

RAMSAR CONVENTION MONITORING PROCEDURE

REPORT NO.26

WETLANDS OF THE SEISTAN BASIN, SOUTH CASPIAN AND FARS
ISLAMIC REPUBLIC OF IRAN

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General Introduction

1. Each Contracting Party to the Ramsar Convention ("Convention on wetlands of international importance especially as waterfowl habitat", Ramsar, 1971) "shall designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance" (Article 2.1 of the Convention). The Contracting Parties "shall designate at least one wetland to be included in the List" (Article 2.4) and "shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List" (Article 3.1). Furthermore, each Contracting Party "shall arrange to be informed at the earliest possible time if the ecological character of any wetland in its territory and included in the List has changed, is changing, or is likely to change as the result of technological developments, pollution or other human interference. Information on such changes shall be passed without delay to the organization or government responsible for continuing bureau duties" (Article 3.2).
2. These are the principal stipulations of the Convention concerning wetlands included in the Ramsar List. Successive meetings of the Conference of the Contracting Parties (held in 1980 at Cagliari, Italy; in 1984 at Groningen, Netherlands; in 1987 at Regina, Canada; and in 1990 at Montreux, Switzerland) have devoted special attention to the conservation of listed wetlands and to the best ways of avoiding "change in ecological character".
3. Conference Document C.3.6 of the Regina meeting ("Review of national reports submitted by Contracting Parties and Review of implementation of the Convention since the second meeting in Groningen, Netherlands in May 1984") included a section (paragraphs 66 to 107) entitled "Changes in the ecological character of listed wetlands". This section recalled that it was "essential that, after a wetland has been designated for the List, its conservation status should be maintained", and that "the concept of preventing 'change in ecological character' is fundamental to the Ramsar Convention". Paragraphs 74 to 107 reviewed the 29 wetlands on the List where such changes had occurred, were occurring, or were likely to occur.
4. During the discussion of these paragraphs, several delegates emphasized the importance of avoiding changes of this kind and the Conference approved a Recommendation (C.3.9) on this matter. The Recommendation urged Contracting Parties to take swift and effective action to prevent any further degradation of sites and to restore, as far as possible, the value of degraded sites; the Recommendation requested Parties in whose territory were located the 29 sites identified as having incurred or being threatened by change, to report to the Convention Bureau the actions undertaken to safeguard these sites.

5. The fourth meeting of the Ramsar Convention Standing Committee, held in Costa Rica in January 1988, considered the best way of promoting the implementation of Recommendation C.3.9. A "Monitoring Procedure" was adopted by the Standing Committee to find a solution to possible change in ecological character at Ramsar Sites, and has been used since February 1988 by the Convention Bureau. The fourth meeting of the Conference of the Contracting Parties, held at Montreux in 1990, approved a Recommendation (C.4.7) which "endorses the measures taken by the Standing Committee to establish a Ramsar Monitoring Procedure"; the text of the Procedure is included as Appendix I to the present report. Recommendation C.4.7 also "instructs the Bureau to continue to operate this procedure when it receives information on adverse or likely adverse changes in ecological character at Ramsar sites". Recommendation C.4.7 finally "determines that Monitoring Procedure reports shall be public documents once the Contracting Party concerned has had an opportunity to study the reports and comment on them".
6. The Montreux Conference also approved a Recommendation (C.4.8) on "Change in ecological character of Ramsar sites". This Recommendation refers back to Regina Document C.3.6 and to the similar document presented at Montreux (document C.4.18) which lists 44 Ramsar sites in 23 countries which appear likely to have undergone, to be undergoing, or to be likely to undergo a change in ecological character. Recommendation C.4.8 requests the Contracting Parties concerned to take swift and effective action to prevent or remedy such changes; it instructs the Bureau to maintain a Record of such sites and to give priority to application of the Monitoring Procedure at sites included in this "Montreux Record".
7. Funding for the Monitoring Procedure is provided from the Convention's core budget and also from additional voluntary contributions made by Contracting Parties, Unesco and interested non-government organizations, notably WWF and RSPB (the Royal Society for the Protection of Birds, UK).

Implementation of the Ramsar Convention in the Islamic Republic of Iran
- general

8. Iran's role in the development of the Ramsar Convention has been crucial. The conference which adopted the text of the Convention was held in the city of Ramsar on the Iranian shore of the Caspian Sea in February 1971. Iran was one of the first seven states to become a Contracting Party to the convention, thus bringing it into force. At the time of joining the Convention, Iran designated 18 wetlands for the List of wetlands of international importance, with a total area of over one million three hundred and fifty thousand hectares - at that time much the largest area of wetland designated by any Contracting Party; these 18 wetlands ranged from extensive coastal sites in the Caspian region, to inland lakes like Ooroomiyeh in Azarbaijan or the Neiriz Lakes in Fars, and to extensive tracts of shoreline along the coast of the Gulf (see Appendix II for details).

9. Following the profound changes in its institutional structures in recent years, Iran has maintained its close involvement in the work of the Ramsar Convention. The Department of the Environment remains the Administrative Authority responsible for implementing the Convention in Iran. Delegations from the Islamic Republic took part in the meetings of the Conference of the Contracting Parties in 1984, 1987 and 1990. Iran accepted the Paris Protocol to amend the convention in 1986, thereby helping to bring these amendments into force before the Regina conference. (However, Iran has not yet accepted the additional amendments adopted at the Extraordinary Conference in Regina in 1987). In 1988, 1990 and 1991, Iran made financial contributions to the Ramsar budget. At Montreux in 1990, Iran was elected Alternate Representative for the Asian region on the Ramsar Standing Committee, and has since then been active in regional Ramsar issues and in the preparation of the fifth meeting of the Conference of the Contracting Parties, to be held at an Asian venue - Kushiro in Japan - in 1993.
10. The Ramsar Bureau is contacting the Iranian authorities separately about the various administrative issues raised in the course of the Ramsar mission's visit to Iran.
11. As will be clear from the later technical sections of the present report, Iranian specialists have continued to carry out scientific and technical research and monitoring at Iranian wetlands, and in particular have contributed to the international midwinter censuses of waterfowl coordinated by the International Waterfowl and Wetlands Research Bureau (IWRB), which provide essential technical and scientific support for the application of the convention. At the seminar on wetlands and waterfowl of south and west Asia, held in Pakistan in December 1991, the Iranian delegation announced plans for ambitious new surveys of Iranian wetlands.

Background to the application of the Monitoring Procedure in the Islamic Republic of Iran.

12. Wetlands of the Seistan basin. Two sites in Seistan were designated for the Ramsar List in 1975. The smaller, Hamoun-e-Puzak, covers 10,000 ha and a much greater area of the lake is in Afghan territory. The larger Ramsar site in Seistan, Hamoun-e-Saberi and Hamoun-e-Helmand, covers some 50,000 ha, and also extends into Afghanistan. In many cases the Iranian authorities have referred to both together simply as "Hamoun Lake".
13. As early as May 1985, the Iranian authorities informed IWRB about difficulties in maintaining the ecological character of the Seistan wetlands. The Assistant Prime Minister and Director of the Department of the Environment informed IWRB of the situation by telephone, and later confirmed this by a telex message. The message read as follows:

"Following telephone conversation of 8th May 1985, will appreciate your immediate actions as well as advices for rehabilitation and enhancement of ecological balance of Hamoun Lake, the wintering area of about 300,000 migratory birds. It seems some human activities have caused complete drought in Seistan area and it is absolutely against the objectives of Ramsar Convention. Hereby, wish to ask all members of the Convention as well as scientific authorities of the world to pay their attention to this ecological catastrophe and would like your assistance for broadcasting the problem. Also would welcome future consultations for finding proper solutions."

14. As requested by the Iranian authorities, the International Union for the Conservation of Nature and Natural Resources (IUCN), which was at that time responsible for continuing bureau duties under the Convention, sent a diplomatic note (No. 85/6) to all Contracting Parties to communicate this information. The text of this diplomatic note is attached to the present report as Appendix III.

15. The Iranian national report to the 1987 Regina meeting (published on pages 477-481 of the conference "Proceedings") presented further information on the situation in the Seistan wetlands under the heading "Important variations in the water level of Lake Hamoun". The report noted that, after high water levels in 1982, there had been a drought leading to complete drying out in 1985; however, shallow water was again present in 1986. It continued:

"Possibly, the variations in the source of the lake and the Hirmand River on the eastern side are an effective factor in the drainage of the lake, but it is important to mention that the construction of the dam on the Hirmand River in our eastern neighbour country will have severe effects on the situation of Lake Hamoun in the near future."

"Our eastern neighbour has constructed two dams and is constructing another one on Hirmand River without taking into consideration the environmental aspects of these projects, especially in the area along the river path in Iran, and also in Lake Hamoun; the disastrous effects of these actions will eventually deteriorate the environmental situation of the region and it will not be in the interest of both countries."

16. Based on the Iranian report to the Regina meeting quoted above, document C.3.6 (paragraph 71, Regina proceedings page 206), refers to the Seistan wetlands under the section on "Changes in the ecological character of listed wetlands" and includes Lake Hamoun in paragraph 107 among the 29 wetlands on the List where change is likely to occur (see paragraph 3 above). In discussion of document C.3.6 (see Regina Proceedings page 46), "the delegation of the Islamic Republic of Iran commended the Bureau on the preparation of document C.3.6" and "remarked that the Islamic Republic of Iran faced exceptional conservation problems for certain of its wetlands and pointed out the drastic reduction of the water level experienced at the Hamoun-e-Saberi and Hamoun-e-Puzak Ramsar sites resulting in their virtual disappearance in 1985."

It explained that the reason for this was the construction of two dams in Afghanistan on the river supplying the lake with water. The delegation referred to Article 5 of the Convention which required that Contracting Parties consult with each other in the case of wetlands or water systems shared by Contracting Parties. While acknowledging that Afghanistan was not a Contracting Party, the delegation of the Islamic Republic of Iran requested that the Bureau take all possible action to promote the restoration of the ecological balance of the lake."

17. The Iranian report to the 1990 Montreux Conference again referred to difficulties in maintaining the ecological character of the Seistan wetlands. After recalling the terms of the report presented at Regina, it noted that no progress had been made at the Seistan Ramsar sites and called for urgent action. Montreux document C.4.18 suggests that the two Seistan Ramsar sites were likely to undergo change in ecological character and includes them among the 44 sites on the Montreux Record; they became as a result, as noted in paragraphs 5 & 6 above, prime candidates for application of the Monitoring Procedure, approved by recommendation C.4.8.
18. Wetlands in the South Caspian. Four wetlands in the South Caspian have been designated by Iran for the Ramsar List; they are, from west to east, Anzali Mordab, Amirkelayeh, Bandar Kiashahr and Miankaleh. The Iranian report to the 1984 Groningen Conference did not mention any change of ecological character at these sites, but indicated that the area of Miankaleh was 40,000 hectares (and not 100,000 hectares, as originally designated). Although the report to the Regina and Montreux Conferences made no special reference to problems in maintaining the ecological character of Miankaleh, it was felt appropriate that the Ramsar mission should visit the Caspian region in order to see the current state of the four Ramsar sites and in particular to investigate any effects on these wetlands of the well-documented rise in level of the Caspian Sea.
19. Wetlands of Fars. Two wetlands in the province of Fars figure on the Ramsar List: Lake Parishan and Dasht-e-Arjan; and Neiriz Lakes and Kamjan Marshes. The Iranian report to the Regina Conference indicated (Proceedings, page 479) that "Kamjan marshes in the western part of Lake Neiriz have been deleted from the List because of the drought and also urgent national interest and requirement". However, no formal notification of deletion or of the designation of other site in compensation was received by the Ramsar Bureau. Regina document C.3.6 therefore included Kamjan among the 29 sites where change in ecological character seemed likely to occur (paragraph 107, Proceedings page 217, see paragraphs 3 & 4 above). At the Regina Conference, the Iranian national report again referred to the deletion of Kamjan Marshes from the Ramsar List and therefore, following discussion of document C.4.18, it was decided to include the site among the 44 wetlands on the Montreux Record (see paragraphs 5 & 6 above).

Organization of the Monitoring Procedure mission

20. Objectives of the mission. In discussions between the Ramsar Bureau and the Department of the Environment of the Islamic Republic of Iran at and after the Montreux Conference, the need for a mission to visit Iran at an early date was emphasized. The Iranian authorities stressed the importance of the mission assessing the situation in the wetlands of the Seistan basin, but welcomed the prospect that the mission should also visit other Iranian wetlands designated for the List. Despite considerable efforts on both sides, it proved impossible to organize a visit in 1991, and so the mission was carried out in the first days of 1992.
21. The participants in the mission were:
- Ashiq Ahmed Khan, now of WWF-Pakistan, formerly of the Pakistan government's Forestry Research Institute. One of his country's foremost wetland specialists, who has worked extensively on wetlands in Pakistani Baluchistan.
 - Derek Scott, who worked in Iran for the Department of the Environment in the 1970s, attended the Ramsar Conference and took part in many field surveys of Iranian wetlands, including those visited by the mission. Since leaving the Department of the Environment, Dr. Scott has played a leading role in compiling regional wetland inventories, including the recent "Directory of Asian Wetlands".
 - Michael Smart, Assistant Secretary General of the Ramsar Bureau, who lived in Iran for two years in the 1970s, and took part during that period in many field visits to Iranian wetlands. Since leaving Iran he has been closely involved in the operation of the Convention at international level, first at IWRB and later in the Ramsar Bureau.
22. The mission's itinerary is given in Appendix IV. The names of the persons contacted by the mission are given in Appendix V. The members of the mission wish to express their warmest thanks to the Department of the Environment of the Islamic Republic of Iran for its excellent technical and logistic support and its generous hospitality. The members of the mission greatly appreciated and enjoyed the friendly and open discussion of all the issues raised.

Wetlands of the Seistan basin

23. General. The wetlands of the Seistan Basin, on the border between Iran and Afghanistan, comprise a complex of freshwater lakes with extensive reed-beds, which at times of peak flooding can cover over 200,000 ha. These wetlands are unusual in that, although the three main lakes - Hamoun-e-Puzak, Hamoun-e-Saberi and Hamoun-e-Helmand - lie within an internal drainage basin, they are predominantly freshwater.

The system lies in an extremely arid region and receives the great bulk of its water from the Helmand (or Hirmand) River, Fara River and several smaller rivers rising in the highlands of central and northern Afghanistan. During long periods of drought, as occurred in the late 1960s and again in the mid-1980s, these rivers supply sufficient water to flood only the northernmost of the lakes, the Hamoun-e-Puzak, which lies almost entirely within Afghanistan. However, during years of heavy rainfall, as occurred in the late 1970s and again in 1989, 1990 and 1991, the floodwaters sweep through all three lakes and overflow into a vast salt waste to the south-east, flushing the salts out of the system in the process. Water levels in the three main lakes during the 1970s and 1980s are summarized in Appendix VI.

24. Hamoun-e-Saberi and Hamoun-e-Helmand. The Iranian portion of the Hamoun-e-Saberi and the northern section of the Hamoun-e-Helmand to the south were designated as a Ramsar site (covering approximately 50,000 ha) in 1975. The Hamoun-e-Saberi receives water via the Fara Rud, which flows into its northeastern sector (in Afghanistan), and also through overflow from the Hamoun-e-Puzak to the east. The Hamoun-e-Helmand receives water via the southern (Seistan) branch of the Helmand River and through overflow from the Hamoun-e-Saberi to the north. Both lakes formerly supported extensive growths of Phragmites, Typha and various rushes and sedges during periods of flooding, but very little emergent vegetation has reappeared since the prolonged drought of the early and mid-1980s.
25. Approximately 37,000 ha of the Ramsar site lie within the Hamoun Protected Area (193,500 ha) established in 1967. This protected area includes only the main open water areas of the two lakes and their western shorelines, and excludes the important marshes in the east. In the late 1970s, it was proposed that the reserve be extended to incorporate all of the Hamoun-e-Saberi and Hamoun-e-Helmand marshes as well as the Iranian portion of the Hamoun-e-Puzak. New boundaries were drawn up, and indeed it is these proposed boundaries which are shown on the official Ramsar site map deposited at UNESCO at the time of Ramsar designation. However, these new boundaries have never been formally gazetted, and the Hamoun Protected Area remains in its original form (apart from a minor modification to the boundary in 1969).
26. Hamoun-e-Puzak, south end. The Hamoun-e-Puzak Ramsar site (10,000 ha) comprises the southwestern, Iranian portion of the vast Hamoun-e-Puzak wetland, the great bulk of which lies to the north and east in Afghanistan. It consists of a complex of shallow freshwater lakes with rich submergent vegetation (principally Ceratophyllum demersum) and extensive Typha and Phragmites reed-beds. The Hamoun-e-Puzak receives most of its water from the Parian branch of the Helmand River which enters the lake in two distributaries, one in the north and one in the east. The Puzak is the first of the three hamouns to fill during periods of flooding, and the last to dry out during droughts. Indeed, it seems unlikely that the main Puzak lake, some seven kms north of the Iranian border, ever dries out completely.

27. The Hamoun-e-Puzak marshes are not legally protected, although the Department of the Environment has a small office at Gorgori near the wetland.
28. Current situation and management problems. At the time of the present mission, water levels in the hamouns were almost up to their maximum levels of recent decades. The wetlands at the south end of the Hamoun-e-Puzak appeared to be in excellent condition, with clear water, rich submergent growth of aquatic vegetation, and extensive reed-beds. However, it was reported that there had been a major change in the dominant vegetation of the reed-beds, Typha having almost completely replaced Phragmites australis within the past few years. The reasons for this change were unknown, although it was supposed that the severe drought of the 1980s and extremely heavy grazing of Phragmites by domestic livestock were responsible. (Typha is said to be unpalatable to local cattle.)
29. At the Hamoun-e-Helmand and Hamoun-e-Saberi, there was an almost complete absence of emergent aquatic vegetation, a situation which contrasted markedly with the situation in the 1970s. During the severe drought of the early 1970s, all of the wetlands on the Iranian side of the border were completely dry for at least a year. However, within two months of flooding (in March and April 1972), there had been a spectacular emergence of aquatic vegetation, and by the following year, large portions of the Saberi and Helmand were covered in reed-beds. Thus the complete absence of emergent vegetation in January 1992, after almost three years of flood conditions, was particularly striking.
30. The reasons for this lack of vegetation are unclear. However, it has been argued that the great duration of the drought in the 1980s (with some parts of the Hamoun-e-Helmand remaining dry for six years) is the principal cause, the vegetation being unable to withstand such long periods of dessication. The digging up of tubers by the local people for use as fuel (witnessed by the present mission) may also have contributed to the problem. However, another likely cause is the massive stocking of the lakes in recent years with herbivorous fishes. Chinese Carp were introduced into the hamouns about 20 years ago, but presumably died out during the drought in the 1980s. However, the even more voracious Grass Carp was introduced about five years ago, and now supports a major fishery. Introductions continue, with some two million fishes being released into the Hamoun-e-Helmand near Kuh-e-Khvajeh in early January 1992. It seems likely that these fishes are retarding, if not preventing, any natural regeneration of the emergent aquatic vegetation.
31. The lack of emergent vegetation is a cause of considerable concern to local pastoralists, who depend on the marsh vegetation as a source of grazing for their herds of cattle and water buffalo. Very few livestock are now present around the Hamoun-e-Helmand and Hamoun-e-Saberi, the great majority having been moved to the Hamoun-e-Puzak marshes on the Afghan border, where the population of livestock is reported to have increased from about 10,000 to 26,000. The danger that this intensive grazing and the large-scale cutting of reeds for fodder could result in permanent damage to the marsh vegetation in this area is now a cause of some concern.

32. The mission noted with some concern the construction of a new asphalt highway across the low-lying flats between the north end of the Hamoun-e-Helmand and the south end of the Hamoun-e-Saberi. The road, which was started about five years ago and is now nearing completion, passes through the middle of the Ramsar site and the Hamoun Protected Area. Although the road passes over several bridges, free flow of water between the two hamouns has been impeded to some extent, with as yet unknown effects on their hydrology and ecological character. The mission was also concerned to learn of the construction of a new canal, between the south end of the Hamoun-e-Puzak and the Hamoun-e-Saberi, to accelerate the flow of water into the Saberi. Again, it seems that no adequate environmental impact assessment has been carried out.
33. Other recent developments in the Iranian portion of the Seistan basin include the construction of a number of major irrigation canals taking water directly from the Helmand River and its distributaries, and the construction of a large reservoir (Chahnimeh) in the desert east of Zabol, supplied by a feeder canal from the Parian branch of the Helmand River. These structures clearly reduce the amount of water entering the wetlands, and must have some impact on the ecology of the system as a whole.
34. The mission was particularly concerned at the very serious problems now being faced by the agricultural sector as a result of increasing soil salinity. Much of the former agricultural land around Zabol has had to be abandoned because of salinity problems, and it was clear that in many other areas, the intensively irrigated fields were producing extremely low yields. Already there have been some problems of wind-blown salt during the summer months, and it now seems quite possible that the area could suffer a fate similar to that of the region around the Aral Sea. At the same time, there has been a great increase in the human population of the basin during the past decade, not only as a result of the high natural population increase (about 4% per annum), but also because of the large influx of refugees from Afghanistan. At the last census in 1989, the population of the Iranian portion of the Seistan Basin was 370,000.
35. Many of the problems of drought in the Seistan Basin have in the past been attributed to dam construction and water diversion schemes on the Helmand River in Afghanistan. The Kajaki Dam, built some 40 years ago, was increased in capacity about 20 years ago and undoubtedly caused a considerable reduction in the amount of water reaching the hamouns, especially during dry years. In an agreement between the government of Afghanistan and former government of Iran, the government of Afghanistan guaranteed to provide an average flow of 26 cubic metres of water per second in the Helmand River entering Iran. It is reported, however, that the Afghani authorities chose to provide the allocated volume as a "lump sum" during the winter months, rather than as a continuous flow during the dry summer months when the water was most needed. In any event, it now seems that this agreement is no longer being honoured.

36. According to recent reports from FAO in Islamabad, the exceptional floods of early 1991 destroyed the Kajaki Dam and damaged other irrigation systems on the Helmand River in Afghanistan. Thus, for the time being at least, there would appear to be no problems of water supply via the Helmand River. However, a proposal apparently exists to build a new dam on the Helmand River in Afghanistan (the Kamal Khan Dam). Obviously, this proposal has become a matter of some concern for the authorities in Zabol, Zahedan and Teheran.
37. A major ecological study of the wetlands of the Seistan Basin was undertaken by a group of experts from Teheran University during the mid-1980s, at the height of the drought. More recently, the Department of the Environment has embarked upon a study of the wetlands, as a part of its nationwide inventory of wetlands. A governmental committee has been established, including representatives of the Departments of the Environment, Agriculture and Water, to coordinate studies and centralize the collection of information.
38. Changes in waterfowl populations. Comprehensive ground and aerial censuses between 1969/70 and 1975/76 indicated that numbers of Anatidae wintering the the Iranian portion of the Seistan wetlands varied from almost nil in exceptionally dry years (eg. 1970/71) to over 700,000 in wet years (eg. 1972/73). It was found that aerial surveys were essential to obtain adequate coverage of the wetlands and reliable counts of the waterfowl. As no aerial censuses have been possible since 1976, it is difficult to compare the counts of the mid-1970s with those of recent years.
39. Regular ground counts by personnel of the Department of the Environment between 1979/80 and 1990/91 have revealed a dramatic decline in numbers of wintering waterfowl, from between 250,000 and 300,000 in 1980-83 to less than 20,000 in 1988-1991. This has been attributed to the prolonged drought of the 1980s and large-scale degradation of the aquatic vegetation.
40. The present mission was able to cover only a small part of these vast wetlands and could not undertake any serious counts. However, the mission observed considerably fewer Anatidae and Coot (4,100) than might have been expected follow three years of extensive flooding (see Table 1). On the other hand, numbers of herons, egrets, shorebirds and gulls were no lower than might have been expected with comparable coverage in the mid-1970s.
41. Recommendations.
 - (a) The mission recommends that the Hamoun Protected Area be extended to incorporate important wetland habitat along the eastern edge of the Hamoun-e-Saberi and Hamoun-e-Helmand, and in the Iranian portion of the Hamoun-e-Puzak, as proposed in the mid-1970s. The new boundaries should follow those indicated on the official map of the Hamoun-e-Saberi and Hamoun-e-Helmand Ramsar site deposited at UNESCO.

(b) The mission recommends that the boundaries of the Protected Area and Ramsar sites be clearly demarcated on the ground, eg. with concrete pillars set at a maximum of one kilometre apart and with conspicuous sign-posts at all major entry points.

(c) Most importantly, the mission recommends that an integrated management plan be developed for all wetland and water resources in the Seistan Basin. The development and implementation of such a plan would require the involvement of all government agencies concerned with water resources in the basin (eg. Departments of the Environment and Fisheries, Ministries of Agriculture, Jihad and Power), and would ultimately involve close cooperation with the relevant authorities in Afghanistan. As pointed out by the Iranian delegation at Regina (see paragraph 16 above), Article 5 of the Ramsar Convention calls for cooperation between countries with shared water systems. One of the main problems in recent years has been the difficulty of communication between Iran and Afghanistan. It is to be hoped that, as a result of current developments in Afghanistan, better communications will become possible. The Ramsar Bureau should help to promote such communications and should encourage Afghanistan to join and implement the Convention.

The management plan would endeavour to rationalize the use of water resources in the basin of the Helmand River by taking into account the needs of the various users (domestic and industrial water supply, agriculture, fisheries and wildlife). A policy would be developed to ensure that adequate supplies of water are set aside to maintain the ecological character of the important natural wetland ecosystems. Mechanisms would be developed to ensure that, in the design of any future dams and other water control structures on the Helmand and Fara Rivers, due attention is given to all possible downstream effects. In particular, full consideration would be given to the potential impact of any such projects on the ecological character of the two Ramsar sites. This would involve close consultation and cooperation between all interested parties in Afghanistan and Iran. Until such time as relations between the governments of Afghanistan and Iran have become normalized, informal discussions between the regional authorities on both sides of the border in the Seistan basin could continue. The Ramsar Convention could perform a useful function in this regard by making preliminary contact with the appropriate authorities in Afghanistan and the UN bodies concerned, notably UNOCA offices in Islamabad and Geneva.

A basic requisite for the development of such an integrated management plan for the region would be a comprehensive ecological and socio-economic study of the wetlands and water resources of the basin. This study, which would build on and extend the ecological investigations conducted by the Department of the Environment and University of Teheran in the 1980s, would include the following:

- a comprehensive hydrological study of the Seistan basin, including a review of the changes in water level that have occurred during the past twenty years, using satellite imagery and meteorological records;

- a comprehensive limnological study of the wetlands of the Seistan basin, including studies of the physico-chemical characteristics of the water bodies, water quality and sedimentation rates;

- studies of the ecological and economic impact of fish introductions, with special attention to the impact of introduced herbivorous fishes on the aquatic vegetation and its consequences for animal husbandry and wildlife;

- a study of the effects of increased disturbance from fishing activities on wildlife populations;

- a detailed study of waterfowl populations in both summer and winter, including aerial censuses of wintering waterfowl (to provide information comparable with that obtained in the 1970s);

- studies on the problem of over-grazing of aquatic vegetation by domestic livestock and excessive harvesting of vegetation for fodder;

- a study of the exploitation of aquatic vegetation for fuel, and an investigation of alternative sources of fuel (eg. fuelwood plantations);

- an investigation of the environmental impacts of the new highway between the Hamoun-e-Saberi and the Hamoun-e-Helmand, the canal between the south end of the Hamoun-e-Puzak and the Hamoun-e-Saberi, and Chahnimeh Dam and other water control structures in Iran which may have had a pronounced effect on the hydrology and ecology of the Hamoun wetlands;

- a review of irrigation and agricultural practices in the basin, with special reference to the problem of increasing soil salinity.

As a first step, a Project Preparation Team should visit the Seistan Basin for a period of at least one month to design a two to three year project which would address the above issues and culminate in the production of an integrated management plan for the region. The Project Preparation Team should at minimum include a hydrologist, wetland ecologist, waterfowl biologist, fisheries expert, a sociologist and an irrigation expert. Implementation of the integrated management plan would require a major financial commitment, possibly through UN agencies or the Global Environment Facility. The Ramsar Convention could perform a useful function in this regard by helping to identify appropriate sources of funding.

Wetlands in the South Caspian.

42. Sea level rise in the Caspian. Between 1866 and 1933, the level of the Caspian Sea fluctuated between 25.3 and 26.0 metres below sea level (see Figure 1). In the early 1930s, however, following the construction of several major dams on the Volga River in the former USSR, the level started to fall and this continued almost without a break (other than seasonal fluctuations) until 1977/78, when the level had reached 28 metres below sea level. Then began a sudden and rapid rise, averaging over 10 cm per year. By the end of 1991, the water had risen by approximately 1.8 metres, bringing the level of the Caspian Sea almost back to its level in the 1930s.
43. Although there has been considerable speculation as to the cause of this sudden rise in sea level, it now seems certain that the rise has been deliberately engineered by the government of the former USSR, in an effort to restore the sea to its original level. Falling sea levels in the 1960s and 1970s were becoming an increasing cause of concern to fishing and shipping interests, as important fish spawning areas in coastal wetlands were drying out, and much of the very shallow northern Caspian was becoming too shallow for shipping. Two major engineering works have contributed to the rise in sea level: the closing of Karabogaz Bay in the east Caspian in 1978 (which reduced the loss of water by evaporation), and the diversion of two Siberian rivers into the Ural River (which increased the inflow of fresh water). The closing of Karabogaz Bay alone is calculated to have been responsible for a rise in sea level of between 40 and 45 cms.
44. A joint committee was formed about two years ago by the governments of Iran and the former USSR to discuss the problems caused by the sudden rise in sea level. The focal point for this committee in Iran is the Ministry of Power (formerly Ministry of Water and Electricity), although several other ministries and the Department of the Environment are involved. From preliminary discussions held to date, it seems that both sides agree that the rise in the Caspian Sea level has more positive than negative effects, and in general is to be welcomed. There seems widespread agreement that the "optimum" level for the Caspian Sea is about 26 metres below sea level, ie. a little higher than its present level. Fishery departments and the shipping industry are undoubtedly benefitting from the higher level, and few of the towns, ports and coastal installations around the Caspian have been adversely affected, since most were established in the early part of the century when the sea level was still high. The major losses, in economic terms, have been in beach development and tourism, especially in Iran, where the rising sea level has almost submerged the former extensive sandy beaches, and has caused considerable damage to beach houses, hotels and other recreation facilities. However, more detailed analysis and discussion is clearly needed.

45. The situation is being carefully monitored by researchers in Iran and the four republics of the former USSR bordering on the Caspian Sea, and considerable attention is being given to the obvious economic aspects of the sea level rise. At a meeting of the Joint Committee in Moscow in January 1992, it was agreed that there should be a full plenipotentiary meeting of the five concerned governments in Teheran in April 1992. The meeting will discuss, amongst other things, the establishment of an international research centre to investigate the situation more thoroughly.

46. Inevitably, the rapid rise in sea level has brought about profound changes to coastal wetlands around the Caspian. These include no less than six Ramsar sites: the Volga Delta (650,000 ha) in the Russian Federation; Kirov Bays (132,500 ha) in the Republic of Azerbaijan; Krasnovodsk and North Chelekensk Bays (188,700 ha) in Turkmenistan; and the Miankaleh/Gorgan Bay complex (100,000 ha), Anzali Mordab complex (15,000 ha) and Bandar Kiashahr/Sefid Rud complex (500 ha) in the Islamic Republic of Iran. At least four and probably all six of these have undergone major changes in ecological character during the last 14 years. Surprisingly, however, very little international attention has been given to the ecological consequences of the rise in sea level on these and other coastal wetlands. The effects of rising sea level in the Volga Delta have been discussed by Russian nature conservation authorities at several international meetings in recent years, but it would appear that these authorities have been ill-informed of the causes of the rise, and the matter has certainly not received the attention which it deserves.

47. Recommendations

(a) It is recommended that an international technical meeting be convened under the auspices of the Ramsar Convention at the earliest possible opportunity to build upon the results of the April 1992 plenipotentiary meeting and to review the whole issue of the rising level of the Caspian Sea in relation to its impact on coastal wetlands, and especially the six Ramsar sites. Matters to be discussed should include the following:

- the causes and extent of sea level rise;
- predictions of future sea level rise and possibilities for its control;
- the ecological changes that have occurred and are likely to occur in coastal wetlands, especially Ramsar sites, and their effect on waterfowl populations, other wildlife and fisheries;
- the optimum level of the Caspian Sea in relation to wise use of wetland resources.

The meeting should be attended by experts from Iran and the four other states bordering the Caspian Sea, and these should include hydrologists, fisheries biologists, waterfowl biologists, wetland ecologists and nature conservationists. The Ramsar Hotel on the shores of the Caspian Sea would be a particularly appropriate venue for such a meeting.

48. Anzali Mordab complex. The Anzali Mordab complex (total area 15,000 ha) comprises a large, shallow, eutrophic, freshwater coastal lagoon with extensive reed-beds, fed by several rivers and streams (including distributaries of the Sefid Rud) and emptying into the Caspian Sea via a narrow channel at the town of Bandar Anzali. Open water areas support extensive beds of the water lily Nelumbium caspicum and a very rich growth of submerged vegetation. These are surrounded by vast beds of Phragmites australis which in places grows to six metres in height. The permanent wetland area is surrounded by a broad belt of flood meadows and ab-bandans (shallow impoundments constructed to retain water for irrigation purposes during the dry summer months). Many of the ab-bandans are utilized for duck hunting during the winter months. The duck hunters employ a traditional dazzling and hand-netting technique (the "net, gong and flare" method) to catch ducks and coots from a boat at night. Elsewhere in the mordab, hunting is by shot-gun.
49. The main Anzali Mordab (about 11,000 ha) is unprotected. However, Siahkesheem Marsh, in the large and almost enclosed basin of the Rud-e-Esfand in the south-west, has been protected since 1967, initially as a Protected Region of 3,515 ha, then as a Wildlife Refuge of 6,701 ha (established in 1971), and since the revolution as a Protected Area of 4,500 ha. In addition, one of the large ab-bandans on the southern edge of the Mordab, Selke, has been protected as a Wildlife Refuge of 360 ha since 1970. The Ramsar site encompasses the whole of the Anzali Mordab, Siahkesheem Marsh, Selke Ab-bandan and several other ab-bandans bordering the marshes.
50. Current situation and management problems. Several major changes have occurred in the ecological character of the Anzali Mordab Complex during the past 15 years. Most striking has been the great increase in the extent of reed-beds, which now almost entirely cover the eastern and central portions of the main mordab. Rapid spread of Phragmites had already become a problem in the mid 1970s, and was attributed to falling water levels in the mordab, as a result of the then continuing fall in the level of the Caspian Sea, and accelerated eutrophication as a result of increased inflow of domestic sewage, fertilizers and other organic material. The situation had become so serious by the end of the 1970s that the Department of the Environment was investigating possible methods of control. However, the 1.8 metre rise in the level of the Caspian Sea since 1978 has resulted in a one-metre rise in the water level in the main Anzali Mordab and increased salt water intrusion during the summer months (when the level of the Caspian is at its highest and inflow of freshwater is at its lowest). These two factors, increased water depth and increased saline intrusion, are likely to check the expansion of Phragmites in the Mordab, although there are no signs as yet of any die-back.

51. Perhaps a more serious problem has been the massive spread of the water fern Azolla, which was introduced into the Caspian wetlands by rice-farmers in the 1970s. This aquatic weed now covers much of the water surface within the reed-beds and in most of the quieter backwaters. The ecological consequences of this invasion by Azolla have yet to be fully documented. However, it is believed that the greatly reduced abundance of Nelumbium caspicum and Trapa natans (both valuable waterfowl food plants) can in part be attributed to the spread of Azolla.
52. Hunting pressure on waterfowl populations in the Anzali Mordab has increased greatly since the 1970s. The number of licensed hunters in Gilan Province has increased from about 6,000 in the 1970s to about 20,000 at the present time. Traditional hunting (using the "net, gong and flare" method) continues at a high level, and is thought to account for at least 100,000 waterfowl per season. Hunting with shot-guns has increased considerably, and there are now about 1,000 hunters hunting in this way at Anzali Mordab. These are thought to account for another 100,000 waterfowl per season.
53. Poaching is reported to have been a very serious problem in the first few years after the revolution. Indeed, at that time the Department of the Environment's Game Guard Station in the central mordab was burned down by local people, and the game guards were able to exert little if any control. The situation has improved considerably in recent years, especially at Selke Wildlife Refuge where there is a new Game Guard Station and protection is excellent, but there remain serious problems of poaching in Siahkesheem Protected Area. In an effort to increase the level of protection afforded to waterfowl in the Anzali Mordab, the Department of the Environment has recently taken steps to establish a new non-hunting area at Sorkhan Kol in the central mordab.
54. The Department of the Environment is currently undertaking a major programme of research (one of the Department of the Environment's largest in the whole of Iran) at the Anzali Mordab in an attempt to resolve the above problems. This has involved the establishment of 35 monitoring stations throughout the mordab, to measure a variety of parameters including changes in water level, water quality and physico-chemical characteristics.
55. Changes in waterfowl populations. The mission was able to visit a large part of the Anzali Mordab wetland. The total number of waterfowl observed (18,500 Anatidae, 8,650 Coot and 3,950 other waterfowl - see Table 1) was far below counts in the 1970s, when the total count of ducks and Coots usually exceeded 200,000. Furthermore, the great majority of these birds (70%) were confined to the well-protected Selke Wildlife Refuge (11,600 birds), and to Gasghiasheh Marsh (10,300 birds), a duck-netting area protected from disturbance by the local people. Siahkesheem Protected Area was very disappointing with only 6,100 birds, mostly concentrated on a small marsh near the Game Guard Station at the entrance to the reserve.

The scarcity of Coot and complete absence of Pochard Aythya ferina from the open waters of the main mordab (open to duck shooting) was striking, and is clearly a result of the great hunting pressure in the area. This continues a trend first recorded in the early 1970s, when Coot numbers in Gilan fell from over 100,000 in 1972/73 to only 34,000 by 1974/75. This decline was attributed to the extremely heavy hunting pressure in Gilan and the almost continuous disturbance from hunters in unprotected wetlands, especially Anzali Mordab.

56. Selke Wildlife Refuge remains impressive, but even here, numbers of waterfowl were well below the counts of the 1970s (when there were generally between 40,000 and 80,000 Anatidae present in mid-winter). Furthermore, there is evidence of a change in species composition, with more diving ducks and Coot and fewer dabbling ducks and geese than in the 1970s. This change is undoubtedly a result of the higher water levels in the refuge.
57. Department of the Environment personnel report a dramatic decline in the population of Purple Swamphen Porphyrio porphyrio at Anzali Mordab, and this was borne out by the present mission which failed to find any. The reasons for this decline are puzzling, as the extent of the species' habitat (tall reed-beds) has increased enormously during the last decade, but may be related to the great increase in water depth and/or spread of Azolla.
58. It was, however, encouraging to find that there was still a large wintering population of the Pygmy Cormorant Phalacrocorax pygmeus at Anzali Mordab. At least 237 were recorded by the present mission, a figure that compares well with the counts of the early 1970s (which ranged from 210 to 325). Anzali Mordab is the principal wintering area in Iran for this globally threatened species.

59. Recommendations

(a) The Ramsar mission commends the Department of the Environment on its excellent programme of research in the Anzali Mordab, and recommends it be continued and extended. Some of the issues worthy of special attention include:

- the impact of sea-level rise on the ecology of the wetlands;
- water pollution from domestic sewage, fertilizers and pesticides, and the problem of eutrophication;
- infestation by Azolla;
- the effects of excessive hunting pressure and its associated disturbance on waterfowl populations.

(b) Unless some measures are introduced to curb hunting pressure and its associated disturbance, there is a high likelihood that within a few years the once vast flocks of migratory waterfowl will have disappeared completely from all those areas of the Anzali Mordab open to hunting for the general public.

Only those areas protected as refuges by the Department of the Environment or jealously guarded by private land-owners for their own hunting activities will remain as havens for waterfowl. The mission therefore recommends that the Department of the Environment should investigate a variety of possibilities for conserving waterfowl populations in the mordab and maintaining hunting opportunities for the general public. These might include:

- imposing stricter controls on the number of hunters, number of days when hunting is permitted, bag limits and hunting techniques;
- giving greater encouragement to duck hunting communities which use traditional hunting techniques to manage and patrol their hunting areas (eg. as occurs at Gasghiasheh in the eastern mordab);
- encouraging sport hunters (using shot-guns) to form their own hunting clubs or societies to manage their activities more wisely;
- improving the protection of Siahkesheem Protected Area;
- creating a buffer zone around Selke Wildlife Refuge to reduce poaching around the edge of this extremely important reserve;
- establishing additional non-hunting areas in other parts of the Anzali Mordab (eg. at Sorkhan Kol).

60. Miankaleh Peninsula, Gorgan Bay, Lapoo-Zaghmarz Ab-bandan. Gorgan Bay is a large shallow inlet at the extreme southeastern corner of the Caspian Sea, almost totally cut off from the open sea by the 60 km long Miankaleh Peninsula, a low sandy peninsula with coastal dunes, pomegranate scrub and grassland. The bay is brackish and receives freshwater inflow from a number of small rivers and streams rising on the humid north slope of the Alborz Mountains. Some freshwater marshes occur at the west end of the bay, where freshwater inflow is greatest, and there are extensive tracts of seasonally flooded tamarisk woodland in this area.
61. Lapoo-Zaghmarz Ab-bandan lies about 10 kms west of Gorgan Bay, and is a long narrow freshwater lagoon with fringing reed-beds, separated from the Caspian Sea by coastal dunes. The ab-bandan is fed by local run-off, and drains east into the Gorgan Bay marshes.
62. The whole of Miankaleh Peninsula and Gorgan Bay (an area of 68,800 ha) was designated as a Wildlife Refuge in 1970 and has been maintained as such ever since. Lapoo-Zaghmarz Ab-bandan has no legal protection, but is protected as a private waterfowl hunting area by inhabitants of the nearby village of Zaghmarz. The Ramsar site includes the whole of Miankaleh Wildlife Refuge except for a strip of arable land along the southern border, as well as the Lapoo-Zaghmarz Ab-bandan and a narrow strip of intervening land (a total of 100,000 ha).

63. Current situation and management problems. The rise in level of the Caspian Sea during the last decade has resulted in a marked increase in the level of Gorgan Bay and re-flooding of all those bare flats at the west end of the bay which had been exposed by falling sea levels during the previous decades (see Figure 2). On the seaward side of Miankaleh Peninsula, the sea beach has virtually disappeared, and no longer provides easy vehicular access to the fishing village of Ashuradeh at the extreme eastern tip of the peninsula. To reach Ashuradeh by road, vehicles must now follow a rough track through the pomegranate scrub and sand dunes, a journey reported to take six to seven hours as compared with only one or one and a half hours on the old beach "road". The traditional access to Ashuradeh by boat across the narrow channel between the tip of the Miankaleh Peninsula and the mainland is however still available.
64. Other changes to the Protected Area appear to have been few, and it is clear that the Department of Environment has continued to afford the reserve good protection throughout the past fifteen years. Much of the peninsula is still heavily grazed by flocks of sheep, goats and water buffalo, but there has been no obvious increase in the number of small farms within the reserve, and indeed the shrubs seem denser and more extensive than in the 1970s. Some poaching was observed along the southwest boundary of the reserve, but this was often reported here in the 1970s, and is probably not a serious problem.
65. The major threat to the area is the proposed construction of an asphalt highway down the centre of the peninsula to provide easy access to the fishery stations along the beach and at Ashuradeh. A highway has already been constructed up to the western boundary of the reserve, but further work has been halted following intervention by the Department of the Environment. While the road itself might not have any significant impact on the wetland ecosystems, the greatly increased access to the reserve would inevitably lead to increased pressure for settlement, increased farming activities and increased poaching. Since access to Ashuradeh is still possible by the traditional boat route, the asphalt road through the centre of the Ramsar site appears to be an unnecessary luxury.
66. The ecological character of Lapoo-Zaghmarz Ab-bandan appears not to have changed since the 1970s. The ab-bandan has been unaffected by rising sea level, and is well managed and protected by the owners - inhabitants of the nearby village of Zaghmarz - who utilize the wetland for waterfowl hunting in winter and as a source of water for irrigation during the summer months. Under an agreement with the Department of the Environment, the owners are permitted to hunt at the ab-bandan on a maximum of three days per month throughout the hunting season. To protect their interests, the owners pay a warden to prevent poaching, and in fact hunt at the site on only three or four occasions per season.

67. Changes in waterfowl populations. The rise in level of the Caspian Sea has had a profound influence on waterfowl populations in the marshes at the west end of Gorgan Bay, which are now permanently flooded. These marshes formerly held between 3,000 and 10,000 Grey Lag Geese Anser anser, 4,000 to 5,000 Lesser White-fronted Geese Anser erythropus and huge numbers of surface-feeding ducks. Large numbers of birds were present in January 1992 (at least 81,000 - see Table 1), but the great majority of these were Coot, a species which was relatively uncommon in the 1970s (usually between 500 and 2,500). Only 260 Grey Lag Geese were observed, and no Lesser White-fronted Geese were located. Indeed, the latter have not been recorded in any numbers at Miankaleh for over a decade. These changes in bird populations are clearly related to the increased depth of water in the western marshes.
68. Lapoo-Zaghmarz Ab-bandan held more birds in January 1992 than was usually the case in the 1970s, presumably because of the better protection from disturbance now being afforded to the wetland by the local duck hunters. In the 1970s, most of the Anatidae utilizing the ab-bandan spent the daylight hours roosting on the nearby Caspian Sea because of almost continuous disturbance from hunters with shot-guns. The mission failed, however, to locate any White-headed Ducks Oxyura leucocephala, a threatened species which wintered in small numbers in the Lapoo-Zaghmarz area in the 1970s. The presence of these ducks was one of the main reasons for including the ab-bandan in the Ramsar site. (A few White-headed Ducks were, however, observed on the west end of Gorgan Bay, and it may be that this small wintering population has simply moved a few kilometres to Gorgan Bay, where the increased water depth has created more favourable conditions for the species).
69. Recommendations
- (a) The Department of the Environment must be commended for maintaining Miankaleh Protected Area in such an excellent condition. In particular, the Department should be applauded for maintaining the reserve free from the disturbance that would have been caused by the construction of a major road through its central area. It is recommended that this stance be maintained and that the successful approach to the management of hunting areas adopted at Lapoo-Zaghmarz Ab-bandan should be used as a model for the management of similar areas elsewhere in the South Caspian, as this clearly constitutes a good example of "wise use" of wetland resources.
70. Bandar Kiashahr and mouth of Sefid Rud. At the time of Ramsar designation, Bandar Kiashahr Lagoon (formerly Bandar Farahnaz Lagoon) was a shallow, brackish coastal lagoon with fringing Juncus marshes in an area of coastal sand dunes and grassland to the east of the mouth of the Sefid Rud. The lagoon was fed by local run-off, and drained north-east through a narrow channel into the Caspian Sea. The lagoon had, in fact, been formed as recently as 1960 as a result of the falling level of the Caspian Sea and development of coastal sand spits (see Figure 3).

71. The Ramsar site (500 ha) includes the whole of the lagoon, its associated marshes and the marshes and sand-flats at the mouth of the Sefid Rud to the west. The site has no legal protection.
72. Current situation and management problems. The rising level of the Caspian Sea has destroyed the sand barrier between the lagoon and the sea, with the result that the wetland is now made up of a sea bay with a broad entrance to the sea. The present situation is thus similar to that in the 1950s. The wetland habitat at the mouth of the Sefid Rud is, however, reported to have remained more or less unchanged, while new wetland habitats have been created to the west of the river mouth, outside the Ramsar site. Department of the Environment personnel report that fewer waterfowl now utilize the Ramsar site because of increased disturbance from fishing activities, and the small flock of Dalmatian Pelicans Pelecanus crispus which frequented the area in the 1970s has not been reported for some years.
73. Recommendations
 - (a) It is recommended that further investigations be made to assess the ecological changes which have occurred in the Ramsar site, and to identify ways of reducing the disturbance to waterfowl from fishing activities.
74. Amirkelayeh Lake. Amirkelayeh is a rather deep, permanent, freshwater lake with rich growth of floating and submergent vegetation and extensive fringing reed-beds of Typha and Phragmites. The lake is fed by springs and local run-off and, at high water levels, drains north through a small stream into the Caspian Sea.
75. The lake and marshes were established as a Wildlife Refuge (1,230 ha) in 1971, and managed as a strict nature reserve in which all human activity was prohibited. This Wildlife Refuge comprises the Ramsar site.
76. Prior to its designation as a Wildlife Refuge, Amirkelayeh Lake had been an important waterfowl hunting area for local villagers, who employed a traditional clap-netting technique to trap ducks and Coot for the market. (This technique was subsequently used with considerable success by Department of the Environment personnel to trap birds for ringing). During the revolution, local villagers burned down the Department of the Environment's Game Guard Station and watch tower, and re-assumed control of the lake. Duck-trapping has re-commenced, and it is reported that there are currently some 60 teams of duck-netters operating at the lake. Thus, although Amirkelayeh Lake formally remains a Wildlife Refuge and Ramsar site, it is no longer under the control of the Department of the Environment. However, some personnel of the Department of the Environment have been able to visit the site on an unofficial basis to conduct mid-winter waterfowl counts, and report that the ecological character of the site remains unchanged. The lake is sufficiently high above the level of the Caspian Sea to have been unaffected by the recent rise in sea level.

77. Recommendations

- (a) It is recommended that the Department of the Environment seek to re-establish its authority at the site. The best solution might be for the Department to downgrade the reserve to Protected Area, thereby allowing hunting to take place, and to enter into a management agreement with the local people whereby they are permitted to continue their hunting activities on a rational basis. The Department could then exert its influence whenever necessary to ensure that the ecological character of the site remains unchanged.
78. Fereydun Kenar "Damgah". The "damgah" of Fereydun Kenar gained international fame in 1978 when ornithologists from the Department of the Environment discovered a tiny wintering population of the endangered Siberian Crane Grus leucogeranus at the site. This population of 7-14 birds has remained remarkably stable since then, and undoubtedly owes its survival to the somewhat unusual but highly effective form of protection afforded by the inhabitants of the nearby village of Fereydun Kenar.
79. The "damgah" is an artificial wetland, created and maintained primarily as a duck hunting area, but also utilized as a supply of water for irrigation during the summer months. The core of the damgah comprises a series of shallow impoundments which provide excellent feeding and roosting habitat for a wide variety of wintering waterfowl, notably ducks and geese. The impoundments are almost entirely surrounded by a belt of tall trees in which there are about 100 trapping stations. Live decoy Mallard Anas platyrhynchos are used to lure other ducks (principally Mallard, but also occasionally Teal Anas crecca) into nets. The duck netting is carried out under licence from the Department of the Environment, each trapping station (manned by two men) being permitted to capture up to five birds each day. The trapping area is surrounded by a large expanse of rice paddies which provide excellent feeding habitat for ducks, geese, shorebirds and the Siberian Cranes.
80. To ensure that the waterfowl are not disturbed, the duck trappers enforce a very strict ban in the area, not only on shooting activities but also on all other unnecessary human activity, and can appear very aggressive to unwelcome intruders. As a result, the damgah wetland and surrounding paddies constitute one of the best protected and least disturbed wetlands in the South Caspian lowlands. Few birds other than Mallard and Teal are trapped, and thus for the many thousands of other ducks, geese and shorebirds and for the cranes, conditions are ideal. The only questionable aspect of this operation is the massive shoot-out towards the end of each season, when the netting becomes unprofitable and the area is opened up to hunting with guns.
81. The mission had the opportunity to pay a brief visit to the damgah, and was very impressed with the excellent quality of the habitat for waterfowl, the huge numbers of birds present, and the obvious efficiency with which the local hunters were guarding their "reserve".

Although the mission only observed two adult Siberian Cranes, it was informed from several reliable sources that at least 11 cranes were present, including two juveniles. Thus the alarming rumours in early 1991 that four or five cranes had been shot or captured for zoos were clearly erroneous, as nine of the ten birds present in the winter of 1990/1991 can still be accounted for.

82. Recommendations

(a) Relations between the hunters of Fereydun Kenar and officials of the Department of the Environment remain delicate, and the mission recommends that every opportunity should be taken to improve them. A good case can be made in support of the damgah system of hunting, as it is dependent on the maintenance of high quality waterfowl habitat and strict protection from disturbance. Only Mallard and one or two other common species of duck are netted, while a wide variety of waterfowl species benefit from the sanctuary-like conditions. By showing active support for the damgah hunters, the Department of the Environment might be able to establish a permanent presence at the site (for crane protection and research), and might also work towards the abolishment of the annual shoot-out. The Department should proceed with great caution as, for the time being, the survival of the tiny flock of Siberian Cranes depends on the tolerance and goodwill of the local hunters.

Wetlands in Fars

83. Neiriz Lakes (Tashk and Bakhtegan) and Kamjan Marshes. Lake Tashk and Lake Bakhtegan are two large salt lakes in an internal drainage basin in the southern Zagros Mountains. Lake Tashk is fed by overflow from the Kamjan Marshes at its western end and a large permanent spring at Gumoon, in the northwest. Lake Bakhtegan receives the bulk of its water from the main channel of the Kur River, which enters at the western end. Water levels in the lakes fluctuate widely according to rain and snow-fall in the Zagros. In exceptionally wet years, the two lakes unite at their western ends to form a single expanse of water covering about 98,000 ha, while during prolonged droughts, Lake Tashk becomes reduced to a series of shallow spring-fed pools at Gumoon and Lake Bakhtegan dries out completely.
84. Kamjan Marshes comprise some 10,000 ha of permanent and seasonal marshes and floodplain wetlands along the Kur River to the west of the Neiriz lakes. Large portions of the area formerly supported Phragmites marsh, but drainage of the wetland for rice cultivation began as early as 1967, and already by the mid 1970s, large parts of the marsh had been drained for agriculture.

85. Lake Tashk and Lake Bakhtegan were included in the Bakhtegan Protected Region (310,438 ha), established in 1968. This reserve was given the status of Wildlife Refuge in the early 1970s, and increased in size to 327,820 ha. The Wildlife Refuge includes the two lakes and the intervening plains and hill ranges, but excludes Gumoon springs and marshes, and most of the marshes at the mouth of the Kur River. Kamjan Marshes are unprotected. The Ramsar site (108,000 ha) includes the two lakes, the Gumoon area and all the marshes at the delta of the Kur River and Kamjan Marshes, but excludes the terrestrial portion of Bakhtegan Wildlife Refuge between the lakes. A proposal to upgrade part of the Bakhtegan Wildlife Refuge by giving it the status of National Park has recently been approved by the relevant authorities (notably the Ministries of Power and Agriculture), and is likely to be implemented in the near future. The National Park would include the greater portion of the two lakes and a range of hills to the north of Lake Bakhtegan.
86. Current situation and management problems. Lake Tashk and Lake Bakhtegan remain in excellent condition. After several years of above average rainfall, water levels in January 1992 were high and both lakes were almost fully flooded. The only significant changes which had occurred since the 1970s were at Gumoon Springs on the northwest edge of Lake Tashk, and at the extreme western end of both lakes near Kamjan Marshes and the mouth of the Kur River. The spring-fed marshes at Gumoon (outside the Protected Area but inside the Ramsar site) have now been partially drained for agriculture and partially converted into aquaculture ponds. Unfortunately, the mission had insufficient time to investigate this area, and was unable to ascertain if any important wetland habitat remained. At the western end of the lakes, new areas of marsh have developed at the mouths of the three main canals draining Kamjan Marshes and the plains to the south of the Kur River.
87. The mission was informed of plans to construct an all-weather road through the centre of the Wildlife Refuge linking villages to the east of Lake Tashk with the asphalt highway to Shiraz from the west end of Lake Bakhtegan. This would involve the construction of a causeway across the low-lying flats between the two lakes (within the Ramsar site), and could have a significant effect upon the overall hydrology of the system. It would also greatly facilitate access to the central hilly portion of the Wildlife Refuge, an area of great scenic beauty which until now has remained remote and relatively undisturbed. Some poaching was observed by the mission at the western end of Lake Bakhtegan, and it is feared that with improved access to the interior of the Wildlife Refuge, this problem could become serious.
88. In 1981, the Ministry of Jihad embarked upon a major programme of drainage in the Kamjan Marshes to provide land for agriculture (principally rice, wheat and cotton). Three large drainage canals were constructed through the marshes, two to the north of the Kur River, emptying into Lake Tashk, and one to the south, emptying into Lake Bakhtegan.

The entire marsh is now criss-crossed with canals and ditches, and much of the permanent marsh vegetation has been destroyed. In Iran's national report Regina meeting in 1987, it was reported that Kamjan Marshes had been deleted from the List because of "urgent national interest and requirement" and had been substituted by Chogakhor and Gandoman Marshes in Chaharmahal and Bakhtiari Province. This statement was repeated in Iran's national report to the Fourth Conference of the Contracting Parties in Montreux in 1990. However, no official documentation concerning this change was ever sent to UNESCO, the Convention's Depository, or to the Ramsar Bureau. Furthermore, the Iranian Government never took the necessary formal steps to delete Kamjan Marshes from the Ramsar List, or to include Chogakhor and Gandoman (see paragraph 19 above). Thus, at the time of the mission's visit, Kamjan Marshes were still officially part of the Ramsar site.

89. Although Kamjan Marshes have been extensively modified by the drainage canals, much wetland habitat remains including expanses of wet mud-flats, stands of Phragmites and other emergent aquatic vegetation along canals and ditches, and large areas of rice fields. Furthermore, a large portion of the "reclaimed" land remains uncultivated, partly because of a shortage of water for irrigation, and partly because of the high salt content of the soils. Some of the irrigation canals are already becoming silted up, and parts of the drained land are reverting to marsh.
90. Changes in waterfowl populations. The present mission found both Lake Tashk and Lake Bakhtegan in excellent condition, with huge numbers of waterfowl. The impressive concentrations of surface-feeding ducks (120,000-140,000) at the western end of Lake Bakhtegan were comparable to the concentrations recorded in the 1970s, and there was no evidence that any major change had occurred in the numbers of birds or in species composition. Very few flamingos were observed, but Department of the Environment personnel had recorded the usual wintering flock of about 50,000 only a week earlier, and their disappearance could undoubtedly be attributed to the unusually severe weather of the previous few days. (Both lakes were partially frozen for the first time for at least a decade).
91. Despite the changes which have occurred at Kamjan Marshes, the area continues to provide ideal feeding habitat for a variety of waterfowl. The mission observed large numbers of Black-tailed Godwit Limosa limosa, Ruff Philomachus pugnax, Glossy Ibis Plegadis falcinellus and White Stork Ciconia ciconia flighting out of the marshes in the evening to roost on the mud-flats at the western end of Lake Tashk, and also observed some ducks and geese flighting into the marshes from the lake at dusk. It seems likely that the marshes continue to constitute an important feeding area for large numbers of ducks which spend the day roosting on Lake Bakhtegan and Lake Tashk.

92. Recommendations

(a) The mission commends the Department of the Environment on its initiative to establish a National Park incorporating Lake Tashk, Lake Bakhtegan and part of the intervening hill ranges, and recommends that this proposal be implemented.

(b) The mission recommends that the boundaries of the Ramsar site and Wildlife Refuge should be clearly demarcated on the ground, especially in the west, where encroachment and poaching are most likely to cause a problem.

(c) The mission recommends that the proposal to construct an all-weather road through the Wildlife Refuge and Ramsar site be critically reviewed and that alternative routings be investigated, since the proposed road could affect the hydrology of the system and lead to increased encroachment and poaching in the reserve.

(d) The mission recommends that studies be carried out at Gumoon Marshes to determine to what extent these marshes have been affected by development, and whether or not any restoration is possible. A decision should then be taken as to whether this small unprotected portion of the Ramsar site should be maintained on the List and managed accordingly, or deleted from the List, with an appropriate area elsewhere designated in cooperation.

(e) The mission concluded that Kamjan Marshes retain sufficient wetland values to justify their continued status as part of the Ramsar site, and therefore recommends that they be maintained on the List. As much of the water entering Lake Tashk and Lake Bakhtegan passes through Kamjan Marshes, agricultural activities in these marshes could have a profound effect on the quality of the water entering the lakes. It is therefore strongly recommended that Kamjan Marshes be designated as a buffer zone for the Wildlife Refuge. The Department of the Environment should establish a presence in the marshes (eg. by constructing a Game Guard Station on the isolated hill near the east end of the marshes), and prepare a comprehensive management plan for the wetland, in collaboration with local communities. While restrictions on sound agricultural development in the region may not be necessary, the use of fertilizers and pesticides should be carefully controlled, and all or part of the area closed to hunting. Parts of the marsh which prove unsuitable for agriculture, such as the large saline areas in the east, should as far as possible be restored to their former condition and might be given special protection, eg. as part of an enlarged Bakhtegan Wildlife Refuge. The Department of the Environment should negotiate with the Ministry of Power and local authorities to ensure that an adequate supply of water is available to maintain the most important areas of marsh during dry years.

93. Lake Parishan and Dasht-e-Arjan. Lake Parishan and Dasht-e-Arjan are two very different wetlands situated only some 15 km apart in the Arjan Protected Area in the southern Zagros Mountains. Lake Parishan, set at 825 metres above sea level in a broad valley between Zagros ranges, is a fresh to brackish or even saline lake in a closed drainage basin fed by several small rivers and a number of permanent springs. During the dry years of the early 1970s, water levels were low, the lake was brackish to saline, marsh vegetation was confined to the western and eastern ends of the lake near freshwater inflows, and there were large areas of bare salt flats in the southwestern bay. In recent years, however, water levels have remained high; the water is now almost fresh, there are very extensive reed-beds of Phragmites and Typha in many parts of the lake.
94. Dasht-e-Arjan lies in an enclosed basin at 1,950 metres above sea level in the high Zagros. The wetland comprises a shallow freshwater lake with extensive Phragmites reed-beds at its northern end. It is fed by several large springs and local run-off, and drains out through a series of swallow holes at the south end. Much of the wetland freezes over in winter, and deep snow cover is not unusual. Open water areas may dry out completely during dry summers, but the spring-fed marshes remain wet throughout the year. As at Lake Parishan, good rainfall in recent years has resulted in a considerable expansion in the area covered by tall reeds.
95. Lake Parishan and Dasht-e-Arjan lie within the Arjan reserve, established as a National Park of 65,750 ha in 1973. The original plans to establish the reserve as an international park (under the control of an international committee) were never implemented, and following the revolution, the reserve was downgraded to Protected Area and reduced in size to 52,800 ha. The Ramsar site is in two parts, and comprises only the wetlands: Lake Parishan (4,200 ha) and Dasht-e-Arjan (2,400 ha).
96. Current situation and management problems. Lake Parishan remains in excellent condition. Following a series of wet years, the reed-beds are now much more extensive than at any time in the 1970s, and the water would appear to be almost fresh. Some 20 hectares of marsh at the extreme northwest corner of the lake were drained for agriculture by the Ministry of Jihad shortly after the revolution, but no other wetland habitat has been destroyed. There has been some development of aquaculture on the plains to the west of the lake, and it is reported that three species of carp have been introduced into the lake. There has been a considerable increase in fishing activities, and the widespread use of outboard motor boats by the fishermen (instead of the traditional reed boats) has resulted in much more disturbance to waterfowl populations. Poaching remains a problem, and there are reports that significant numbers of waterfowl are accidentally killed in fishing nets.

97. Dasht-e-Arjan also remains in excellent condition, the great extent of the reed-beds reflecting several years of above-average rainfall. Poaching remains a problem, despite the presence of a small Game Guard Station in the nearby village of Dasht-e-Arjan, and it is estimated that some 500-1,000 birds are poached annually. The only major detrimental change has been the construction of two high-tension power lines across the basin, both of which cross over the western side of the marshes and the Ramsar site. Apart from being an eye-sore in a region otherwise of great scenic beauty, the power lines undoubtedly present a considerable hazard to waterfowl flighting into and out of the marshes. One of the power lines (from a nuclear power station under construction in Bushire) was erected in the late 1970s and is still not in use. The other transports electricity to Shiraz from a conventional power station in Khuzestan.
98. Changes in waterfowl populations. Both Lake Parishan and Dasht-e-Arjan remain extremely important for wintering waterfowl of a wide variety of species. The mission found large numbers of surface-feeding ducks and geese at Dasht-e-Arjan, despite considerable ice cover and deep snow, and it seems that conditions here have remained almost unchanged since the 1970s. Significant changes were, however, noted at Lake Parishan. Improved agriculture to the south of the lake now provides better feeding habitat for Grey Lag Geese Anser anser and Common Crane Grus grus, and numbers of both species have been much higher in recent years than in the 1970s. The extensive reed-beds now support large breeding colonies of herons, egrets, ibises and spoonbills, and the small resident population of Dalmatian Pelican Pelecanus crispus has shown a slight increase. The Purple Swamphen has colonized the area (presumably from the wetlands of Khuzestan), and is now common in the reed-beds. However, the numbers of ducks and Coot in January 1992 were far below those of the 1970s (just under 12,000 Anatidae and 2,300 Coot, as against an average of 25,000 ducks and 120,000 Coot in the four winters 1972/73 to 1975/76 - see Table 1). It has been suggested that this decline can be attributed to the greatly increased disturbance from fishermen in high-speed motor boats. Only six White-headed Ducks were recorded by the mission, although Department of the Environment personnel had recorded about 25 some two weeks previously. Even that number is well below some of the counts in the 1970s, when as many as 90 were recorded in mid-winter at this lake.
99. Recommendations
- (a) The mission recommends that both portions of the Ramsar site (Lake Parishan and Dasht-e-Arjan) be clearly demarcated on the ground, with some publicity given to the fact that they are Ramsar sites (eg. by conspicuous sign-boards).
- (b) The mission recommends that both portions of the Ramsar site and other appropriate sections of the Arjan Protected Area be upgraded to the status of Wildlife Refuge.

(c) The mission recommends that any further drainage of marshes at Lake Parishan be strictly prohibited, and that the possible negative impacts of the present drainage ditch from the northwest corner of the lake be investigated.

(d) The mission recommends that studies be carried out on the changes which are taking place in the aquatic vegetation at Lake Parishan. Eutrophication may become a problem in the future, especially if this is being accelerated by inflow of domestic sewage and fertilizers, and some control of the spread of Phragmites may become necessary.

(e) The mission recommends that the problem of increased disturbance from fishing activities at Lake Parishan be investigated. A possible solution might be the establishment of one or more no-fishing zones.

(f) The mission recommends that the Department of the Environment's current plans to establish a Guest House on a peninsula overlooking the western part of Lake Parishan be modified to include provision for day visitors (eg. by providing informative exhibits, picnic areas and nature trails). The location of the Game Guard Station would be an ideal site for a Visitor Centre for day visitors to the lake. The mission recommends that contacts be established with wetlands in other countries where visitor centres of this kind have been established.

(g) The mission recommends the investigation of the possibility of re-routing the high-tension power lines across the Ramsar site at Dasht-e-Arjan, as these severely compromise the scenic beauty and naturalness of the area, and may cause considerably mortality to waterfowl.

Other potential Ramsar sites in Iran

100. The mission held discussions with personnel of the Department of the Environment concerning the possibility of designating additional sites for the Ramsar List. Five sites were considered to be especially suitable for designation.
101. Gomishan Marshes, Mazandaran Province. In the 1970s, the Gomishan wetlands consisted of a chain of narrow, brackish lagoons behind the Caspian Sea beach, stretching from the town of Gomishan north to the border with Turkmenistan. In the east, the wetlands bordered on a vast area of low-lying plains with halophytic vegetation. The recent dramatic rise in the level of the Caspian Sea has resulted in extensive flooding of these plains, with the result that the Gomishan Marshes now comprise a large area of shallow, brackish lagoons and marshes many times larger in size than was the case in the 1970s. Huge numbers of waterfowl have been recorded at these wetlands in recent years (eg. 95,000 in 1988/89, 57,000 in 1989/90 and 215,000 in 1990/91), including concentrations of several hundred Dalmatian Pelicans. Part of the wetland is now protected as a No-Hunting Area, and there are plans to upgrade this to Protected Area within five years.

102. Helleh Delta Marshes, Bushire Province. The freshwater lakes and marshes of the delta of the Helleh Rud northwest of Bushire comprise the only major freshwater wetland on the southern coast of Iran east of Khuzestan. The wetland is in a sparsely populated area and difficult of access. The entire wetland was included in the Helleh Wildlife Refuge (42,600 ha), established in 1977. This reserve was downgraded to Protected Area after the revolution, but the wetland remains in excellent condition, and continues to support large numbers of breeding, passage and wintering waterfowl of a wide variety of species.
103. Gandoman and Chogakhor Marshes, Chaharmahal and Bakhtiari Province. Gandoman Marsh (1,200 ha) and Chogakhor Marsh (1,600 ha) are both rather isolated freshwater marshes in the highlands of the northern Zagros Mountains southwest of Esfahan. Both are important breeding and staging areas for many species of waterfowl, and are especially important as breeding habitat for the endangered White-headed Duck. The two sites have been proposed for Protected Area status, and were, in fact, referred to as Ramsar sites in the Iranian reports to the Regina and Montreux Ramsar meetings in 1987 and 1990, although a map and description of the site has not been formally deposited with UNESCO or the Ramsar Bureau.
104. Ghara Gheshlaq Marshes, Azerbaijan Province. Ghara Gheshlaq comprises some 400 ha of freshwater marshes on the plains to the south of Lake Ooroomiyeh in Azerbaijan. The marshes are extremely important for breeding and passage waterfowl, but are usually frozen and under snow cover during the winter months. Ghara Gheshlaq has already been designated as a No-Hunting Area, and is likely to be upgraded to Protected Area status within five years. The wetland was suggested as a Ramsar site in the Iranian report to Montreux meeting in 1990.
105. Kaftar Lake, Fars Province. Kaftar Lake is a high altitude freshwater lake of some 500 ha in the Zagros Mountains north of Shiraz. The lake is generally frozen over during the winter months, and can dry out completely during dry summers. However, during the spring and autumn migration seasons, the wetland can hold as many as 120,000 migratory waterfowl, including 2,000-3,000 Common Cranes. The lake is currently unprotected. However, a proposal by the Ministry of Jihad to utilize the waters of the lake for irrigation purposes has recently been opposed by the Department of the Environment, because of the importance of the site as staging area for migratory waterfowl.
106. Ramsar sites important for groups other than waterfowl. In designation of wetlands of international importance Iran has in the past placed emphasis on sites of importance for waterfowl. Given the value of waterfowl as bio-indicators and the excellent data on waterfowl available from Iran, this is natural and understandable. It would now perhaps be appropriate for the Iranian authorities to think of designating other sites which meet other Ramsar criteria, eg. of uniqueness, naturalness or of importance for other groups of wetland fauna or flora.

The Pardisan Environmental Theme Park, Teheran

107. The mission paid a brief visit to the site of the Pardisan ("Paradise") Environmental Theme Park in the suburbs of Teheran, in the company of officials of the Department of the Environment and of park staff. The project, situated in a prime site covering over 200 hectares and ideal for attracting large numbers of the inhabitants of the capital (who now number some 12 million), aims to present open air exhibits illustrating the various biomes of the world. The project, still in its first stages of development, represents a major effort to educate the people of Iran on environmental issues, and as such is the Department of the Environment's largest current project in terms of budget.
108. The mission recommends that special effort be given to feature wetlands in the various exhibits and that contacts be established with educational establishments and experts in other countries that have experience in such projects; such establishments and individuals could provide considerable assistance in the field of training.

General recommendations

109. Better publicity for the Convention and for existing Ramsar sites. It is recommended that much greater publicity be given to the significance of Iran's Ramsar sites, both generally in the national media and specifically on the ground at each site. The boundaries of each Ramsar site should be clearly demarcated with appropriate sign-boards, and whenever possible there should be an open-air exhibit or small visitor centre at the site explaining the Ramsar Convention, its relevance to Iran and the importance of Ramsar sites. Publicity should be aimed at improving the general public's awareness of the need for wetland conservation.
110. Application of the Ramsar Monitoring Procedure at other Ramsar sites. The mission recommends that a further mission be organized under the Ramsar Monitoring Procedure in collaboration with the Department of the Environment, perhaps in 1993. The mission understood from discussions with Department personnel that no significant changes had occurred in the ecological character at most other Ramsar sites in Iran. However, the mission was informed of existing or potential problems at the following four sites:
- (a) Yadegarlu: there have been reports of wetland drainage for agriculture in this sector of the Ramsar site of Shurgol, Yadegarlu and Dorgeh Sangi Lakes in Azerbaijan.
- (b) Alagol, Ulmagol and Ajigol Lakes: it is reported that this Ramsar site on the Turkoman Steppes is increasingly being disturbed by hunters.

(c) Shadegan Marshes and mudflats of Khor-el Amaya and Khor Musa: parts of the Shadegan Marshes in Khuzestan were badly affected by the Iran/Iraq war, and may have suffered some damage as a result of "acid rainfall" from the Gulf War.

(d) Khuran Straits: some of the mangroves in this Ramsar site in Bandar Abbas province are potentially at risk from the proposed development of a free port and tourist facilities on the adjacent island of Qeshm.

111. The Ramsar Convention Bureau would welcome an opportunity to visit some or all of these sites with experts of the Department of the Environment, with a view to investigating whether problems exist and, if so, to determining what measures might be taken to restore the wetlands to their former condition or to mitigate against future changes.

112. Designation of additional Ramsar sites. The Government of Iran has not formally deleted any part of a Ramsar site, and is therefore under no obligation to designate sites for inclusion in the List in compensation. However, there are several extremely important wetlands in Iran which would be suitable for Ramsar designation, and a number of recommendations of the Conference of the Contracting Parties have called for the designation of additional sites. It is therefore recommended that the Government of Iran give consideration to the designation of one or more of the following sites, described in paragraphs 101 to 105 of the present report:

- Gomishan Marshes, Mazandaran
- Helleh Delta Marshes, Bushire
- Gandoman and Chogakhor Marshes, Chaharmahal and Bakhtiari
- Chara Gheshlaq Marshes, Azerbaijan
- Kaftar Lake, Fars

Other sites which meet Ramsar non-ornithological criteria should also be considered.

113. Analysis of waterfowl counts: Mid-winter waterfowl counts were initiated in Iran (in Gilan) in the winter of 1966/67 and have been continued almost without a break ever since. For many wetlands in Iran (including most of the 18 Ramsar sites) there is now available a series of waterfowl counts unparalleled elsewhere in Asia. An analysis of this massive amount of data is already long overdue. IWRB has developed a computer programme for the analysis of waterfowl counts, and has already carried out analyses of similar data gathered in Europe. It is therefore recommended that the Department of the Environment should collaborate with IWRB in the analysis of the Iranian data, with a view to determining trends in waterfowl populations at national, regional and site level. This would provide basic information vital for the rationalization of waterfowl hunting activities in Iran, and of great value in the development of wetland management plans.

114. Assessment of annual hunting harvest of waterfowl in the South Caspian region: In 1975, personnel of the Department of the Environment conducted a major survey of waterfowl hunting activities in the South Caspian region. This included a review of hunting activities and techniques, an estimate of the total numbers of birds hunted each season, and an assessment of the importance of market hunting in the economy of the region. The survey was conducted with the aid of questionnaires, and involved many of the Department's field staff in its Gilan and Mazandaran offices. It concluded that the total annual harvest of Anatidae and Coots in the South Caspian region was approximately three million birds.
115. It is recommended that the Department of the Environment conduct a similar survey as soon as possible, to assess changes in hunting practices and harvesting levels in relation to changes in waterfowl populations (which will be determined from the analysis of waterfowl count data proposed in paragraph 113). The survey should gather information on the following subjects:
- number of licensed hunters;
 - approximate number of illegal hunters;
 - methods of hunting and success rates;
 - extent of illegal hunting methods (eg. flight nets);
 - frequency and times of hunting;
 - approximate numbers of birds killed according to species and method of hunting;
 - extent of market hunting and its importance in the local economy;
 - extent of sport hunting.
116. The results of such a survey would provide the Department with a sound basis for the future management of waterfowl hunting in the South Caspian. It would provide the information necessary to assess the advantages and disadvantages of various hunting techniques, thereby enabling the Department to give greater support to those systems which are least harmful to waterfowl populations, while at the same time adopting stricter measures to control wasteful and indiscriminate hunting practices.
117. The Department of the Environment should also consider conducting a study of the use of lead shot in the South Caspian region and the potential problem of lead-poisoning amongst waterfowl. Lead-poisoning has become a serious problem at many heavily shot-over wetlands in Europe, and has recently been the subject of a number of detailed investigations. A considerable amount of information on this subject (including a video presentation) is available from IWRB.
118. Disease control at Ghara Geshlaq Marshes and Kaftar Lake. In recent years, large-scale die-offs of waterfowl have been reported during the breeding and migration seasons at two important wetlands in Iran: Ghara Geshlaq in Azerbaijan and Kaftar Lake in Fars. At Ghara Geshlaq, as many as 100,000 waterfowl are believed to have died in a single year, while at Kaftar Lake, the annual mortality may be as high as 10,000. The problem was first noticed at Ghara Geshlaq in the early 1980s, and was reported to the Third Conference of the Contracting Parties in Regina in 1987.

The reason for the die-offs is unknown, but disease (perhaps botulism) seems much the most likely. Further investigation is required.

119. It is recommended that the Department of the Environment work closely with an institution with expertise in avian diseases (eg. The Wildfowl and Wetlands Trust in the United Kingdom) in an attempt to resolve this problem. It would be a relatively simple matter for field staff of the Department to collect fresh corpses from the sites in question and send these to an appropriate institution in Europe or North America for analysis. Waterfowl diseases have been the subject of extensive research in both continents, and considerable expertise now exists in the management of wetlands to reduce the incidence of diseases, especially botulism.
120. Wetland management workshop: Many personnel of the Department of the Environment, responsible for the management of wetland reserves and Ramsar sites, expressed a desire to participate in short-term courses in wetland management techniques, to enable them to manage the wetlands under their control more effectively. While a great deal of expertise in wetland management now exists around the world, with many institutions offering training courses in wetland-related fields, the mission was unable to suggest any short-term courses (maximum two months) that would suit the particular needs of Department personnel. For a course to be useful, it would have to address the special problems of wetland management in semi-arid regions; it would need to be pitched at a fairly advanced level, and would need to cover the very broad range of disciplines and activities required of a wetland manager.
121. Rather than search, perhaps fruitlessly, for an existing training course which more or less fulfils these requirements, the mission recommends that a better approach would be to organize a special workshop which could concentrate exclusively on wetland management in the region and provide precisely the right level of training. In fact, this idea is already being discussed in relation to a workshop which it is proposed to hold in Pakistan in early 1993. As the wetlands of Iran and Pakistan have many characteristics and problems in common, a combined workshop with participants from both Pakistan and Iran would be highly appropriate. Participants might also be invited from other neighbouring countries such as Afghanistan.
122. The workshop should focus on the development and implementation of management plans for wetland reserves, and would include presentations by invited experts and participants on a wide range of topics, eg. manipulation of water levels, management of aquatic vegetation, disease control, management of hunting activities, wise use of wetland resources, environmental impact assessments, public awareness and education, and law enforcement. The workshop should be held at or near an important wetland area, and would have as one of its main themes the development of a comprehensive management plan for that site. Participants would thus be able to take part in the development of a management plan in actual field conditions, and develop skills which they might apply immediately on returning to their own country and wetland reserves.

123. If the proposed Pakistan workshop proves to be a success, a second workshop could be arranged in Iran in the following year, to allow much greater participation by personnel of the Department of the Environment. The Ramsar Convention Bureau will pursue this concept in collaboration with the organizers in Pakistan, and will keep the Department of Environment informed of developments.
124. Development of wetland exhibits at Pardisan. Considerable expertise exists in Europe, North America and other parts of the world in the development of wetland-related features and conservation education activities in recreation areas, zoos, waterfowl collections and safari parks. Nowhere has such expertise been developed more fully than at The Wildfowl and Wetlands Trust in the United Kingdom. The Trust's main centre, at Slimbridge in Gloucestershire (also the home of IWRB), consists of one of the world's largest waterfowl collections, adjacent to an important waterfowl refuge (which is also a Ramsar site). The centre includes a wide range of facilities for day visitors, including educational exhibits, classrooms, lecture hall, shop and restaurant, and attracts over half a million paying visitors each year. Many of the facilities and activities at Slimbridge would be eminently suitable for development at Pardisan. It is therefore recommended that senior personnel of the Pardisan Theme Park, especially those involved in the development of the wetland and waterfowl exhibits, should visit The Wildfowl and Wetlands Trust on a study tour to view the range of activities being carried out there, and to investigate the possibility of employing Trust personnel on a consultancy basis in the development of certain aspects of Pardisan.
125. Study tours for senior personnel of the Department of the Environment: In addition to visits to Slimbridge and of course to other suitable locations, notably in the Netherlands or Spain, by personnel from Pardisan, it is recommended that senior managerial staff of the Department of the Environment's Teheran and provincial offices participate in one or more short study tours (each of two weeks' duration) to appropriate wetland institutions, wetland reserves, Ramsar sites and managed waterfowl hunting areas in one or more countries in Europe. Such tours would give the participants an opportunity to view recent developments in wetland and waterfowl conservation in Europe, and to exchange ideas and information with their counterparts in the field. The Ramsar Convention Bureau would be happy to assist in designing such tours.

Conclusions and summary of recommendations

126. The mission was very much impressed by the progress made by the Department of the Environment in recent years, and by the way the government of the Islamic Republic of Iran is meeting its responsibilities as a Contracting Party to the Ramsar Convention. While some problems were clearly encountered in maintaining the integrity of the Department's network of reserves and Ramsar sites in the years immediately following the revolution, it is evident that these problems have now to a large extent been overcome; the mission was optimistic that an acceptable solution could be found to the remaining problems.

The principal recommendations of the mission are as follows:

1. Integrated Management Plan for the wetlands of the Seistan Basin.

The mission recommends that an integrated management plan for the wetlands and water resources in the Iranian portion of the Seistan Basin be prepared and implemented as an urgent priority, and that at the earliest possible opportunity, the Government of Afghanistan be invited to collaborate in the extension of this management plan to encompass the main Hamoun-e-Puzak and lower Helmand River in Afghanistan; these activities should if possible receive financial and technical support from international institutions, notably the Global Environmental Facility (see in particular paragraph 41c).

2. Technical Meeting on sea level rise in the Caspian.

The mission recommends that a technical meeting between experts from each of the five countries bordering the Caspian Sea be convened in Iran under the auspices of the Ramsar Convention, to review the ecological changes which have occurred and are continuing to occur at wetlands around the Caspian Sea as a result of the rising sea level (see in particular paragraph 47);

3. Improved management of Ramsar sites.

The mission recommends that management plans be developed for each of the Department of the Environment's wetland reserves and Ramsar sites. In particular, such management plans should provide for better demarcation of reserve and site boundaries, improved protection (by upgrading the status of existing reserves, extending reserve boundaries or creating new reserves), better control of hunting activities, improved management of unprotected wetlands through the development of management agreements with local communities, and better conservation awareness and education programmes for the general public (see in particular paragraphs 41a, 41b, 59b, 92b, 92d, 99a-99d, and 109);

4. No delisting of existing Ramsar sites and designation of new sites.

The mission recommends that the boundaries of all existing Ramsar sites be retained as originally designated, and that as far as possible new Ramsar sites be designated at one or more of the five important wetlands identified as being particularly suitable for listing (see in particular paragraphs 92e, 101-106 and 112).

The Ramsar Convention Bureau will be happy to assist the Department of the Environment and other authorities in Iran in the implementation of these and the other recommendations in this report, and would welcome an opportunity to visit Iran again in the near future to consider further possibilities for collaboration.

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