner organisations prominent in wetland development and conservation, with a view to blending IUCN's work with theirs, or simply learning from their achievements. For example, in identifying future wetlands priorities, IUCN has drawn on the experience of the specialised agencies and the Environment Programme of the UN, the US Fish and Wildlife Service, The Nature Conservancy, the International Council for Bird Preservation (ICBP) and the International Waterfowl Research Bureau (IWRB). With them, IUCN has discussed their successes, their disappointments and their views on what needs to be done now. Similarly, IUCN has worked closely with government agencies and NGOs in many tropical countries to develop key field projects.

The result of all this consultation is an IUCN Wetlands Programme presenting a broad agenda for wetlands conservation worldwide. In this Programme, the unique talents of different IUCN members and partners are matched to specific goals. The contribution of WWF is of cardinal importance to the Programme. Although WWF's resources are finite, it has the great advantage of flexibility in where it chooses to invest them. WWF can participate in long-term conservation programming yet can also move quickly to respond to urgent, often controversial, conservation problems. This does not mean a superficial treatment of such problems: WWF's investments nearly always seed larger spending by governments, development aid agencies and other conservation groups.

WWF therefore asked IUCN to identify, within the framework of the larger IUCN Wetlands Programme, the areas in which WWF resources could be deployed to greatest effect. The result of this effort, the joint IUCN and WWF Wetlands Conservation Programme, is now to be the focus of WWF's fundraising efforts during 1986.

Some of the more prominent activities which WWF will help support with these funds in 1986, including some which sustain existing initiatives, others which are completely new, are listed below. A comprehensive guide to the entire agenda of WWF-tailored activities has recently been published in English, French and Spanish versions: the announcement on the back

*Review of the design of wetlands development projects.* Development managers are turning their attention more and more to wetland areas whose productivity might be harnessed and used to feed the world's growing population. This trend may be seen as a threat to wetlands; if the conservation community seeks only to protest rather than intercede constructively, such runaway development will indeed pose a major threat. If, however, the conservation community takes the lead in identifying economically beneficial and ecologically sound wetland development techniques for aid agencies to espouse, there is a good chance that those agencies will respond in kind by seeking the help of conservation organisations to implement projects geared to those techniques. IUCN and WWF believe this initiative is central to their common goal of saving wetlands and the ecological services they provide.

*Conservation and Management of wetlands in the Kafue Flats and Bangweulu Basin, Zambia.* In these two sites, IUCN and WWF are working with Zambia's National Parks and Wildlife Service to ensure that conservation efforts, in particular the establishment and management of protected areas, can reflect the needs of local people and conservation-worthy wildlife alike.

*Conservation and Management of Wetlands in the Senegal Delta.* Although one of the best-known wetland areas of Africa, many of the most important parts of the Senegal delta have in recent years run dry, the consequence of low rainfall and man-made alterations to patterns of water-flow in the delta. Now, however, the government of Senegal is examining ways to conserve the remaining wetlands of the delta within a sustainable development regime. WWF and IUCN are collaborating in Senegal's pioneer effort.

*Protection and Management of Caiman in the Pantanal of Mato Grosso, Brazil.* Of the many conservation problems faced by the Pantanal, perhaps the most widely



known is the large-scale poaching of spectacled caiman *Caiman crocodylus jacare*. Hundreds of thousands of individuals are killed each year and their skins smuggled out through Bolivia and Paraguay. In response to this problem, WWF will support the current conservation efforts of the *Instituto Brasileiro de Desenvolvimento Florestal* who are

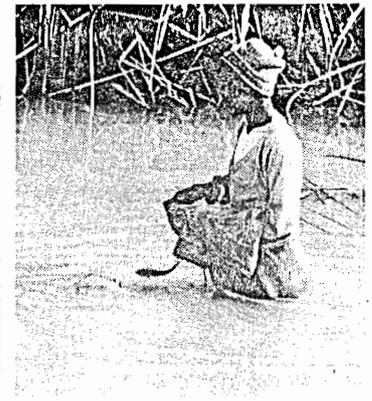
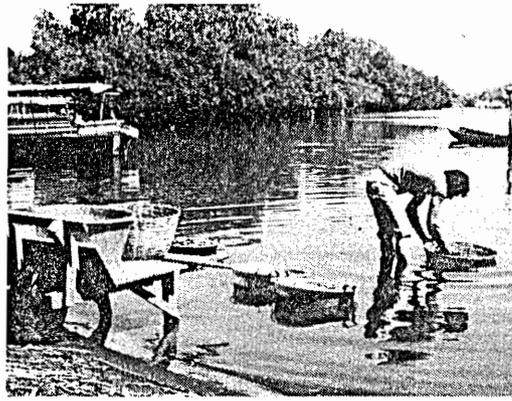
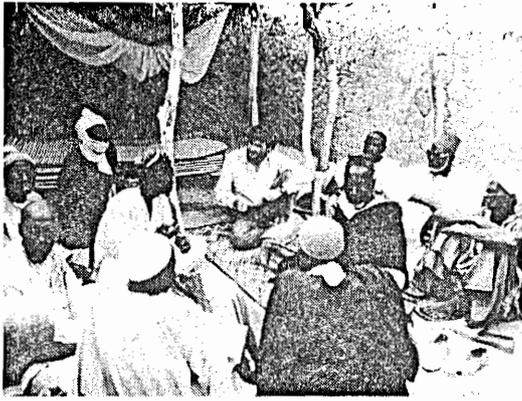
working with other conservation groups in the region to reduce poaching pressure and to develop techniques which will allow controlled market use of the caiman by local landowners.

*Conservation and Management of the Monterrico Coastal Zone, Guatemala.* In support of work now underway in the hands of the Centre of Conservation Studies (CECON) of the University of San Carlos, WWF funds will be used to develop public awareness of the need for effective management of this spectacularly diverse but seriously threatened wetland. In addition, a management plan incorporating innovative techniques for relieving pressure on the area's resources, will be prepared. WWF and IUCN see the Monterrico project as a major opportunity not only to help conserve a remarkable ecosystem, but also to support the activities of one of the leading conservation NGOs in the region. This is a particularly good example of how wetlands conservation can contribute to wildlife protection and sustainable development in one package.

*Sustainable development in the Inner Delta of the River Niger, Mali.* With support from WWF and the Government of the Federal Republic of Germany, an IUCN team is studying the problems of wetlands resource use in this, one of Africa's most important wetlands. Threatened by overgrazing, overfishing and the construction of dams in upstream Guinea, the Delta and its dependent rural communities are in desperate need of a planning framework to regulate use of, but distribute fairly, the available resources. Basing their approach on detailed studies of past and present patterns of resource use in the area, the IUCN team is preparing recommendations for environmentally sound management of a sample site in the Delta. □

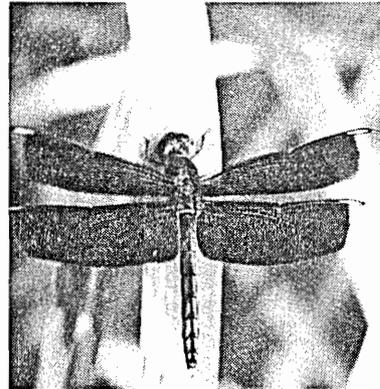


Volunteer work force organised by IUCN member Antwerp Zoo, clearing a blocked water-



# Target Wetlands

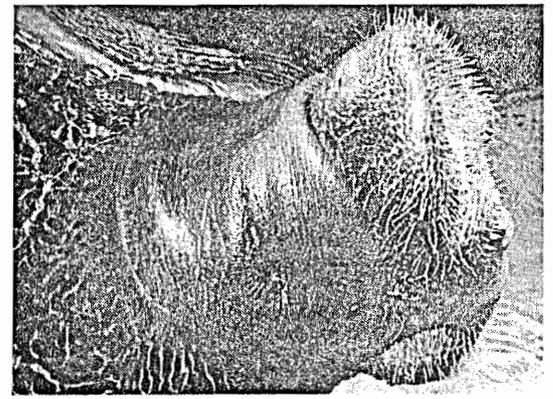
- 1. A focus of the IUCN project in the Inner Delta of the River Niger is to learn from people.
- 2. The well-being of the fishing community of Monterrico depends on sound management of the mangrove resource.
- 3. In the Senegal delta the remaining wetlands support an important fishery resource.



A healthy wetland supports a diverse and abundant dragonfly population.



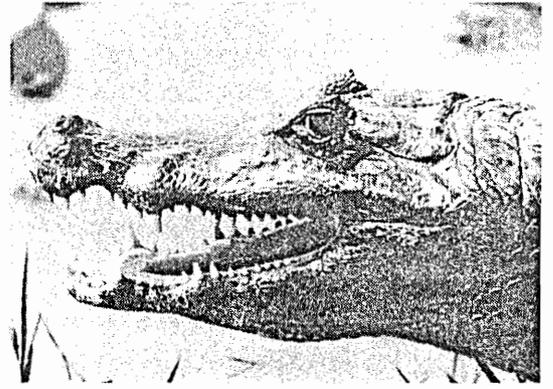
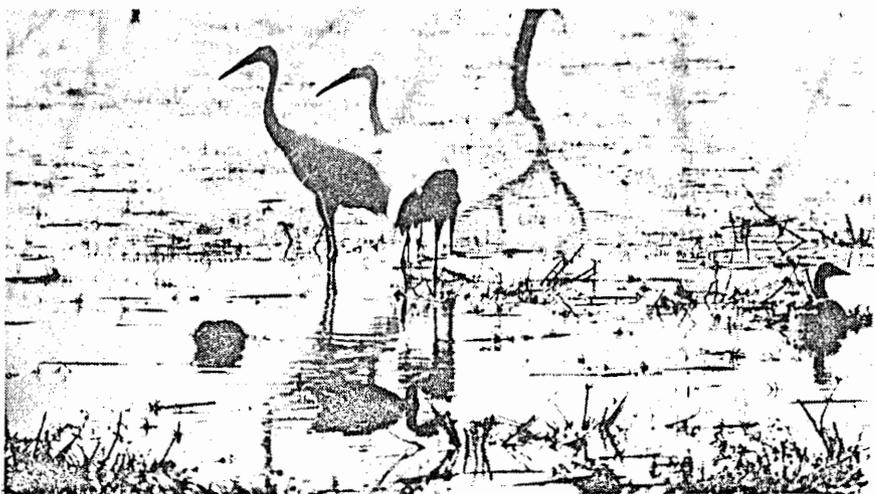
Aquatic plants like the water hyacinth offer possibilities for water treatment, fertiliser production and biogas generation.



Manatees are among the most endangered of wetland mammals.

The Bengal Tiger *Panthera tigris* is but one example of the many mammals which find refuge in undisturbed wetlands.

# Leaks in the Genetic Pool



In many parts of the world careful management of crocodilian populations is seen as a source of sustainable income for many rural communities.

Siberian cranes *Grus leucogeranus*, one of our rarest birds, symbolise the importance of wetlands for the world's waterfowl.

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# Pulling out the Plug

Wetlands throughout the tropics are vanishing with the help of finance and expertise from the world's richer nations. Of the nearly 200 large-scale polder (wetland reclamation) projects now completed or under way worldwide, only in nine cases has any serious study been made of environmental and ecological consequences. Any nation which gives or receives technical or financial aid for such schemes must accept responsibility for the wider consequences of pulling out the plug, argues THOMAS B. STOEL, Jr.

DEVELOPMENT aid agencies often provide financial support for projects which result in unnecessary and short-sighted destruction of biologically valuable wetlands. Changes in the policies of these agencies could do much to improve prospects for conserving wetlands and the sustainable benefits they bring to people. IUCN's members — especially its NGO members — can help to bring about these changes.

Development aid agencies fall into two broad categories. Bilateral agencies, such as the Swedish International Development Agency and US Agency for International Development, are controlled and funded by a single donor nation. Multilateral agencies, such as the World Bank and Asian Development Bank, are funded by a number of countries and governed by executive directors who are appointed by individual donor nations and cast votes in proportion to that donor's contribution.

## The buck stops where?

Development aid agencies are not just technical bodies. They are also political entities which respond to the priorities of donor nations as well as the nations which they are assisting. Conservationists, especially those in donor nations, have shown that it is possible to change the priorities of these agencies by influencing their governments. As a result of pressure from national NGOs, the US Agency for International Development has implemented good environmental impact assessment procedures, has adopted an excellent policy towards tropical moist forests, is funding each year more than \$100 million worth of projects aimed at ensuring sustainable development, and is launching a new programme specifically designed to conserve biological diversity.

NGOs have also persuaded the US Government to adopt a good new en-

vironmentally sound project to colonise tropical forest areas in Brazil's Rondonia State.

## Lobby for the South

Could NGO pressures likewise bring about major changes in agency policies and actions affecting wetlands in the developing regions, where foreign aid has been (and continues to be) a major factor in wetland loss? What is needed is a coordinated effort by IUCN members to influence bilateral and multilateral agencies alike.

## Early warning

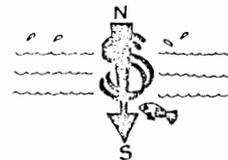
To take effective action, IUCN members must have early, accurate information about agency actions which will affect wetlands, before irreversible political decisions are made. The programme therefore

formation with respect to key agencies. The programme should facilitate the establishment of a network which can disseminate and act on this information. IUCN members in developing countries should then use the network to inform others about plans for actions supported by aid agencies on their territories.

IUCN members can use this information to influence the policies and actions of their bilateral aid agencies and — via their nations' executive directors — multilateral agencies. Agencies should be pressed to implement environmental impact assessment requirements, to adopt policies specifically directed at wetlands conservation, to abandon or modify projects which would unnecessarily destroy wetlands, and to support activities — such as training and institution-building — which further wetlands conservation. IUCN members should now be looking for ways by which to cooperate closely in order to influence the policies and actions of multilateral agencies and projects which are funded by a number of agencies.

*Thomas B. Stoel, Jr. is Director of the International Program of the US Natural Resources Defense Council.*

## WHO AIDS WHAT IN SENSITIVE WETLAND AREAS



### World Bank

- In the late 1970s, the Bank financed feasibility studies and master plans for the clearing, drainage, and agricultural settlement of 570,000 ha of wetlands in South Sumatra and Central Kalimantan, Indonesia.
- In 1981, the Bank loaned US\$22 million for the US\$45 million "Indonesia Swamp Reclamation Project I," involving the clearing and draining of 9000 ha of wetlands in South Sumatra.
- In 1984, the Bank loaned US\$65 million for "Indonesia Swamp Reclamation Project II" (total project cost: US\$190 million) to drain another 30,000 ha of wetlands in South Sumatra for agricultural resettlement, and to assist in preparing further feasibility and master plans for wetland conversion.
- The Bank embarked in 1983 on a billion-dollar regional development program for Chiapas State, Mexico, commencing with a loan of US\$75 million for a US\$151 million drainage and river straightening project on the Pacific coast which will adversely affect mangrove wetlands.

### IDB

- In 1981, the Inter American Development Bank loaned US\$50 million to help finance the conversion to agricultural use of 165,000 ha of marshlands in Mato Grosso State, Brazil.
- In the early 1980s, the IDB loaned US\$95 million for drainage and irrigation works in 80,940 ha of wetlands in Guyana.
- In 1982, the IDB loaned US\$13.2 million to Panama to help convert 1500 ha of salt marshes to shrimp farms.

### USAID

- AID is currently financing many multi-million dollar irrigation projects which may affect wetlands, including at least four in India, two in Pakistan, and others in Indonesia, Sri Lanka, the Philippines, Ecuador, the Senegal River Basin, and Guinea-Bissau.
- AID financed, as part of its participation in the multi-billion dollar Mahaweli Irrigation Project in Sri Lanka, an in-depth environmental impact assessment costing more than US\$1 million, and then funded actions to mitigate the adverse environmental impacts identified in the assessment.
- AID is launching an ambitious Coastal Resources Management Project to assist developing nations in reviewing their coastal management policies and designing pilot projects to demonstrate the economic benefits of renewable coastal resources.

# Wetlands take many forms

They occur along coastlines and in continental interiors — even in deserts, on high mountains and amidst densely settled lowlands — from the high arctic tundra to the tropics.

## Marshes

Are dominated by herbaceous plants. Not directly rain-fed. Vary greatly in form and function depending on origin, location, hydrology, water chemistry and substrate. Highly productive and a key wildlife resource.

## Swamps

Are flooded throughout most or all of the growing season, include a wide range of wetlands occurring at the coast (mangroves), on floodplains (swamp forest) and around open water (reed and papyrus swamp).

## Mires

Wetlands which form peat — an accumulation of plant debris which is not completely decomposed because of waterlogging, oxygen deficiency, acidity, low temperatures or lack of nutrients.

Thick peats (> 10 metres) can form in association with

swamps and marsh especially in the subtropics and tropics. But peat also produces distinctive wetland landscapes of bog, moor, muskeg and fen. Peatlands cover at least 500 million ha of the world's surface. Much has been altered and they are threatened increasingly by mining for fuel or horticultural products and drainage for agriculture.

## Floodplains

Periodic flooding of land adjacent to river channels due to seasonal rains or snowmelt produces a complex variety of riparian wetland and more expansive flooded zones such as deltas and areas of extreme sheet flooding. Often contain large and numerous lakes.

## Man-made wetlands

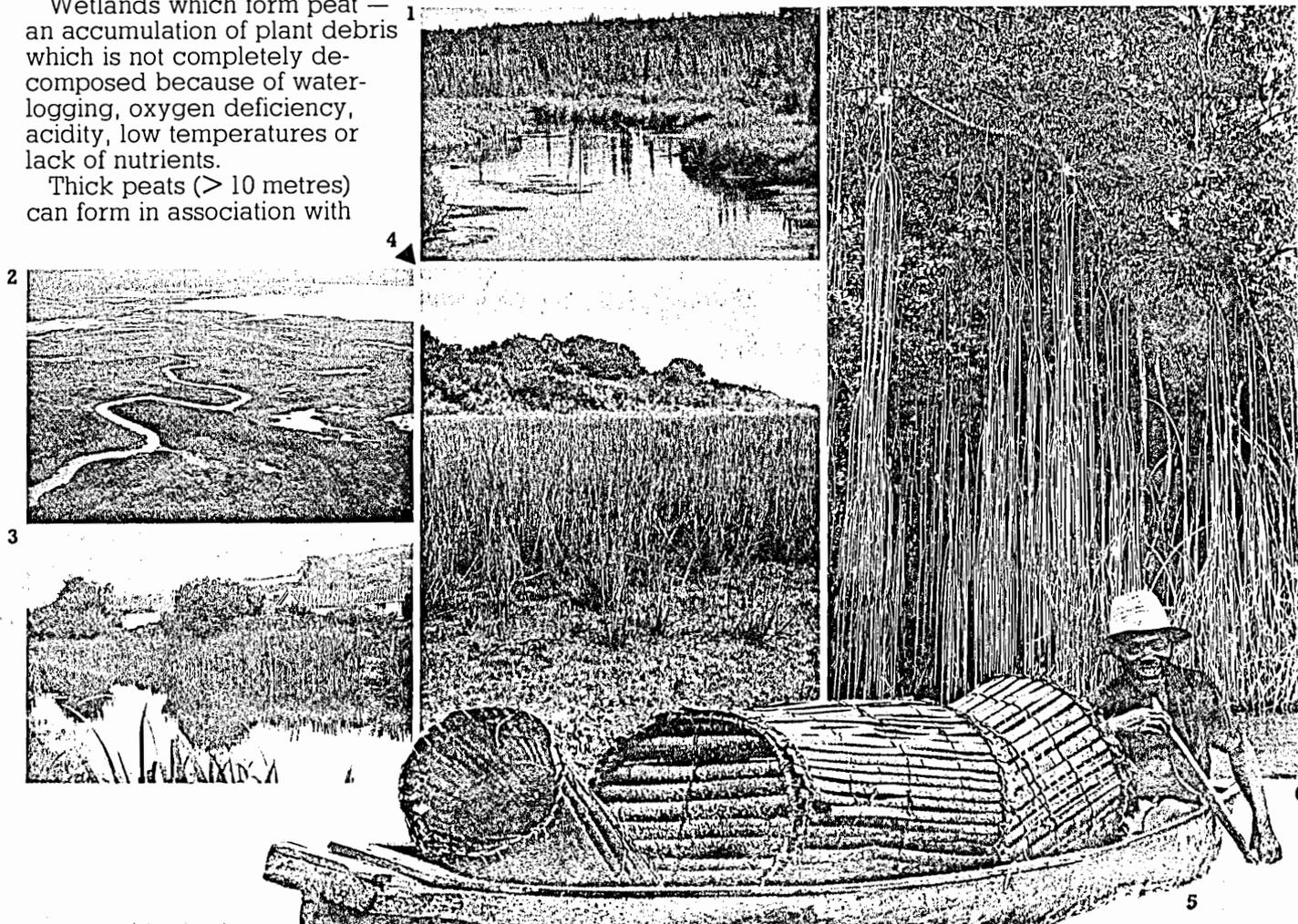
Have become some of the most important wildlife habitats in western Europe but unlikely to fulfill the range of functions of their natural counterparts — which do the job for less expense and maintenance. In-

clude reservoirs, ponds, mineral extraction pits, and canals.

Ability to recreate wetland mimics — such as the zoned salt marsh creeks created by the phosphate industry in North Carolina — raises new questions and arguments about mitigation. If the concept is widely accepted, it sets at risk all pristine wetlands. □

- 1 Peatlands in high latitudes are part of a complex mosaic of wetlands muskeg.
- 2 The floodplains of Africa are vital life-support systems for people and wildlife.
- 3 Canals, such as this in S.W. England, are valuable man-made wetlands especially when abandoned for commercial use and natural vegetation succession begins.
- 4 Saltmarshes are important habitats for spawning and juveniles of commercially important fish and crustaceans.
- 5-6 Mangroves like these in Jamaica fringe the coast and brackish waters throughout the Tropics and sub-tropics.

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# Wetlands are valuable

## Food chain support

High productivity means high sustainable yields of many economic wetland plants such as reeds, sago, and rice. The primary producers, through grazing and detritus food chains, sustain many organisms within the wetland and also well beyond its boundaries through the action of currents and tides exporting nutrients and food material. In this sense, wetlands are the ecological coupling between land and water.

## Fisheries — feeding, spawning and nursery grounds

Maintaining productive river, lake and coastal fisheries is certainly one of the most valuable functions of wetland habitats. Two-thirds of the fish caught worldwide are hatched in tidal areas. In the Gulf of Mexico 90% of commercial fish depend on estuaries and salt marshes. In the Lower Mekong Basin, 236,000 metric tonnes out of a total fish catch of 500,000 tonnes are derived from wetlands. This catch was worth \$90 million in 1981 and supplied 50-70% of 20 million peoples' protein needs. The floodplains of Africa are vital sources of fish protein.

## Water quality

Wetlands maintain and improve natural water quality by acting as sediment and chemical sinks. Harmful or excessive amounts of chemicals can be absorbed and in some cases broken down by biological processes in the wetland (such as the cycling of nitrogen).

## Flood and Storm Protection

Wetlands reduce flood hazards by breaking up flow peaks, increasing flow duration and storing excess waters. They are a vital buffer between natural catastrophe and human misery.

## Wildlife habitat

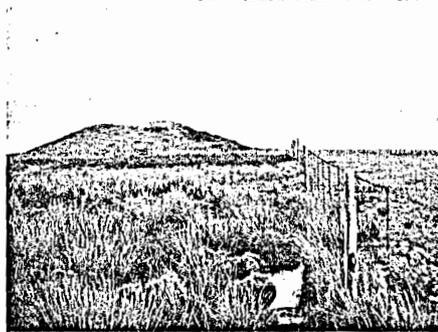
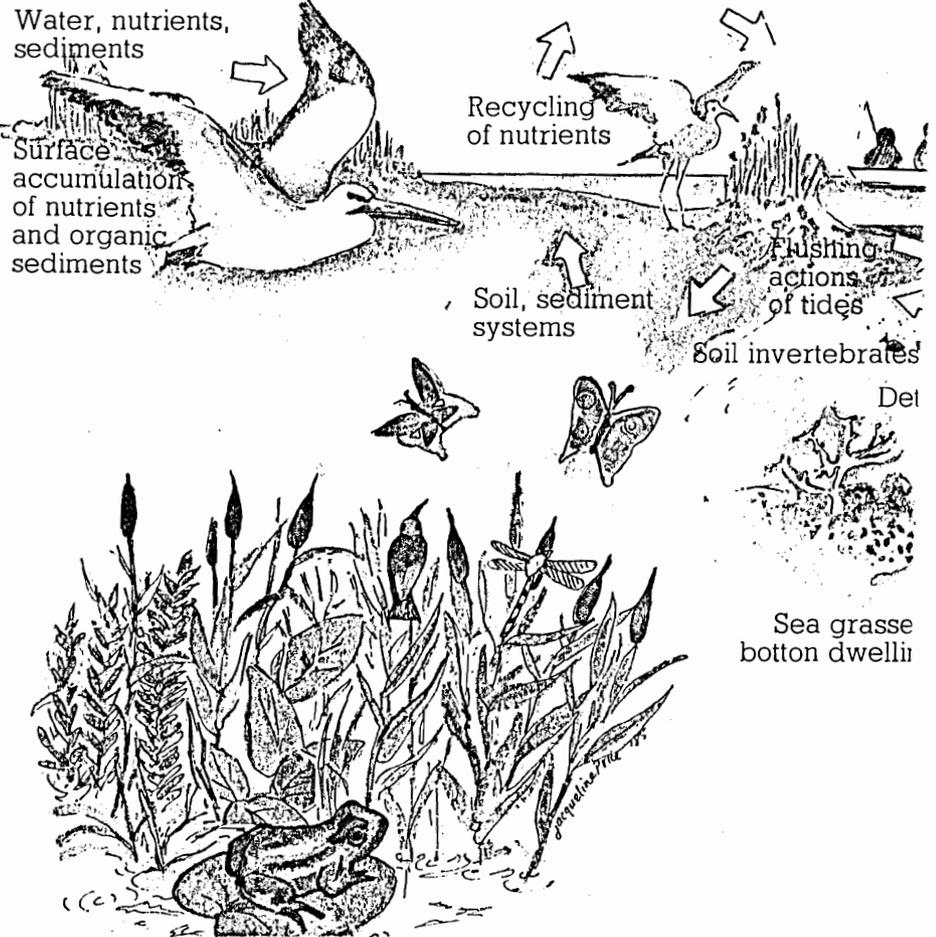
Wetlands provide habitat for a richly diverse assortment of plants and animals, many rare

TERRESTRIAL SYSTEMS

## WETLAND SYSTEMS

### Hydrological cycle

### Biological cycle

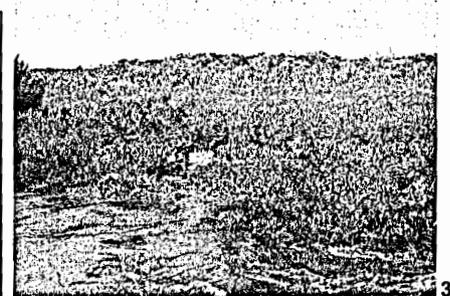


and endemic. In the US, almost 35% of all rare and endangered animal species either inhabit wetlands or are dependent on them.

## Amenity and heritage

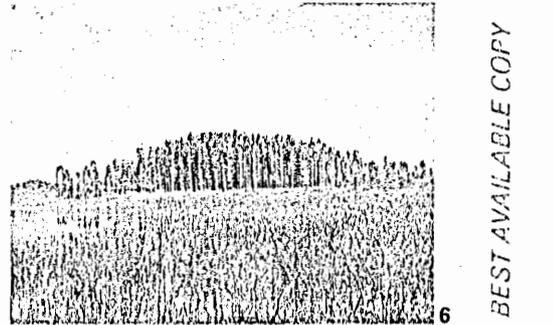
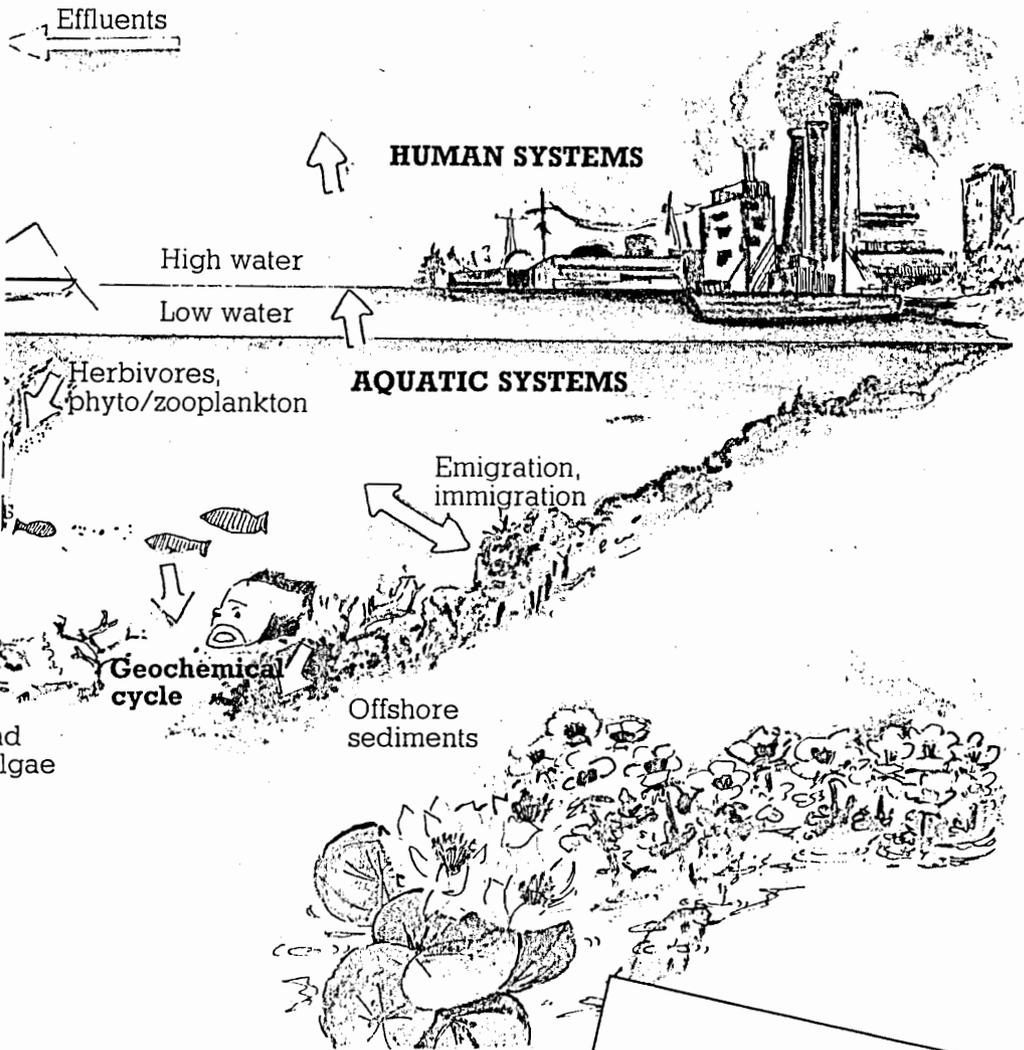
Wetlands are key areas for bird watching, fishing, walking and boating. Wetland landscapes are often of outstanding quality and it is no accident that many are sited in areas singled out for official protection.

Developing countries are realising the practical benefits of their wetland ecosystems. In Botswana, wildlife safaris are



worth some US\$ 13 million per year and tourism is the largest single employer in Maun, on the edge of the Okavango Delta. Many wetlands also preserve the evidence of past cultures, climates and environments.

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- 1 A 3000 year old burial mound amidst upland bogs in Britain records the presence of early human cultures and attracts many visitors and scientists.
- 2 Vast flocks of shorebirds like these ruff *Philomachus pugnax* in the Senegal delta symbolise the importance of wetlands for migratory birds.
- 3 Mangroves such as these in Florida are important in shoreline stabilisation and storm protection.
- 4 African floodplains support many millions of domestic cattle, 1.2 million alone in the Inner Delta of the river Niger.
- 5 Crustaceans which depend upon coastal wetlands as breeding areas are among the biggest wetland money earners.
- 6 Experiments have shown cypress domes to be ecologically and economically effective means of tertiary water treatment.

### Cash values of some Wetland areas

**USA**

- Salt marsh in southeast USA — 'Life-support' value: \$212,500/ha
- Coastal marsh in Georgia — commercial and environmental value: \$50-125,000/ha
- Tidal marshes — tertiary wastewater treatment value: \$123,500/ha

**Australia**

- At Brisbane International Airport, the cost of planting 51,000 mangrove seedlings was (in 1981) US\$228,271 = \$4.50/plant

**Thailand**

- Fishery products value of mangroves: US\$200 to 2000/ha/year (shrimp); US\$30 to 100/ha/year (fin fish)

■ Charles River, USA, cash values of practical functions:  
 Flood prevention \$13,505/ha  
 Local amenity \$61/ha  
 Pollution reduction \$9983/ha  
 Water supply \$40,766/ha  
 Recreation \$1267/ha  
 Total: \$65,582/ha (average real-estate value of farmland in USA is \$10,000/ha)

# Wetlands are vulnerable

Wetlands provide their goods and services for free. But remove the wetland and the cost of replacing those functions is passed on to other sections of society, many downstream from, or far outside the boundaries of the wetland. Instead of removing wetlands, we could be taking advantage of their renewable resources for the good of society. Yet if we go too far, we may break the ecological links which hold the wetland together as a self-sustaining ecosystem.

Within the last 200 years, as much as 50% of the wetlands in the contiguous USA have been lost. Agricultural drainage has been the main cause but this is just one of a growing number of pressures on wetlands. And, perhaps more importantly, although similar trends are apparent elsewhere in the developed world and increasingly in the developing world, we have no well quantified data on the actual rates of loss.

## Pressures

### Non-renewable Resource Exploitation

■ Peat mining leading to habitat loss, disturbance of vegetation and loss of environmental and scientific record.

### Over-exploitation of Renewable Resources

■ Water: upstream control by dams, obstruction, effluent discharge, polders and other impoundment structures, lead-

ing to low flows, artificial regime, habitat loss, disruption of migration patterns, eutrophication and pollution.

■ Vegetation: clear-cutting of mangrove forests leading to reduced productivity, increased erosion, and loss of storm buffers.

■ Species: overfishing and poaching of commercially and ecologically important species.

### Modifications for Agriculture or Aquaculture

■ Drainage and controlled flooding both lead to disruption of water supply, habitat loss, pesticide runoff and eutrophication.

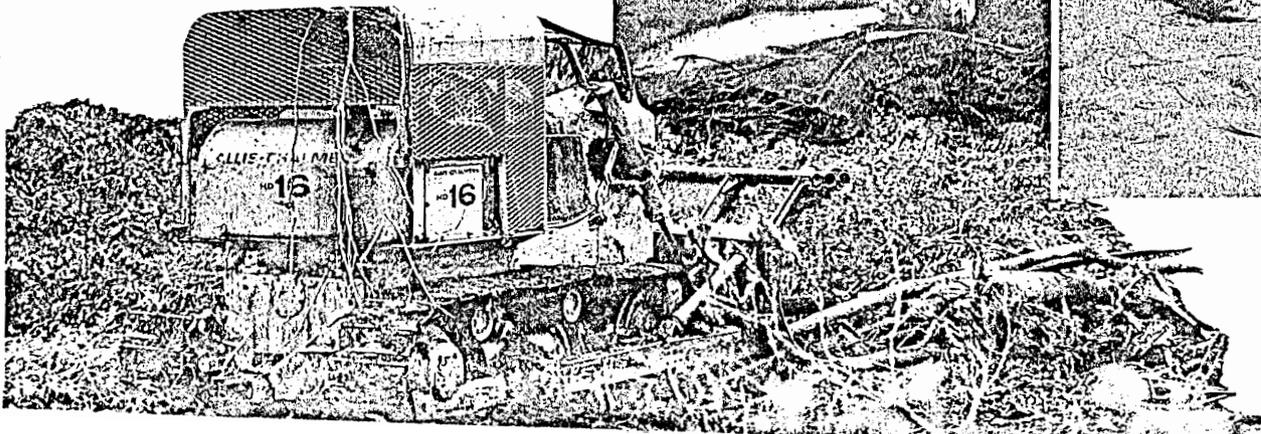
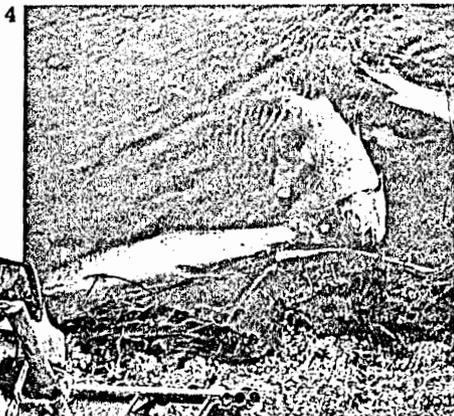
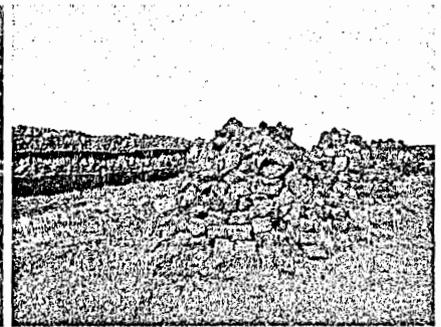
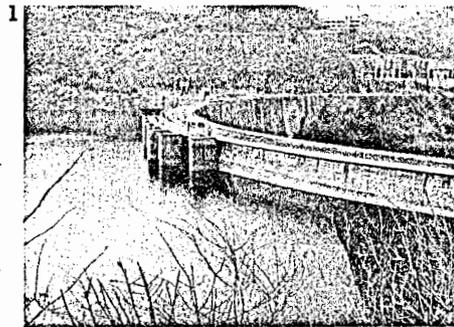
■ Landfill for residential, commercial, industrial, transport or education purposes has in

many areas led to total wetlands loss, and increased pressures on remaining margins.

1 Large dams can provide many benefits to human society, but ecological costs can outweigh these benefits.

2-3 Small scale peat cutting is a long established practice to provide domestic fuel in many remote regions, but in many areas the drainage and cultivation of peat results in oxidation, a process which in turn reduces the wetland to a dry dust bowl.

4-6 Conversion of wetlands to agricultural land can be achieved rapidly with modern technology but often leads to reduction in water quality and loss of other ecological services provided by these ecosystems. These costs are passed on to other sections of society further downstream.



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# Valuing Liquid Assets

Scientists must take a lead in changing the often deeply-entrenched attitudes that have given rise to wetland losses. **JOSEPH S. LARSON** looks at the case for wetland valuation techniques that could help avoid such wasted opportunities.

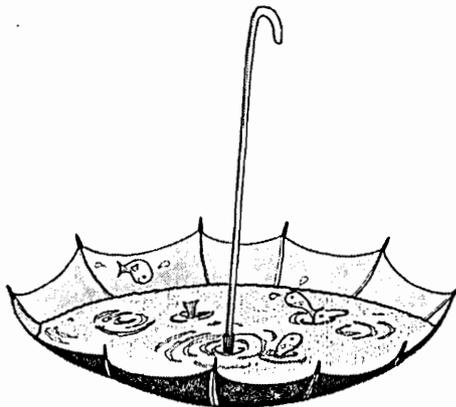
**H**UMAN attitudes to wetlands have long determined the fate of swamps, marshes, bogs, fens and mires all over the world. Traditionally, wetlands have been regarded as waste areas that benefitted humans only if they could be drained for agriculture or some other dry-land use. Thus, while in parts of developing regions (like the lower reaches of the Tigris and Euphrates Rivers, or the Dal Lake in Kashmir) people have adapted comfortably to living in large wetlands, in most other places wetland drainage has been the rule whenever the means have become available.

But over the last half century the economic role of wetlands has come under fresh scrutiny. At first, naturalists and waterfowl hunters were alone in their concern that wetland destruction was endangering continental populations of birds in North America and Europe. During the past 20 years, however, the spectrum of benefits perceived to accrue from temperate marine and freshwater wetlands has dramatically enlarged and 'post-industrial' society now appreciates their vital importance to human wellbeing. Wildlife is now but one of many functional wetland items of value considered in a new wetland assessment procedure being tested in the United States.

## Wetlands legislation and the need for wetlands assessment

While wildlife protection and the inherent scientific interest of wetlands provided the initial justification for wetland protection, it is not these but more recently recognised values which have mainly led to wetland regulation. The key to long-term conservation of wetlands lies in their value in terms of fishery, flood control and water quality management. In North America, recognition of these values has already led to the public regulation of wetlands at local, state and national level. Outright acquisition of wetlands will — in the long run — preserve too few wetland areas to sustain more than a very limited 'museum' of wetland resources. Maintenance of wetlands as functioning components of the world landscape will require regulation without resorting to purchase.

Regulation must be sustained by wide public understanding of the societal values that are being served. And these values must be identified with the essentials of human life. Thus, to become protected, whether by purchase or government regulation, wetlands have to be shown to have specific functions that make them more valuable in their natural state. Failing this, the defenders of wetlands have to



demonstrate that any proposed local benefit gained from draining and filling wetlands will not balance the public costs or adverse impacts incurred elsewhere in the watershed or ecosystem — such as a decline in coastal fisheries through the loss of estuary marshes.

## Assessment techniques come of age

Assessing the biological worth of wetlands used to be based on identification of certain specific 'products' of particular wetlands. Records of numbers of birds nesting or feeding and counts of all species, abundant or rare, helped identify many important wetlands. But such indices are restricted in scope and vary greatly over time. A significant change in our approach to wetland assessment is now underway, alongside an international trend towards adoption of a bio-physical classification based on factors involved in the formation and function of wetlands.

This broader notion of wetland functions and values examines wetlands in relation to groundwater recharge and discharge, flood storage and desynchronisation, shoreline anchoring and dissipation of erosive forces, sediment trapping, nutrient retention and removal, food chain support, habitat for fisheries and wildlife, active and passive recreation, heritage, forestry and agricultural values. Some of the more prominent among these vital functions are highlighted in the centrefold of this feature.

## Tailoring regulation to assessment

Wetland regulation has achieved national scope in the United States but it now operates on the assumption that all wetlands have the same functions until case-by-case studies show otherwise. But it is already evident that wetlands in different physiographic regions function in different ways. With support from private and federal agencies, the National Wetlands

among scientists in each region of the country to examine the scientific database for each region in order to form a basis for 'tailoring' regulations to regional ecological differences. Each discussion group is considering a region's major wetland types in the context of eight issues:

- Where are the types located? How extensive is each type?
- What are the biotic and physical characteristics of the major wetland types?
- What are the special functions and values associated with the types?
- What problems are associated with the wetland, including losses and causes of losses?
- What techniques are available for evaluating the functions and values?
- How good is the scientific database on the wetland type in question and what priority research is needed to supplement the base?
- Where are the potential national wetland sites for long-term research, whose hydrology is known or can be readily researched?
- What is the relationship between critical science issues and critical conservation issues where wetlands are concerned?

Regional reports will offer a succinct statement by the wetland specialist community on the functions and values of the wetlands of their region, documented by scientific research. They will identify those regional wetland types most critical to major wetland functions, delineate science research needs and relate the critical wetland types and research priorities to regional conservation issues. By this means, they will try to help government agencies tailor wetland regulations according to wetland functions at the regional level, and thus provide the scientific base for long-term conservation of wetlands in the United States.

## Tropical wetlands — special problems

The understanding of wetlands functions and values in North America is, despite the concentration of wetlands scientists in that region, still not enough to spur appropriate legislation for the wise, sustainable use of this crucial biotope. Our understanding of these functions and values in other parts of the world, especially in the tropics where the pressures upon wetlands are reaching crisis point, is much poorer. It is essential to fill the gaps soon if we are to develop an effective and persuasive tropical wetlands policy.

In the tropics and other developing regions, such policy must be based upon a clear demonstration of the contribution of wetlands to sustainable development, as fishery support, game harvesting or tourist facilities. This must be one of the top priority goals for IUCN's current Wetlands Conservation Programme.

*Dr Larson is Professor and Director of the Environmental Institute, University of Massachusetts, Amherst, USA and Executive Chairman of the US National Wetlands Technical Council.*

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# Planning and Managing Wetlands

Wetlands are affected by water supply well beyond their evident limits. That supply is being affected more and more by decisions taken outside the jurisdiction of the authority responsible for the wetland itself — sometimes even in another country. CARLOS QUESADA sizes up this problem in the light of Central American examples.

WETLANDS must be considered an integral part of the water catchments and fluvial systems that support them. To manage many wetlands on a sustained basis, we need to manage the whole watershed upon which they depend. Examples of the importance of this rule are many: high erosion rates from poorly protected upper watersheds result in heavy river sediment loads, cause mortality in both marine and coastal wetland communities and lead, through increased sedimentation, to reduction of the available area of open water. River discharges of muddy waters with fine silts can be transported long distances along the shoreline by the littoral current, to tourist beaches or coral reefs. And the impact of inadequate management is frequently compounded by surplus use of agricultural fertilisers and toxic pesticides.

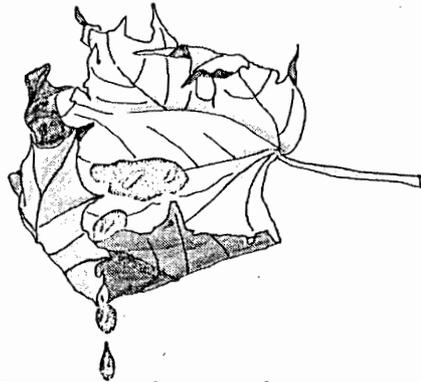
Watershed mismanagement does not just mean increased siltation. It can also reduce the capacity of the catchment to retain water. That leads to flash floods after rain and low water levels in rivers which formerly received a good and gradual water supply from well vegetated watersheds. This pattern of events can lead still further — to drought in some areas, or to excess salinity in normally brackish estuaries and mangroves and hence to greater mortality among the estuarine fauna. The impact of this phenomenon on populations of economically important fish and crustaceans still remains to be measured.

## Trouble on the isthmus

These problems are especially acute in the Central American isthmus, which includes 10% of all Neotropical wetlands so far recognised as being of international importance.

The region has one of the world's fastest rates of deforestation; even on the steep mountain highlands, lush tropical rainforest is giving way to cropland or pasture. There is, however, a growing realisation among politicians and planners that the conservation of wetlands is intimately linked to the conservation of watershed quality. But the problems are mounting rapidly: increasing silt loads in Río La Estrella near

led to increased turbidity and degradation of the only live reef in the country. In El Salvador, watershed deterioration has led to sedimentation of the Laguna de Jocotal. In Panama, overgrazing and lack of conservation management in valuable market garden sites in the highly erodible volcanic soils on Volcán Barú has led to sedimentation of the mangrove areas of the Gulf of Chiriguí. In northwest Nicaragua, the Estero Real, with almost 100,000 ha of mangrove, is being damaged by pesticides applied to cotton crops higher in the catchment area and leached into drainage waters.



## Conservation action stirring

Despite the gravity of the problems which watershed degradation presents for wetlands, recent events in Central America give cause for cautious optimism. Perhaps the most important signal is the increasing number of well-trained resource managers who are organising activities to take care of various conservation needs arising in important watershed catchment areas.

A guiding presence behind many of these new conservation efforts is the Wildlands and Watershed Management Program of the Department of Natural Renewable Resources in CATIE — the *Centro Agronómico Tropical de Investigación y Enseñanza*, based in Turrialba, Costa Rica. By working closely with national institutions in different countries in the region to identify potential protection sites, to train personnel at different levels (from management supervisors to park rangers and forest guards), to jointly prepare management plans and to identify local and external fieldwork project donors, the Program has taken a leading role in events throughout the region.

Among present priorities are effective operation and management of La Tigra National Park which protects the water supply of Tegucigalpa, Honduras' capital city, and an major watershed management project in the Río Choluteca catchment. The Río Choluteca feeds the Gulf of Fonseca and is attributed special importance in the IUCN Wetlands Programme. Together with the Honduran Ecological Society and the *Corporación Hondureña de Desarrollo Forestal*, IUCN is, with WWF support, developing a project to protect the mangroves of the Gulf from uncontrolled cutting, so preserving their capacity to support the commercially important populations of fish and shrimp which depend upon the mangroves as a breeding and nursery area.

A unique integrated effort is also under way in Costa Rica, linking multi-purpose resource utilisation and conservation. There, IUCN and CATIE are working with other scientific organisations and an array of national institutions to develop effective management plans for the integrated conservation and wise use of the Río Arenal and Río Tempisque interbasin diversion complex. This complex includes the largest hydropower scheme in the country and an ambitious irrigation project for close to 100,000 ha in the Río Tempisque valley.

Bordering the lower portion of the proposed irrigation scheme site and between the mouth of the Tempisque and Bebedero rivers, lies Palo Verde National Park and Wildlife Refuge, one of the most important wetland sites in Central America. The future of Palo Verde depends on how much attention is paid to environmental considerations during the planning process and on how well appropriate protection measures can be implemented. Here is a major challenge for IUCN, CATIE and Costa Rica during 1986.

## Lessons learned

The problems which watershed degradation in Central America pose to the wetlands of the region demonstrate clearly the importance and complexity of links between watershed management and wetlands conservation. It is encouraging and a source of regional pride that significant efforts are now being made to address these issues. Such efforts must now serve as an example for other countries and regions. However, in seeking to hold up the example of Central America, some caution is required. Most river systems there are contained within one country.

In contrast, from the Niger (which flows through the Sahel before emptying into the Gulf of Guinea) to the Paraguay, which links Brazil, Paraguay and Argentina, nearly all the greatest river systems of the world require international agreement for their effective management. So far, the vast size of these systems has actually helped spare them many of the problems which we see today in Central America — but time is running out. If, during the course of the next decade, the nations who control these rivers do not learn to work together to develop innovative approaches to management of their resources for the common benefit of their people, the problems experienced by Central America will be magnified a hundredfold in larger-scale river basins and watersheds.

Fortunately, a number of organisations are now applying more effort and money to these questions, among them UNEP — which will launch a major programme in 1986 for the environmentally sound management of inland fresh waters. This is a most important initiative, to which IUCN must give its full support, as to any measure that may help tackle what is one of the crucial environmental issues of our time.

*Carlos Quesada heads CATIE's Regional Watershed Program for Central America*

# Midnight at the Oasis



Wetland resources are vitally important bulwarks against the spread of the world's arid and semi-arid areas, where new options for greater food production are limited or prohibitively expensive. Wetlands are rich protein sources but this resource is being set in jeopardy as water is lost to other uses. PATRICK DUGAN, who steers the IUCN and WWF Wetland Conservation Programme, looks at the problems of the Sahel.

**D**URING the past two decades, world attention has been drawn more and more urgently to the problems of the Sahel. Loss of arable soil and a consequent drop in *per capita* food production have come to characterise the region's circumstances in the public eye.

The very word Sahel has become for most people synonymous with drought, yet — paradoxically — the Sahel region contains some of Africa's most important wetland areas (see below).

## Sahel Wetlands

- Senegal valley (Senegal/Mauritania) — 5,000 km<sup>2</sup> of floodplain.
- Inner Delta of river Niger (Mali) — 30,000 km<sup>2</sup> of floodplain and lakes.
- Nile Sudd (Sudan) — 27,000 km<sup>2</sup> of wetlands.
- Lake Chad (Chad / Niger / Nigeria / Cameroon) — variable in area: 25,000 km<sup>2</sup> in 1964; 9,000 km<sup>2</sup> in 1973.
- Logone River (Cameroon) — 5,000 km<sup>2</sup> of floodplain.

## Threats

As rising population and fluctuating rainfall step up the pressure on the natural resources of the Sahel, intensified use or conversion of wetland areas is increasingly seen as a quick answer to the problem. However, if wetlands are to contribute in full measure to maintaining or improving conditions for people in the Sahel, it is essential that the way they function is fully understood and that the ecological processes which form them are preserved. The floodplains, river beds and lakes which are spread thinly but generally across the region have, for centuries, stood between

the people of the Sahel and destitution. Even in the wettest years, rural communities still depend upon these productive wetlands for fish, dry season pasture, and water. In short, human life in the Sahel depends upon wetlands and — even if rainfall soon returns to earlier levels — sustainable development in the region will always depend upon environmentally sound use of the wetland resource.

## Management a must

The need for sound management increases every year. Since the breakdown of the traditional grazing and fishing controls which regulated use of these wetlands in former times, resources have dwindled and production has slumped. As a result, the value of natural or only part-modified wetland habitats has been questioned and moves to develop new systems of food production on wetland sites have become more and more widespread. Yet, while intensive irrigated agriculture has an important role to play in meeting the food needs of the countries of the Sahel, it can only be part of a solution to problems of resource use in the region's wetlands. Irrigation, as it is conventionally practised, is falling prone to a growing number of social and environmental constraints: a call is being made for a reappraisal of resource use which accommodates a need to know where irrigation can be developed successfully and where other approaches to resource use are more likely to be viable over the long term.

It is essential to safeguard the water flow on which the productivity of the wetlands depends. Too many dams and other impoundments are sited without due regard to their impact further downstream. Too local a perspective can compromise the productivity of vast regions. In Lake Chad, for instance, water levels are dropping not just as a result of poor rainfall, but also because of

simply, one man's gain is another man's loss.

## IUCN's role

Already, with help from the Federal Republic of Germany and from WWF, IUCN is effecting a major study of wetland resource use and management in the inner delta of the river Niger in Mali. A team of European and Malian experts is working to determine the root causes of resource degradation and identify long-term solutions.

As a supplement to this pioneer project IUCN is, once more with the help of WWF, developing a series of small field projects in other countries of the region. As part of a rural development plan for the Mauritanian shore of the Senegal delta we are backing Mauritania's efforts to establish a protected wetland area there.

On the other bank of the river, in Senegal, we are exploring ways to establish additional protected areas where traditional grazing, fishing and agriculture may continue, but under effective controls which safeguard resources from over-exploitation and destruction.

And in northern Nigeria a project for establishment of multiple use reserves in the Hadejia valley will be twinned with a study of the water budget of the river basin, to provide clear recommendations on how the water resources of this river can be exploited in environmentally sound ways.

## Waterproof agencies

Faced with accelerating crisis in the Sahel, the development aid community has been looking for new ways to reap more benefits from the natural resources of the region. Until recently, however, their attention has focused on raising the productivity of mainly rain-fed marginal rangelands. The *inherent* productivity of the Sahel's wetlands has been ignored.

As the Wetlands Programme gets into its stride, it offers an ideal opportunity to repair this omission. Already IUCN's Conservation for Development Centre is canvassing the agencies for support for a major project to study and publicise the productivity of Sahelian wetlands and the impact different types of management and development have on them.

But this is only a beginning. Over the next few years IUCN will mould the results of the demonstration projects described above into a springboard for much greater aid agency participation in the conservation and sustainable development of the Sahel's wetlands.

IUCN members can do much to make this task easier by, for instance, lobbying their own governments to make them more aware of, and receptive to, the IUCN approach to sustainable development and environmental rehabilitation in Sahelian Africa and its wetlands. Some IUCN members are already doing exactly that, but many more could enter the picture. The regional opportunity is there. We must now rise, as a Union, to the challenge of using the Sahel's wetlands sensibly to meet the many different needs of the people who depend on them.

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# Campaigning for Wetlands

Information, education and publicity are essential elements in winning acceptance among the public and their leaders of initiatives like the IUCN Wetlands Programme and campaigns — like WWF's — that are linked to it. Wetlands are difficult candidates for such treatment: their public image lacks glamour and their value is not self-evident. Whatever the audience, however, well-targeted awareness campaigns or lobbying efforts will always be worth the effort, says DAVID BALDOCK.

Of all major ecosystems, wetlands have perhaps the poorest public image. Their value is rarely obvious. To the contrary, most people fear the diseases which many wetlands harbour and can readily see the advantages of a reclamation project in terms of more food or jobs.

The IUCN Wetlands Programme incorporates a series of activities intended to convince people at large of the benefits which well-cared-for wetlands bring them. The WWF and IUCN Campaign and Programme leads this field. The national organisations of WWF, with several other IUCN members, have devised a series of media events to raise wetlands higher in the esteem of the world's citizens, politicians and planners. To supplement these efforts by enlarging international media coverage of wetlands, WWF has also funded publication of a forthcoming Earthscan press briefing document on wetlands (called *Waterlogged Wealth*) and will support the distribution of press materials relevant to wetlands through the international press agency Depthnews.

Though WWF's national organisations have set the pace for this awareness drive, many other members of IUCN (especially NGOs) will have the opportunity to campaign for wetlands and enlist public support for wetland conservation. Their efforts will, naturally, succeed best if they focus on issues which the public can understand and get involved in.

Wetlands drainage is one issue which can attract exceptional public attention. While some drainage schemes offer tangible and real benefits to local people, the value of

altering or destroying wetlands is often over-estimated and the costs incompletely accounted. In North America and western Europe, many public action groups have proved that inappropriate drainage schemes produce few long-term benefits for farmers and result in considerable environmental damage. Today, advanced scrutiny of large drainage projects has become something which many communities faced by such schemes insist on as a matter of absolute priority.

Banking on this degree of public support, conservation NGOs are widening their scope to question more generally the technical feasibility of drainage and other forms of wetland development, their social acceptability and their expected economic returns. They are demanding that, before they permit such schemes to go ahead, politicians and planners first ask:

- are projects technically sound?
- have they taken adequate account of soil conditions and hydrology?
- have the benefits of a scheme been rigorously estimated or are they based on over-optimistic assumptions?
- have alternatives been considered?

## Self-recommendation

At present, many drainage works go ahead on the basis of economic assessments drawn up by those promoting the scheme and making assumptions highly favourable to their own case. Added to this, secrecy in the decision-making process poses a major

cedure. In many countries, a priority of some past campaigns has been free access to relevant official documents.

But these NGO efforts need to be expanded and greater public support needs to be enlisted. And there is every reason for public interest in many of these issues. More and more wetlands are destroyed with the aid of taxpayers' money, even in countries whose governments regularly express their commitment to conservation. The use of public funds in this way can often be an important campaigning point, making people aware that they themselves are financing the loss of valuable sites, and showing that there may be financial as well as environmental benefits in opting for conservation rather than development.

## Fair questions

Where public funds are financing drainage projects to help increase production of agricultural products which can in turn only be dispensed of with a large subsidy, the conservation case is particularly strong. This has helped influence the Commission of the European Community which, in reviewing the possible future of the Common Agricultural Policy, referred to wetland drainage thus:

"The destruction of such valuable ecosystems is generally irreversible, and the question is therefore posed whether public aids for this activity are any longer justified, particularly since the Community has passed self-sufficiency for many agricultural products. It would be desirable to conduct a review of agricultural drainage, with a view to limiting, or even in some cases or regions prohibiting the use of public aids for this purpose."

The review referred to is still urgently needed and a final decision to set it on course needs to be strongly pressed for by NGOs in Europe.

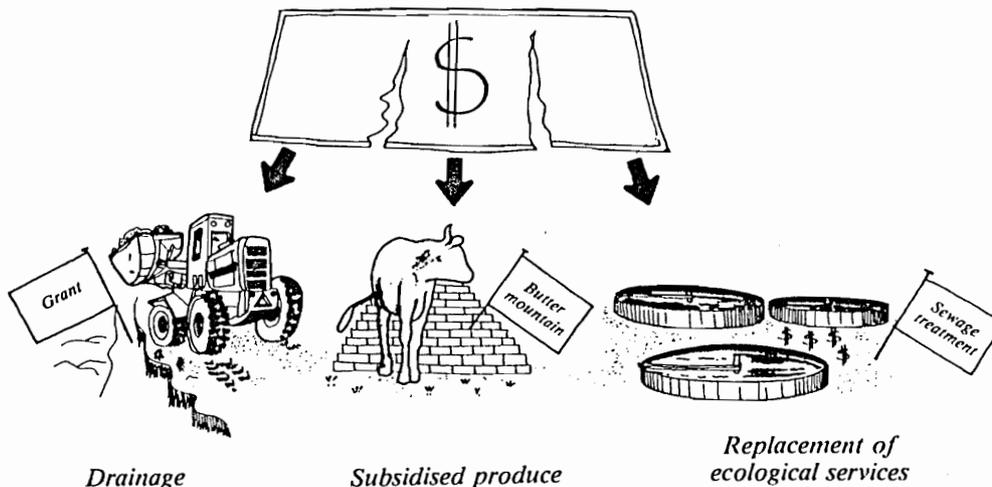
## Tactics

Throughout the world, different threats to wetlands have to be resisted in different ways. Fighting long-term pollution or over-exploitation of biological resources require tactics quite different from lobbies against more palpable targets such as plans for an insufficiently planned tourist development or power station on a coastal site. However, in general, campaigns should aim to secure guarantees of adequate physical planning and environmental protection legislation, whatever the threat. Once the provision is established, it is up to conservation interests to ensure that it is properly implemented and applied. Active and vigilant non-governmental organisations can often take the lead in ensuring that legislation achieves the results it was intended to bring.

David Baldock is a London-based consultant attached to the International Institute for Environment and Development and the Institute for European Environmental Policy. He is the author of *Wetland Drainage in Europe — the Effects Agricultural Policy in Four EEC Countries*.

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## The many costs of wetland loss



14

# Peat Mining in Jamaica

Plans to mine peat for energy in Jamaica are a vital test of IUCN's capacity to respond to wetland conservation problems in the tropics. EDWARD MALTBY identifies at first hand some of the dilemmas involved.

MANY developing nation governments are looking to coastal and tropical peatlands as a source of energy to slow the rise in oil imports, a key factor in foreign debt problems. Nowhere is this more true than in Jamaica, where oil imports today provide 98% of the country's fuel needs and add 20% to the annual import bill.

The case of peat mining in Jamaica is complex and holds far-reaching implications for coastal and tropical peatlands worldwide. Faced with immense balance of payment problems and acute shortage of hard currency, the government established the Petroleum Corporation of Jamaica (PCJ) in 1969, with a mandate to develop new and diversified energy sources for the country. Peat's cost-saving and development potential has recently awakened high hopes in Jamaica — but are they justified?

## The resource

Jamaica's peat resources occur in two of the largest wetlands left in the Caribbean, the Negril (23km<sup>2</sup>) and Black River (57km<sup>2</sup>) coastal morasses. They constitute 75% of the island's wetlands and provide wildlife habitats for outstanding numbers of endemic and rare species — outstanding not just in the Caribbean context but in terms of the Neotropical region as a whole.

Yet it has been estimated that the morasses hold enough recoverable peat to fuel power plants with a total capacity of 120 megawatts for 30 years. Even allowing for environmental constraints, the Minister of Mining, Energy and Tourism confidently predicted (in a March 1985 statement) a yield of 90 megawatts for 25-30 years — about 35% of present electricity consumption, producing a foreign exchange saving of \$24 million a year and the possibility of real industrial expansion.

The combination of techniques to be used at Negril is novel. It involves extraction of wet peat which will be pumped to mechanical de-watering sites and eventually converted to a sufficiently combustible material to make electricity generators an economic proposition. Until all the trials are complete and the engineering links are made in practice it remains to be seen whether the economic forecasts will be fulfilled.

## The conflicts

The Negril Morass is already in a degraded state because of drainage and canal excava-



tion in the 1950s and through burning and draining for the illegal (but profitable as a foreign exchange earner) cultivations of 'ganga' (*Cannabis sativa*) in the last remnants of swamp forest. The PCJ has endorsed the view that mining would preserve the Morass as a permanent wetland and "... counteract the processes and activities otherwise leading to degradation". And development would result in the creation of an extensive new lake — at 15 km<sup>2</sup> it would become the largest open-water body in Jamaica. Future environmental management proposals for the area include recreation, aquaculture and natural fisheries, and habitat creation for wildlife.

But there are drawbacks. A power station is planned at or close to the coast, using sea water for cooling and releasing heated effluent water in a tropical marine environment, many of whose species are probably already living close to their upper limits of temperature tolerance. Air quality would depend on the operational success of electrostatic precipitators but the 75 metre stack would be visible over a large area. The Jamaican peat is high in mineral ash and sulphur, which increase enormously the demands on technical efficiency and management to minimise environmental damage arising from its processing.

The Negril Chamber of Commerce fears that development, however well-conceived and implemented, will lead to loss of environmental quality and decline in tourism, the region's most important employer and external dollar-earner. PCJ has a poor track record of environmental concern, especially in relation to bauxite mining. PCJ's environmental advisors approved the mining proposal but important habitat rehabilitation may not be fully realised for at least 20-30 years. And there is a growing realisation that development of Negril will open the door to mining, first in the Black River Lower Morass (much of it pristine, ecologically diverse and richer in wildlife than Negril) and then even further afield in other tropical and coastal peatlands such as those of Indonesia.

## External aid

As in many other countries, the PCJ have been advised on environmental and technical aspects of the mining proposal by teams of overseas scientists and engineers, financed through bilateral aid — in the case of Negril some US\$1 million from Sweden and Finland. This cooperation has resulted in a multitude of ecological and technical reports, including environmental feasibility

and 'optimum' utilisation studies of the wetland resource. These follow a report in 1981 by the Natural Resources Conservation Department (NRCD) and the consultants Travers Group Inc. (TGI), indicating that the original engineering proposals for the scheme would be ecologically and socio-economically damaging.

However, despite this plethora of cautionary reports, the Jamaican government has given complete authority to pass judgement on conservation issues in potential peat mining areas to PCJ. The role and influence of the NRCD has waned over the last year and the department is running increasingly short of funds and effective power for any detailed research or management action. A recent proposal to create a National Park and recreation-horticultural peat complex around the remaining *Roystonea* forest comes from PCJ.

NGOs are not strong in Jamaica but public opinion and awareness in favour of conserving the natural environment seem to be on the upsurge there. This year witnessed, for example, the creation of the Negril Association for the Conservation of Nature.

## IUCN's role

Worried about the possible adverse ecological effects of peat mining and the harm it may do to Negril's flourishing tourist trade, the Negril Chamber of Commerce (NCC) sought the external assistance of IUCN to interpret the studies and intentions of PCJ and their consultants and to advise local people on the proposed project. An initial environmental assessment was carried out early in 1985 under the auspices of the IUCN Conservation for Development Centre and the first report was published in June 1985.

Recent newspaper reports continue to headline the conflicts between Kingston and Negril. IUCN is in a privileged position to exercise influence in both places and also abroad in the matter of external funding. At least one key question of national policy still needs to be addressed in order to satisfy local and international interests: what would be the returns from using investment funds to capitalise to the same extent on alternative resources like tourism or solar energy — both sustainable uses? This option was recognised as early as 1981 in the NRCD/TGI assessment. A strong and influential nationwide conservation or environmental protection agency would do much to defuse suspicion and enable Jamaica to take a lead among developing countries in optimising resources for sustained development rather than compromising future uses in the name of short-term benefit. IUCN means to assist wherever it reasonably can in this often difficult ecological, economic and political process. □

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# RAMSAR: Buoyant Prospects

IUCN continues to perform Bureau (secretariat) functions under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971). DANIEL NAVID, Head of IUCN's International Relations Unit, looks at recent developments under the Convention.

THE Ramsar Convention is the main mechanism for international cooperation to conserve wetlands. In fact, Ramsar is the only international convention which is dedicated to the conservation of a particular ecosystem type along with the species dependent upon it.

Through the provisions of the Convention, States have the obligation to include wetland conservation considerations in their national planning initiatives. They agree to promote as far as possible the "wise use" of wetlands in their territory. They are also obliged to establish protected areas for wetlands and to designate wetlands for inclusion in the List of Wetlands of International Importance, maintained at IUCN's Conservation Monitoring Centre. It is fitting, then, that promotion of the Ramsar Convention is a central pillar of the IUCN Wetlands Programme.

## Surge of interest

Governments and conservation organisations are paying more and more attention to Ramsar as the importance of concerted international action for wetland conservation becomes more and more evident. Wetlands are affected, for example, by faraway and even transnational impacts upon the streams and rivers which supply them. Wetlands can be seriously degraded by transboundary air and water pollution, and many wetland-dependant species are migratory and so require protection tuned to international cooperation. Thanks to this surge of interest and awareness, the Convention is experiencing an exciting period of growth.

In the Federal Republic of Germany, interventions are being made by local and international organisations and impact assessment studies are being carried out on plans for industrial development or mining operations at the Orsoyer Rheinbogen site and for plans for autoroute construction near the Wollmatingen reed-bed site. In Iran, the Government has requested IUCN and IWRB to provide international assistance to assess water disruption at Lake Hamoun, said to be caused by water diversion beyond the border of Iran in Afghanistan. In all of these cases and in other, less dramatic, instances concerning the wise use requirement of the Convention in other Contracting Party countries,

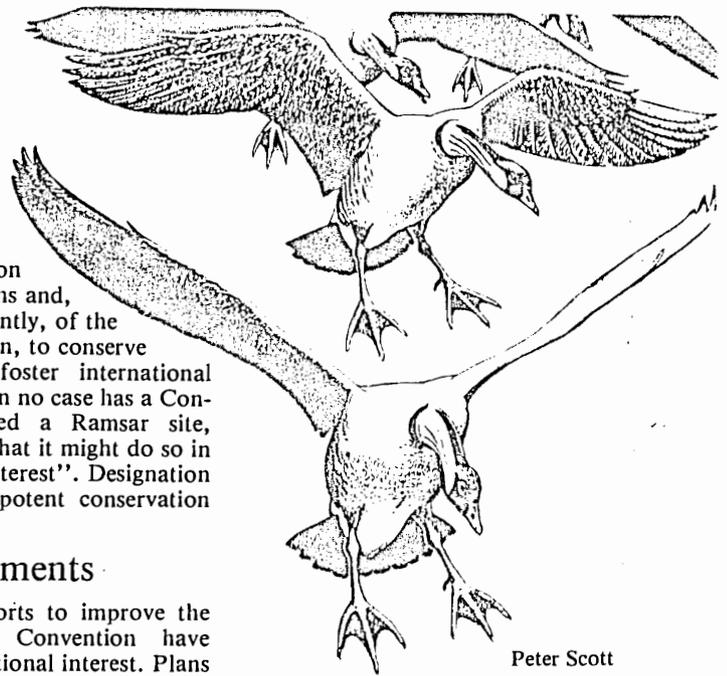
IUCN has been most encouraged to see the value being placed upon observance of the terms and, perhaps more importantly, of the spirit of the convention, to conserve wetland areas and foster international cooperation. Indeed, in no case has a Contracting Party delisted a Ramsar site, despite the provision that it might do so in its "urgent national interest". Designation has proved to be a potent conservation tool.

## Future requirements

It is evident that efforts to improve the functioning of the Convention have fostered much international interest. Plans are now being made for the next Conference of the Contracting Parties, which is expected to be the largest and most ambitious Ramsar Convention meeting ever held. It is intended that at Regina an Extraordinary Conference of the Parties will also be held, pursuant to the terms of the Paris Protocol, in order to adopt necessary Convention amendments. A Task Force of the Parties, established at the Groningen Conference, has been working to develop these amendments and to propose extra infrastructure requirements. The report of the Task Force will be distributed to all Parties in late autumn of this year, together with the programme for the "ordinary" Regina Conference. That programme will focus upon scientific and technical requirements for wetland conservation and will be organised to include working group discussions as well as presentations about wetland conservation approaches in different parts of the world. Details about the Conference programme as well as the procedure for the registration of observers will be available from IUCN in early 1986.

## New Parties and Sites

In the past year, Uruguay, Ireland, Suriname and Belgium have joined the Convention. The Convention Depositary, Unesco, has also recently received the deposit of incomplete instruments of accession from Mali and Egypt as well as a declaration of intent from Mexico. Once formalities have been completed for these latter three States, total membership in the Convention will include 42 Contracting Parties. In addition, the United States signed the Convention on 13 September 1985 and ratification of that signature is expected to occur before the end of the year. Finally, France has ratified the Protocol and by the terms of that instrument will automatically become a Contracting Party when the Protocol enters into force. Reports from countries throughout the world and especially in Latin America indicate that many more new Contracting Parties are expected in the near future. The Ramsar List of Wetlands of International Importance now numbers some 325 sites covering more than 20 million hectares.



Peter Scott

## Implementation

IUCN has received numerous reports from the Contracting Parties attesting to the value which they attach to the Convention in providing the basis for their national wetland conservation policies.

Even more significantly, the Contracting Parties and concerned non-governmental organisations have brought to the attention of IUCN several cases wherein the integrity of Ramsar sites have been under threat and special national actions are being launched to conserve these internationally recognised areas. In the case of the Ramsar site near Hainburg in Austria, injunctive legal relief initiated by WWF has been granted to delay the clearing of the riverine forest area for the construction of a power plant and thus allow further investigations to be made.

However, the Convention, the first global nature conservation convention, has been handicapped by lack of a financial basis for its administration. Further problems arise from the fact that the Convention possesses a cumbersome language clause which provides that only the English text is "authentic". This provision has limited participation in non-anglophone parts of the world and there is no amendment procedure which could be used to correct such serious deficiencies.

Contracting Parties, recognising the potential of the Convention, have initiated a series of actions to overcome these kinds of problems. In the first place, a protocol text was adopted by the Parties in Paris in December 1982 which, when in force, will provide that all language versions of the Convention are equally authentic and will provide a procedure for the adoption of amendments to the Convention. At the time of writing, action by only two more Parties is required to bring the Protocol into force. In the meantime, work has been started for the elaboration of substantive amendments to the Convention, including the creation of a financial regime which might be adopted at the time of the next Conference of the Parties, now scheduled to be held at Regina, Canada in late May and early June of 1987.