Information Sheet for Ramsar Wetland

Hail Haor
Sreemangal, Moulvibazar
Bangladesh

Information Sheet on Ramsar Wetlands (RIS) – 2006-2008 version

Available for download from http://www.ramsar.org/ris/key_ris_index.htm.

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.

2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.

3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

Designation date | Site Reference Number

On behalf of Department of Fisheries and Ministry of Fisheries and Livestock, Bangladesh
Management of Aquatic ecosystems through Community Husbandry (MACH) project
(Dr Paul Thompson)
Winrock International
House 2 Road 23/A, Gulshan, Dhaka 1212, Bangladesh
(some information compiled in an earlier draft in 1993 by S.M.A. Rashid and Sara Bennett for Flood Action Plan component 6 has also been used)

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2. Date this sheet was completed/updated:

26 December 2006

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3. Country:

Bangladesh

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4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Hail Haor

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5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

a) Designation of a new Ramsar site ☑; or
b) Updated information on an existing Ramsar site ☐

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6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged: ☐

or
If the site boundary has changed:
i) the boundary has been delineated more accurately ☐; or
ii) the boundary has been extended ☐; or
iii) the boundary has been restricted** ☐

and/or

If the site area has changed:
i) the area has been measured more accurately ☐; or
ii) the area has been extended ☐; or
iii) the area has been reduced** ☐

** **Important note**: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

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7. Map of site:
Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:
i) **a hard copy** (required for inclusion of site in the Ramsar List): ☑;

ii) **an electronic format** (e.g. a JPEG or ArcView image) ☐;

iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** ☐.

b) Describe briefly the type of boundary delineation applied:
e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

Two boundaries have been defined and mapped.

Firstly, the boundary of the wetland area defined as the water extent for the average of the annual maximum water levels recorded between 1999 and 2005.

Secondly, considering the difficulty in places to locate on the ground this boundary and the issues of land management in the immediate catchment, a boundary following the closest surfaced roads that surround

the haor is shown. On the basis that for this site it is defined as a wise use area rather than delimited as a protected area, this forms a more easily defined unit on the ground.

The area in between these two boundaries (mostly non-wetland) may be considered a "buffer" as it includes all of the main villages that use the haor, as well as part of Sreemangal town, streams flowing into the haor, and agricultural land that drains into the wetland.

8. Geographical coordinates (latitude/longitude, in degrees and minutes):
Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

Centre: 24°22' N 91°40' E
NW corner 24°28' N 91°38' E; NE corner 24°29' N 91°46' E
SE corner 24°18' N 91°44' E; SW corner 24°18' N 91°39' E

9. General location:
Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

Hail Haor is located in Moulvi Bazar District in northeastern Bangladesh, about 60% of the wetland area lies within Sreemangal Upazila (sub-district) and the remainder in Moulvi Bazar Sadar Upazila. The southeast edge of the haor is about 3 km northwest of Sreemangal Town, while Moulvi Bazar town is about 4 km north of the northeast edge of the haor in the wet season (and about 14 km from the dry season water area).

10. Elevation: (in metres: average and/or maximum & minimum)

Average for wetland about 5 m above sea level

11. Area: (in hectares)

Wetland area: 13,258 ha
Total area enclosed by roads including "buffer": 21,577 ha

12. General overview of the site:
Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

A large shallow lake in a saucer-shaped depression, bounded in the south, east and west by low hills and in the north by the plains of the Manu and Kushiara rivers. Hail Haor is encircled to east and west by a chain of tea gardens and natural forest blocks. The river Gopla flows through the wetland from south to north. The haor floods during the rainy season (May-October), and at the peak of the dry season (March) reduces to around 3,000 ha of water. Land exposed as the water level recedes is converted to rice fields. Much of the lake's surface is overgrown with lotus and water hyacinth. The maximum depth of water during the wet season is about 7.5 m. It is one of the largest natural freshwater wetlands of Bangladesh and is distinctive in Bangladesh for having much of its catchment within the country. It has long been recognized as of international significance on ecological grounds, is nationally important as a fishery, and since 1999 has become a model of community-based co-management and restoration of wetland biodiversity and productivity.

13. Ramsar Criteria:
Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1	2	3	4	5	6	7	8	9
☐	☑	☐	☑	☑	☑	☑	☐	☐

14. Justification for the application of each Criterion listed in 13 above:
Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 2: the following threatened wetland dependent bird species are supported by Hail Haor: Baer's Pochard *Aythya baeri* (rare winter visitor, Vulnerable but currently under review for upgrading of threat status); Pallas's Fish-eagle *Haliaeetus leucoryphus* (regular winter visitor with potential to become resident through conservation efforts, Vulnerable); Greater Spotted Eagle *Aquila clanga* (regular winter visitor, Vulnerable); Imperial Eagle *Aquila heliaca* (rare winter visitor, Vulnerable). In addition the following threatened bird species also occur: White-rumped Vulture *Gyps bengalensis* (regular visitor, bred during 1990s in adjacent areas, Critical), Indian Spotted Eagle *Aquila hastata* (rare visitor, Vulerable). One threatened reptile occurs: Asiatic Softshell Turtle *Chitra indica* (recorded in the early 1990s when it was regularly caught by fishers, not recorded during surveys in 1999-2001).

Criterion 4: Hail Haor retains a relatively large area of 3,000-4,000 ha of water in the dry season (depending on the year). This is vital for the lifecycles of water birds which spend the northern winter (Bangladesh dry season) there and are international migrants (47 wetland dependent migratory species occur), and for a diversity of fish species which make local movements from dry season water bodies in the haor to repopulate parts of the connected catchment and downstream river system.

Criterion 5: In the 1960s very large populations of ducks (especially Fulvous and Lesser Whistling-duck) in excess of 20,000 occurred in winter (Mountfort 1969), these were completely lost in the 1980s-1990s due to hunting and disturbance from intense fishing. In the 2000s these populations are restoring through a community wide ban on hunting and community protection of "Baikka Beel Sanctuary" covering about 100 ha. Counts from this sanctuary area (about 3% of the dry season water area) in early 2006 gave almost 7,000 water birds. Although this sanctuary holds the largest concentration of water birds in the site, it is estimated that the total population (considering ducks, egrets, shorebirds, etc.) of the haor is in excess of 20,000.

Criterion 6: Hail Haor supports 1% or more of the Central Asia-South Asia biogeographic populations (based on Wetlands International 2002; update not yet available according to BirdLife) of the following congregatory waterbirds:
Fulvous Whistling-duck *Dendrocygna bicolour* (1% threshold 200; maximum of about 4,000 (November 2006), count only from Baikka Beel sanctuary but not regularly recorded in the site outside that area),
Ruff *Philomachus pugnax* (1% threshold 500; maximum of 1,286, % area of haor covered in that count uncertain, totals of 350-400 counted in recent years within 7-10% of suitable areas);
Pheasant-tailed Jacana *Hydrophasianus chirurgus* (1% threshold 500; average of mid-winter counts from about 7% of the dry season water area in 2005 and 2006 of 219 giving an estimated population of over 3,000, resident in the haor);
Grey-headed Lapwing *Vanellus cinereus* (1% threshold 500; average of mid-winter counts from about 14% of the suitable edges of the haor in 2005 and 2006 of 209 giving an estimated population of over 1,500),
Great Egret *Casmerodius albus* (1% threshold 250; average of mid-winter counts from about 7% of the dry season water area in 2005 and 2006 of 251 giving an estimated population of over 3,700);
Intermediate Egret *Mesophoyx intermedia* (1% threshold 250; average of mid-winter counts from about 7% of the dry season water area in 2005 and 2006 of 97 giving an estimated population of over 1,400).

Criterion 7: there are no endemic fish species to Bangladesh, however so far 90 species of fish have been recorded in Hail Haor out of about 260 species recorded in Bangladesh (Rahman 1989) or 35% of the national fish fauna. This diversity is also reflected in a wide range of life cycles since these species represent 29 families adapted to the large annual fluctuations in water extent and level.

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):
Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

In terms of migratory wetland dependent birds the Central Asia-South Asia flyway region. In terms of general bio-geography: Assam and Sylhet Plains also known as "Assam plains" Endemic Bird Area 131.

b) biogeographic regionalisation scheme (include reference citation):

Asian Flyways (Wetlands International 2002)
Endemic Bird Areas and Asian biogeographic regions as defined by BirdLife International (2003)

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16. Physical features of the site:
Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality, water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Hail Haor forms part of the Meghna Basin, which is of pleistocene origin and includes a series of plunging anticlines, filled up by recent sediments. Hail Haor is located in the anticline between the Satgaon and Dinajpur hills in the west (Rashidpur anticline) and the Barshijura and Balishira hills in the east (Balisera anticline). Geologically the soils, which belong to the Recent Era overlay the Pleistocene formations occurring at greater depths.

About 60% of the area is covered by semi-recent Surma-Kushiyara flood plain alluvium, which is moderately to fine-textured. These soils are mostly seasonally flooded. Slightly more than 30% of the area is covered by semi-recent piedmont colluvium and recent river outwash deposits, originating from sandy hill formations. These soils are commonly coarse to moderately (fine) textured and intermittently flooded after rains during the monsoon season.

Arable soils have been under cultivation for centuries. Because of the annual flooding these soils appear to be relatively fertile. The floodplain soils occupy flat to very gentle undulating (abandoned) levees in the transition zone between piedmont aprons and river basins (Harinarayanpur Series), basin margins (Jainka Series) and proper basins which are almost flat to slightly undulating (gilgay) and are occupied by the fine textured Kirtantala Series.

The highest topographic position is occupied by the Mirzapur Series, followed second by the Lungla and Harinarayanpur Series. The lowest topographic positions are for the Kirtantala Series, followed by the Jainka Series, which seem to appear the most responsive to field surface drainage.

The climate is sub-tropical with three distinct seasons. From November to early March which is relatively cool and dry (winter), from March to May which is hot with some rain (summer) and from June to October which is wet and warm (monsoon).

Some 94% of the total annual rainfall is recorded in a period of seven consecutive months (from April to November), average annual rainfall is about 2,500 mm. The evapotranspiration index (ET), exceeds precipitation (P) from the month of November up to April, resulting in a P/ET – ratio of 50 % of less. In all the other months the ratio is well above 100%, being highest in June (489%). The annual P/ET – ratio equals 210%. Lower temperatures are recorded during winter with daily maxima of about 25°C and daily minima of 9°C, while in summer and the rainy season daytime temperatures exceed 30°C. The highest values for relative humidity occur during the late monsoon because of high rainfall and limited sunshine duration and in the winter season due to low night temperatures causing heavy dew formation in the early morning hours.

The area under water varies from about 3,000 hectares during the dry season to a maximum of from 12,000 to 15,000 hectares during the wet season (depending on the year, based on records from 1999 to 2005). Maximum wet season water depth is 7.5 m and maximum dry season water depth is 5.5 m.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

Hail Haor catchment area is estimated to be 60,000 ha, approximately 85% in Bangladesh and 15% in India. Due to the undulating landscape and optimum climatic conditions this area was once forested and this habitat supported a very diverse flora and fauna, much of which has been reduced. The Lungla river is the main collector that discharges into the haor. The Gopla river is the only drainage outlet from the basin. The main source of flooding for the area is evidently the Lungla; Kushiyara flood flow apparently does not reach the haor's northern boundary. The charas (streams) that originate in the hills east and west of the haor (the Borshijura/Balishira Hills and Satgaon Hills respectively) are relatively small flood sources. Reportedly, the Gopla's drainage capacity downstream of the project has been reduced by siltation. The Gopla also drains Gangajuri Haor and other low areas to the north of Hail Haor. The Gopla downstream to its discharge into the Upper Meghna has not been studied.

The communities around the haor report that as many as 352 streams (locally known as charas) used to flow from the upper catchment into the Haor. Presently a total of 59 flowing charas have been found by inventory to be active, these range in length from 1.5 km to over 23 km long, the most important is Bilas Chara which flows from India into the haor and accounts for about 37% of water flowing into the haor. The climate of the catchment is the same as for Hail Haor.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

With such a large seasonally inundated area of 12,000-15,000 ha and only one outfall, it is likely that the Hail Haor is the major source of groundwater recharge in its catchment although no studies have been conducted of this.

The haor also plays an important role as a natural flood water retention basin slowing the flow of water from its catchment into the main Surma-Kushiara-Meghna River basin system. Since the hills of its catchment are a relatively short distance from the haor the charas are prone to flash floods and the rise in water is rapid in the early monsoon (wet season) – the most dramatic early flood in recent years was a 2.5 m rise in water level within 2 weeks in April 2004.

Hail Haor is a major sediment trap for its catchment. Poor land management in the neighbouring hills results in serious soil erosion throughout the region, particularly where pineapple is grown in lines up-down slope. In recent years contour cultivation has been successfully introduced to combat this and is slowly expanding. In 1999 it was found that the largest chara feeding the haor carried over 200,000 m^3 of sediment just in July. In 2001 silt loads of 22 charas were monitored – they carried 50,000 tons, suggesting that the total of 59 active charas carry over 100,000 tons of silt into Hail Haor each year. Moreover sediment traps showed deposition of 8-15 cm of silt in one year near the outfalls of the charas, which results in an average estimated raising of the haor bed in some areas by about 5 cm per year or 1 m in 20 years (MACH 2004).

19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines.*

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va •
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:
List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

Hail Haor land use	Area (ha) within road boundary	Area (ha) within wetland boundary
Seasonally flooded agricultural land (4) and Irrigated land (3) (not separable, some of this category is seasonally flooded, and part of this category including seasonally flooded land is irrigated in dry season):	14,595	7,854
Permanent freshwater lakes (over 8 ha)(O):	2,888	2,878
Seasonal/intermittent freshwater marshes (Ts):	1,767	1,702
Permanent freshwater marshes and pools (under 8 ha) (Tp):	136	136
Permanent rivers/streams/creeks (M):	419	399
Fresh water tree dominated wetland (Xf):	20	20
Aquaculture ponds (1):	121	84
Settlements	1,631	185
Total	**21,577**	**13,258**

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The majority of the wetland comprises of a shallow lake-like environment: in the wet season this forms one large lake, and in the dry season a total of 84 named public (state) owned water bodies known as beels (floodplain depressions or lakes) are distinguished. Some of these beels retain a water connection with others through the year while others become isolated in the dry season. Extensive areas of floating and floating leaved vegetation dominate much of the open water area, while most of the seasonally flooded area is used in the dry season either for cattle grazing or is cultivated with a single dry season rice crop. Slightly elevated natural and man-made levees along river and chara-khal (stream-canal) banks are dominated by stands of *Ipomoea carnea fistulosa* (dhol kolmi), in some of these native swamp and riparian tree species have in recent years been planted to restore natural swamp and riparian forest. The site is a major natural fishery supporting 90 fish species, upon which many small scale fishing households are dependent. Since 1999 community based management initiatives have resulted in adoption of conservation measures and adoption of wise-use principles in much of the area which have restored fish catches and water bird populations. The site provides flood storage services to substantial downstream floodplains along the Gopla river and Surma river system, it also provides ground water recharge services in its catchment. Plants as well as fish are important wild products from the haor that are used by the local communities for human food, fodder, fuel, mulches and construction. Most of the privately owned land within the wetland is used to grow a single rice crop in the dry season using a mixture of residual moisture, surface irrigation and groundwater.

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Approximately 100 wetland plant species have so far been identified from the haor (list annexed). The haor is particularly notable for its floating and floating leaved vegetation. There are large areas of lotus *Nelumbo nucifera* , most notably within Baikka Beel sanctuary, a survey covering all major wetlands in northeast Bangladesh only found this species here (FAP 6 1993). Waterlilies Nymphaeaceae are also common, as is *Euryale ferox* (makhna) which is scarce in the rest of northeast Bangladesh and is an important wild food plant. In addition to indigenous vegetation, two introduced invasive species cover significant areas of the site: *Eichhornia crassipes* water hyacinth which covers parts of the open water and *Ipomoea carnea fistulosa* morning glory or "dhol kolmi".

In addition 130 terrestrial plant species, including cultivated/planted species, have been recorded from the seasonally inundated areas of Hail Haor and from the surrounding lands in the catchment (list annexed).

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22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Full species lists including sources for data and threat status are attached as Annex 1. National threat status is based on the relevant volumes of IUCN Bangladesh (2000), while global threat status of birds is based on BirdLife International (2001).

Fish: out of the 90 species of fish that are present in the site 81 species are native. Notably these include 32 species that are regarded as nationally threatened out of a total of 54 nationally threatened species. The most significant of these include a number of declining larger fishes such as Chital, Rita and Bagair which are declining nationally and have important populations that are fished following wise use principles in the site. The nationally endangered and critically endangered species regularly caught in the site are: Chital, *Chitala chitala,* endangered; Chep Chela, *Chela laubuca,* endangered; Tatkini, *Crossocheilus latius,* endangered; Vangra, *Labeo boga,* critically endangered; Kalibaush, *Labeo calbasu,* endangered; Goinna, *Labeo gonius,* endangered; Moa, *Osteobrama cotio,* endangered; Shar Puti, *Puntius sarana,* critically endangered; Elong, *Rasbora elanga,* endangered; Rani, *Botia dario,* endangered; Rita, *Rita rita,* critically endangered; Guzi air/Guzkata, *Sperata seenghala,* endangered; Kani Pabda, *Ompok bimaculatus,* endangered; Madhu Pabda, *Ompok pabda,* endangered; Ghaura, *Clupisoma garua,* cr, critically endangered, critically endangered; Bacha, *Eutropiichthys vacha,* critically endangered; Bagair, *Bagarius bagarius,* critically endangered; Kali/Napti Koi, *Badis badis,* endangered; Naftani/Berkul, *Ctenops nobilis,* endangered; Gojar, *Channa marulius,* endangered; Boro Baim, *Mastacembelus armatus,* endangered.

Amphibians: only five species have so far been identified, all are common, although Boulenger's Frog *Rana tytleri/Rana alticola* is listed as nationally vulnerable.

Reptiles: 25 species have so far been reported from the site, notably these include seven species of freshwater turtles, in addition to one globally vulnerable species, five other turtle species are listed as nationally threatened: *Morenia petersi, Hardella thurjii, Kachuga smithii, Aspideretes hurum, Lissemys punctata.* A further eight monitors and snakes found in the site are considered nationally threatened: *Varanus bengalensis, Varanus flavescens, Python molurus, Ahaetulla nasutus, Coluber mucosus, Bungarus fasciatus, Naja kaouthia* and *Naja naja.*

Birds: among a total of 165 species recorded since the late 1970s, including threatened species noted in section 14, the following globally near-threatened species are also present: Ferruginous Pochard *Aythya nyroca* (regular winter visitor), Blyth's Kingfisher *Alcedo hercules* (vagrant), Grey-headed Fish-eagle *Ichthyophaga ichthyaetus* (resident), Oriental Darter *Anhinga melanogaster* (rare visitor), Black-headed Ibis *Threskiornis melanocephalus* (regular winter visitor). In the 1960s very large populations of ducks (especially Fulvous and Lesser Whistling-duck) in excess of 20,000 occurred in winter (Mountfort 1969), these were

completely lost in the 1980s-1990s due to hunting and disturbance from intense fishing. In the 2000s these populations are restoring through a community wide ban on hunting and community protection of "Baikka Beel Sanctuary" covering about 100 ha.

Mammals: 17 species have been reported from the haor, of these Bengal Fox *Vulpes bengalensis* is globally data deficient and seven others are nationally threatened: Asiatic Jackal, Fishing Cat, Common Mongoose, Common Otter, Large Indian Civet, Small Indian Civet and Rufous-tailed Hare.

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23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

A valuation study in 2000 estimated that the economic value generated from 12,300 ha that was flooded in 1999 was equivalent to US$ 7,981,100. This was based on the following estimates for the main human use values from the site: Commercial fisheries 12%, Subsistence fisheries 18%, Non-fish aquatic products (aquatic plants used by local residents and by tea estates) 28%, Dry-season (Boro) rice value 14%, Biodiversity funds 10%, Pasture value 9%, Flood control 5%, Recreation 2%, Transportation 2%. However, by 2004-5 with conservation based management improvements the fish catch had increased by 220% compared with 1999, indicating at constant prices an economic value from the haor of US$ 10,922,000 (57% derived from fish).

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box ☑ and describe this importance under one or more of the following categories:

i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:

Beginning in 1999 a management system for Hail Haor has been developed under the auspices of a fisheries management project ("MACH") involving local communities and Department of Fisheries that is based on the principle of wise use. This is now a model for Bangladesh, and other countries, for community based co-management of a large wetland. Key elements of this system have been: participatory planning with all stakeholders to articulate local problems and solutions based on local knowledge; establishing eight community organizations (Resource Management Organizations) that represent all stakeholders using their parts of the wetland, that follow sustainable practices within their areas and influence wetland management throughout the site; establishing a co-management body ("Local Government Committee") where community organizations, local councils (Union Parishads) and government officers (particularly the Upazila Fisheries Officer) coordinate management and resolve problems; implementation of extensive programs to reverse past degradation and over-exploitation of the wetland – notably excavation of silted up areas and swamp and riparian tree planting to restore wetland habitats; creation of local fish sanctuaries by the RMOs and declaration by the government of a major sanctuary (Baikka Beel) that is protected by these local institutions to support ecological functions and in particular protect fish and bird populations that repopulate the haor as a whole; and provision of endowment funds through the government so that these institutions and practices can be sustained. All of these measures have helped to restore productivity of the wetland to the benefit of local people on a sustainable basis and are expected to ensure that the character of the wetland is maintained.

ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:

iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:
a) within the Ramsar site:

There are 84 jalmohals (government owned waterbodies where the fishing rights are leased out) within the haor covering 1,305.6 ha (about 9% of the wetland area of the site) and ranging in size from under 1 ha up to 336 ha. These named beels retain water through the year they are mostly distinct and become separated in the dry season. Of these 22 jalmohals covering 472.8 ha have been reserved by the government for management by community organisations known as Resource Management Organisations. Also a total area of about 100 ha (including 57 ha of the Chapra-Magura and Jaduria Beels jalmohals, 0.7% of the wetland area and 0.5% of the total site area) has been permanently reserved by the Ministry of Land as a sanctuary known as "Baikka Beel sanctuary" under management of Baragangina Resource Management Organisation supervised by Sreemangal Local Government Committee.

In addition there is a scattered area of at least 1,000 ha of khas land (government owned) that retains some water through the year within the haor, including much of the Gopla river which is now an open access fishery. The exact status of much of this khas land is unclear, much is commonly used, some parts are believed to have been encroached for private use. Some areas of this khas land have been officially distributed for settlement and use by landless people, but in practice this land retains water through the year either as beels or freshwater marsh and wet grazing, and so they remain common pool resources over which either local people or jalmohal leaseholders exercise use rights. The remainder of the area (seasonally inundated) is under private ownership, however during the wet season the aquatic resources in these areas form a common pool resource that local communities can access and use for subsistence.

b) in the surrounding area:

The remainder of the catchment lands are under three main types of tenure. Lower/more level land is privately owned. Much of the hills surrounding are public (state) lands that have been leased long term to companies for tea estates, with smaller areas leased to individuals for crops such as pineapple and lemons. Significant areas of these hills both to west and east of the haor are state owned reserved forest, within this to the east is Lawachara National Park covering 1,200 ha. In addition east of the haor between Sreemangal and Moulvi Bazaar some of the Forest Department lands are under rubber cultivation.

25. Current land (including water) use:
a) within the Ramsar site:

The population living around and making use of Hail Haor is about 160,000 living in 60 villages in the immediately surrounding catchment (these villages lie between the wetland area of the site and the roads that encircle the site). About 84 percent of households have some involvement or dependence on fishing and 53 percent are full time fishing households (MACH, 2001).

The major land uses of the site are:

- Fishing in both the permanent water areas and the seasonally inundated areas of the wetland. As noted elsewhere, from the same water areas the capture fishery production has more than doubled between 1999 and 2004-05 associated with habitat restoration and conservation based management;

- Collection of other aquatic resources. A wide range of plants for human food, livestock fodder, fuel and construction, monitoring indicates no change in the level of use;
- Livestock grazing in the dry season. Several groups of people specialise in seasonally herding large numbers of cattle and buffaloes for milk and meat production within the site particularly in the khas lands on the eastern side of the site;
- Agriculture. Within the site only a single crop of dry season rice (boro paddy) can be grown due to high wet season water levels, this is grown on both residual moisture and irrigation from the remaining beels, in addition irrigation using surface pumps and ground water is used to supply crops grown on slightly higher lands around the haor;
- Fish farming. An area of ponds for aquaculture of native and exotic carps has been established since the late 1980s at the south end of the haor. In the 2000s embankments have been built by private investors to enclose some areas along the east side of the wetland and convert them to large permanent fish ponds.
- Brickfield. One brickfield has been operating for 3-4 years on the eastern edge of the haor.
- Hunting. In the recent past wintering waterbirds (any ducks that visited and more often shorebirds and egrets/herons) were often hunted through netting by local people and shooting by better off locals and visitors. Since 2000 there has been a major change, hunting throughout the haor has largely ended through actions of the local Resource Management Organisations. In the Baikka Beel Sanctuary the community has successfully ended all fishing and hunting and has resisted attempts by outsiders to shoot the ducks that have returned to the area.

There is some tourism and recreational use, and educational and research uses have started (see sections 29-31).

A valuation study in 2000 estimated that the economic value generated from 12,300 ha that was flooded in 1999 was equivalent to US$ 7,981,100. This was based on the following estimates for the main human use values from the site: Commercial fisheries 12%, Subsistence fisheries 18%, Non-fish aquatic products (aquatic plants used by local residents and by tea estates) 28%, Dry-season (Boro) rice value 14%, Biodiversity funds 10%, Pasture value 9%, Flood control 5%, Recreation 2%, Transportation 2%. However, by 2004-5 with conservation based management improvements the fish catch had increased by 220% compared with 1999 (with both catch per hectare and catch per person day increasing), indicating at constant prices an economic value from the haor of US$ 10,922,000 (57% derived from fish).

b) in the surroundings/catchment:

Hail Haor watershed area is estimated to be about 57,000 ha including the area of the haor itself, approximately 85% in Bangladesh and 15% in India. The lower floodplains and more level land closer to the haor is cultivated with rice in the monsoon and with dry season crops or irrigated rice in the winter/dry season. The many villages (more than the 60 that directly use the haor) within the catchment are concentrated in this zone and contain small areas of homestead trees and gardens. The town of Sreemangal is an important centre for the tea industry and has been growing rapidly.

The undulating hills with their abundant rainfall were once forested and this habitat supported a very diverse and abundant flora and fauna, much of this has been reduced. Most of the upper catchment, previously dense forest, is now covered with tea, pineapple and lemon gardens. Several tea estates operated by national and international companies cover the wet and east sides of the catchment. In addition there are many small holdings on hill slopes, where pineapple, lemons and other fruit trees are grown. Significant areas of these hills both to west and east of the haor are reserved forest, within this to the east is Lawachara National Park covering 1,200 ha and the adjoining West Bhanugach Reserved Forest (2,749 ha), about a third of this total area lies within the haor catchment. This is one of the most important patches of tropical forest remaining in Bangladesh and still supports a wide range of flora and fauna, protection arrangements and visitor facilities are currently being enhanced in the national park. To

the west is Satgaon forest (much of which is degraded plantations). In addition east of the haor between Sreemangal and Moulvi Bazaar some of the Forest Department lands are under rubber cultivation.

Downstream of the site connected to the Gopla river are areas of seasonally inundated agricultural land and smaller wetlands.

The composition of land uses within the catchment (including Hail Haor) is estimated to be:

Land use	area (ha)	%
Cultivated land	23,507	41%
Tea estates	20,633	36%
Wetlands and uncultivated areas	3,436	6%
Settlements	2,875	5%
Forest	2,404	4%
Lemon and pineapple gardens	2,361	4%
Settlements, gardens and degraded forest used by khashia ethnic minority	1,744	3%
Total	56,960	

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) within the Ramsar site:

In the 1980s an embankment project undertaken by Bangladesh Water Development Board with World Bank support was initiated to expand dry season agriculture in the haor. An embankment in the east side of the haor was built, but that project fortunately did not enclose any significant area of the haor and has not affected water levels or flows. However, it did improve access into the haor and provide an embankment and ditches that have been used to expand aquaculture. This project was revived as a proposal in the early 2000s but the government was persuaded not to pursue it. Attempts to drain the seasonal wetland areas remain a threat, although through MACH project the value of the present wetland system is better recognised. Other water development projects may also affect the wetland. In 2006 the Local Government Engineering Department is implementing a rubber dam for water retention and irrigation downstream on the Gopla River (outside of the site). But predictions indicate that project will likely raise slightly dry season water levels which should be beneficial for the wetland ecology.

A recent trend with adverse impacts on the wetland ecology is enclosure of seasonally flooded areas and shallower year-round wet areas of private and public lands for aquaculture. These have been mapped up to 2001 but have expanded in the east side of the haor in the last three years including in areas adjacent to Baikka Beel sanctuary. While these retain some value for birds, embanking areas for aquaculture results in loss of connectivity and loss of natural fish populations, it also results in loss of common property aquatic plants.

Economic growth in the catchment also poses a threat: more intensive cultivation (both in the nearby fields and in the tea estates) is typically associated with use of agro-chemicals which could affect water quality in the haor given it has only one outlet, but there is no evidence so far of any impact. In addition to fuel the growth of Sreemangal town one brick field has been established within the site, in the short term this results in loss of dry season shallow flooded grazing lands and air pollution, but in the longer term it may deepen these habitats.

Two long established and naturalised introduced invasive species cover significant areas of the site: *Eichhornia crassipes* water hyacinth which covers parts of the open water and *Ipomoea carnea fistulosa* morning glory or "dhol kolmi" which covers extensive areas of slightly higher land and levee banks particularly in

the southern half of the site, and is known to have spread in the last two decades. These may gradually change the ecological character of the site.

b) in the surrounding area:

The main threat from the surrounding area has been soil erosion in the catchment hills resulting in significant sedimentation within the haor (details given earlier). Up to the mid 1800s almost the entire catchment was forested, thereafter there was major deforestation to establish tea estates (mostly in the late 1800s), for short rotation plantations, for agriculture, and for small holdings. This caused loss of evergreen forest in the low hills and loss of swamp forest around the haor. In recent decades adoption of pineapple cultivation using inappropriate practices has posed a significant threat although the area under pineapple is under 4% of the catchment. Pineapple are grown in rows aligned up-down slope accelerating soil erosion during the concentrated rains of the monsoon season. Since 2000 alternative contour cultivation practices have been promoted by MACH project, which has shown that this not only reduces erosion but also increases farmer profits, and this has gradually been adopted by some of the pineapple farmers. In 2006 the Department of Agricultural Extension agreed to continue to promote contour cultivation in the area.

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27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

The whole site has been identified as an "important bird area" (BirdLife 2004), although this carries with it no protected status. Bangladesh does not so far have a national legally defined system for wetland protected areas, but within the Hail Haor site the government has set aside a protected area that can be a model for other wetlands. The Baikka Beel Sanctuary, and more specifically the jalmohals within it, have been set aside as permanent sanctuaries by a Ministry of Land decision to give up collection of revenue through the normal process permanently, on condition that there be no fishing or other extractive use of that area. Instead, against a nominal Tk 501 payment each year, the Baragangina Resource Management Organisation, under the Sreemangal Local Government Committee supervision, is responsible for protecting, restoring, and managing the area. All of this area lies within the site.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ☑;Ib ☐; II ☐; III ☐; IV ☐; V ☐; VI ☑

Baikka beel, covering 100 ha is a strict nature reserve with no uses allowed other than controlled eco-tourism.

In addition significant areas of the site under the eight RMOs are managed resource protected areas where there is sustainable use aimed at maintaining and restoring the wetland productivity and functions. In particular these RMOs have established small sanctuaries within the areas that they manage, and observe closed seasons on fishing, a ban on hunting birds, and a ban on complete drainage of dry season water.

c) Does an officially approved management plan exist; and is it being implemented?:

A management plan for Baikka Beel sanctuary (about 100 ha, the area reserved by Ministry of Land as a sanctuary) has been developed through a process involving MACH project, Baragangina Resource Management Organisation, and local government. After local participatory planning sessions with different stakeholders, a workshop involving all stakeholders was held in June 2005. Based on this the

plan was modified and elaborated and reviewed by the RMO and then by the Local Government Committee for the haor (the members comprise government officers, local elected councillors and leaders of RMOs). After revisions the final management plan was approved by the same Sreemangal local government committee and signed by the Upazila Nirbahi Officer (chief administrator at sub-district level) and Upazila Fisheries Officer in 2006. It is being implemented – no fishing has taken place apart from isolated incidents of poaching, and attempts to shoot ducks that have returned to the area with protection have been thwarted by the guards employed by the RMO and by the local community. Baragangina RMO had already been implementing most of the provisions of the management plan in the form of a draft plan since early 2005. This plan is available in both Bangla and English (see annex).

For the site as a whole the situation is more complex. The eight Resource Management Organisations each have a brief management plan in Bangla which is reviewed and updated each year and accompanies a sketch map of their activities and area. These plans are endorsed by the concerned Upazila Fisheries Officer and mainly cover conservation and sustainable fishing practices (individual plans differ in their details but in general they include provision for smaller fish sanctuaries, closed seasons, gear restrictions, a ban on draining water bodies in the dry season, and a ban on bird hunting). The RMOs have complete use rights through agreement with the government covering 473 ha of jalmohals that permanently hold water, but their management plans not only cover these areas but also large adjacent areas of seasonally flooded land and chara banks where trees have been planted. The Upazila level co-management committee does not have a separate plan but seeks to coordinate and support the RMOs in their activities, and to overcome conflicts where they arise.

The success of implementation of these plans is apparent through widespread recognition of the rules set by the RMOs and acknowledgement of their benefits, and through a doubling of fish catches over a 5-6 year period.

d) Describe any other current management practices:

The basis of the management practices of the RMOs is sustainability or wise use.

In Baikka Beel sanctuary through the MACH project support conservation measures since about 2003 include planting of native swamp forest trees – mostly Koroch and Gijal (as of October 2006 11,600 trees were surviving in their area) – this former habitat had long since disappeared from the site; dredging to deepen some of the silted up areas (out of a planned area of about 8 ha so far about 1 ha has been excavated); placement of submerged concrete hexapods and pipes (these shelter fish, are a deterrent to fishing and provide substrate for attached plankton (periphyton) growth by substituting for the missing trees that would have occurred in the past and are gradually being restored).

This has further been promoted more generally for the haor as a whole through awareness raising activities – dramas, posters, film shows, public meetings and workshops.

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28. Conservation measures proposed but not yet implemented:
e.g. management plan in preparation; official proposal as a legally protected area, etc.

The following are proposed, have been approved by Government of Bangladesh and are in process of being implemented. Changing the name of the Local Government Committee to Upazila Fisheries Committee (UFC) and constituting two UFCs – one for Sreemangal Upazila and another for Moulvi bazaar Upazila (about a third of the site, mostly seasonal wetland is within that sub-district). This will also be associated with a strengthening of the role of the UFCs. The responsibilities of the UFCs are to coordinate and ensure sustainable use of the wetland. A mechanism for coordinating the activities under the two UFCs is planned and will be developed once the Moulvi Bazar UFC is formed. The Ministry of Fisheries and Livestock has approved establishing endowments of trust funds for both UFCs due to be established within 2006. From the interest on this they will cover the operating costs of the committee, fisheries and other officers are able to make frequent visits, awareness raising activities can be funded,

the maintenance costs and guard costs for Baikka Beel sanctuary will be covered, and the UFCs can make small grants to the community organisations (Resource Management Organisations) for habitat restoration, sanctuary protection and maintenance, restoration of swamp forest, awareness raising, and other related activities. This system has already been tried and tested by providing equivalent grants to the LGC/UFCs since September 2005.

29. Current scientific research and facilities:
e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

The MACH project has since 1999 undertaken detailed monitoring of fish catches from a sample of areas of the haor, and monitoring of fish consumption and use of aquatic resources for a sample of households from villages around the haor. MACH has maintained an office in Sreemangal since 1999, and its partner NGO (Center for Natural Resource Studies) plans to retain a presence in the area and may open its own field station. Regular mid-winter water bird counts have been made for several years as part of the Asian Waterbird Census, and this is expected to continue. With the establishment of Baikka Beel sanctuary, and in accordance with its management plan, universities will be invited to undertake ecological research in the area.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:
e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

In the Baikka Beel Sanctuary an observation tower, with lower hide and information/interpretive display level and upper observation level, has recently been built. Arrangements under the management plan for this sanctuary have been made for guided boat trips in part of the area and walks along one trail. Information boards have been installed, a poster and an information brochure produced, and a video documentary produced and shown on TV, all of these are in both Bangla and English. Members of the local Resource Management Organisation responsible for the sanctuary and the sanctuary guards are being trained in guiding visitors through MACH project.

Arrangements are planned to encourage and enable school and university student visits to this sanctuary, including a tie-in with the American International School Dhaka and its "Roots and Shoots" group which it is hoped will sponsor local school visits. Since the site has probably the easiest access of any of the major wetlands of Bangladesh, being only a few kilometres from Sreemangal town which is well connected by road and railway, it has considerable education potential for those who can afford to make a visit as well as for local communities.

31. Current recreation and tourism:
State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

The site is presently used for low intensity recreation and tourism. The Sreemangal area with Hail Haor, Lawacharra National Park and scenic tea estates all within close range of the town with several accommodation options and its good communications, is already a popular destination with modest numbers of national and international visitors. Publicity for Bakka Beel sanctuary and for Lawacharra National Park is likely to increase visitor numbers, especially with increasing affluence. In 2000 surveys indicated that there were about 10,000 visitors per year to Sreemangal including about 1,100 foreign visits, lasting about 2 days per visit and it is believed that about a half of visitor time is spent in the haor. Visitors tend to make boat trips on the haor for recreation (in the past some also shot birds). It is expected that the visitor facilities in Baikka Beel coupled with recent newspaper and TV coverage will attract more visitors interested in seeing the increasing numbers of wintering waterbirds. However, visitor numbers are unlikely to exceed 50 per weekend in the near future.

32. Jurisdiction:
Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

Territorial: Ministry of Land represented by Deputy Commissioner, Moulvi Bazar District, Moulvi Bazar, Bangladesh. Under him/her: Sreemangal and Moulvi Bazar Upazilas (sub-districts).

Functional: Department of Fisheries, Matshya Bhaban, Ramna, Dhaka, Bangladesh, has responsibility for ensuring sustainable and productive fisheries, and has taken the lead role in developing the co-management arrangements for this wetland, and in coordinating management through the Local Government Committee system.

Note that "jalmohals" – state owned fishery waterbodies are under the Ministry of Land represented by the District administration (Deputy Commissioner, see above), except that 23 jalmohals in the site are now under specific community based co-management arrangements (see 33) through agreement with the Ministry of Land.

The combination of jurisdiction and co-management authorities developed in Hail Haor by Department of Fisheries, local government, and local community organisations through support of MACH is notable as it is now a model which has been proposed for national adoption by the Department of Fisheries in its Inland Capture Fisheries Strategy (DOF 2006) which has been approved as the way forward by the Ministry of Fisheries and Livestock

33. Management authority:
Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Direct management of the wetland is under the following:

Sreemangal Local Government Committee/Upazila Fisheries Committee coordinates management of the wetland area under Sreemangal Upazila (and until late 2006 also the area under Moulvi Bazar Upazila which now has just established an equivalent committee): chairperson Upazila Nirbahi Officer (senior administrative officer of the upazila), member-secretary Upazila Fisheries Officer, members – other relevant Upazila officers, chairmen of the Union Parishads (elected local government councils), and chairmen of five Resource Management Organizations (community based organisations). Contact: UNO or UFO, Sreemangal Upazila, Sreemangal, Moulvi Bazaar District. This committee is approved by Ministry of Fisheries and Livestock.

Moulvi Bazaar Local Government Committee/Upazila Fisheries Committee coordinates management of the wetland area under Moulvi Bazar Upazila: chairperson Upazila Nirbahi Officer (senior administrative officer of the upazila), member-secretary Upazila Fisheries Officer, members – other relevant Upazila officers, chairmen of the Union Parishads (elected local government councils), and chairmen of three Resource Management Organizations (community based organisations). Contact: UNO or UFO, Moulvi Bazaar Sadar Upazila, Moulvi Bazaar District. This committee is in the process of being established, having been approved by Ministry of Fisheries and Livestock.

Eight Resource Management Organizations (RMOs) each comprising of local stakeholders, each with an executive committee headed by a chairman. These have management responsibility and plans covering 23 jalmohals (473 ha). However, considering the areas over which their management practices influence use as well as areas where communities have restored swamp and riparian forest within the site, their total management area is about 9,000 ha where they encourage sustainable resource use (for example limiting harmful fishing and observing a closed season, and banning hunting). The RMOs are named: Agaria, Balla, Borogangina, Dumuria, Jethua, Kazura, Sananda, and Ramadia.

Out of these Borogangina RMO has direct responsibility for managing and protecting "Baikka Beel" sanctuary within Hail Haor, in accordance with the management plan noted earlier that was developed with and approved by the Local Government Committee.

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

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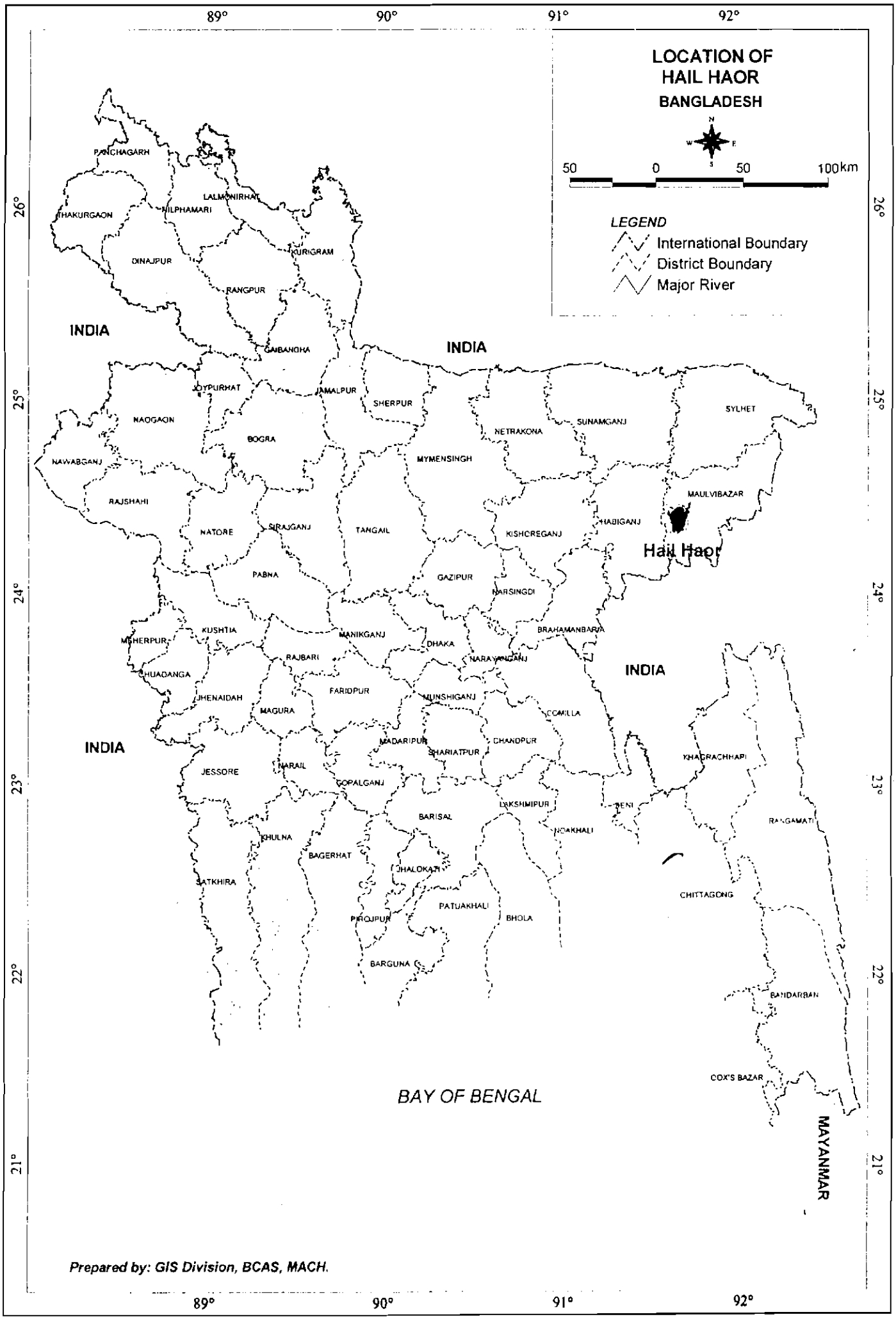
HAIL HAOR, BANGLADESH

RAMSAR INFORMATION SHEETS

MAPS
(Final versions will be A3)

Map 1: Location of Hail Haor
Map 2: Hail Haor Boundary for Proposed Ramsar Designation
Map 3: Hail Haor Landuse
Map 4: Hail Haor Seasonal Variation of Water Extent


LOCATION OF
HAIL HAOR
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INDIA
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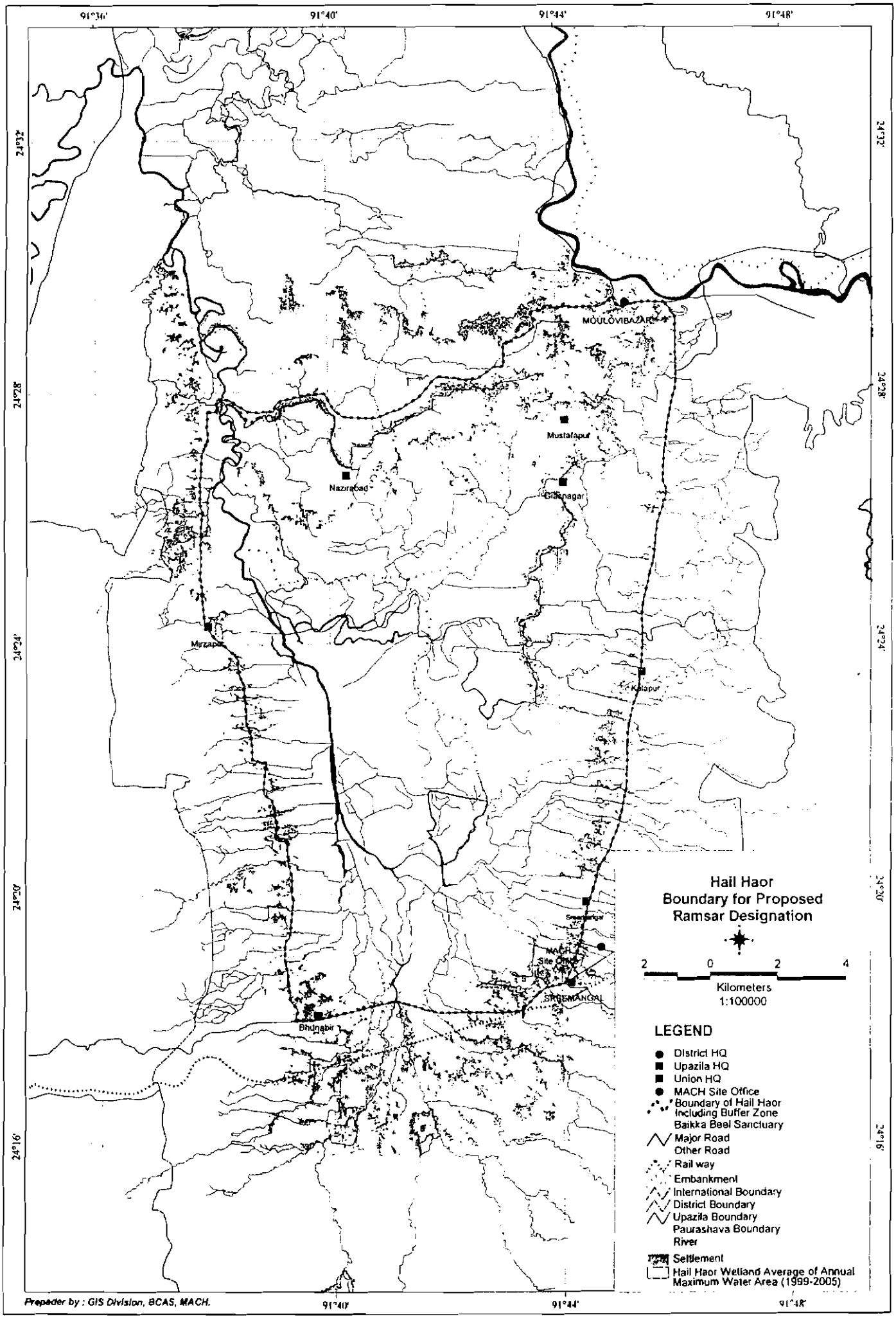
THAKURGAON
LALMONIRHAT
NILPHAMARI
DINAJPUR
KURIGRAM
RANGPUR
GAIBANDHA
JOYPURHAT
JAMALPUR
SHERPUR
NAOGAON
BOGRA
NAWABGANJ
MYMENSINGH
NETRAKONA
SUNAMGANJ
SYLHET
RAJSHAHI
NATORE
SIRAJGANJ
TANGAIL
KISHOREGANJ
HABIGANJ
MAULVIBAZAR
Hail Haor
PABNA
GAZIPUR
NARSINGDI
KUSHTIA
MANIKGANJ
DHAKA
BRAHAMANBARIA
MEHERPUR
RAJBARI
NARAYANGANJ
CHUADANGA
JHENAIDAH
FARIDPUR
MUNSHIGANJ
MAGURA
COMILLA
MADARIPUR
CHANDPUR
SHARIATPUR
KHAGRACHHARI
JESSORE
NARAIL
GOPALGANJ
LAKSHMIPUR
FENI
BARISAL
NOAKHALI
RANGAMATI
KHULNA
BAGERHAT
JHALOKATI
SATKHIRA
CHITTAGONG
PATUAKHALI
PIROJPUR
BHOLA
BARGUNA
BANDARBAN
COX'S BAZAR
BAY OF BENGAL
Prepared by: GIS Division, BCAS, MACH.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Mustafapur
Nazirabad
Gilanagar
Mirzapur
Kalapur
Sreemangal
MACH Site Office
Bhunabir
Hail Haor
Boundary for Proposed
Ramsar Designation
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Kilometers
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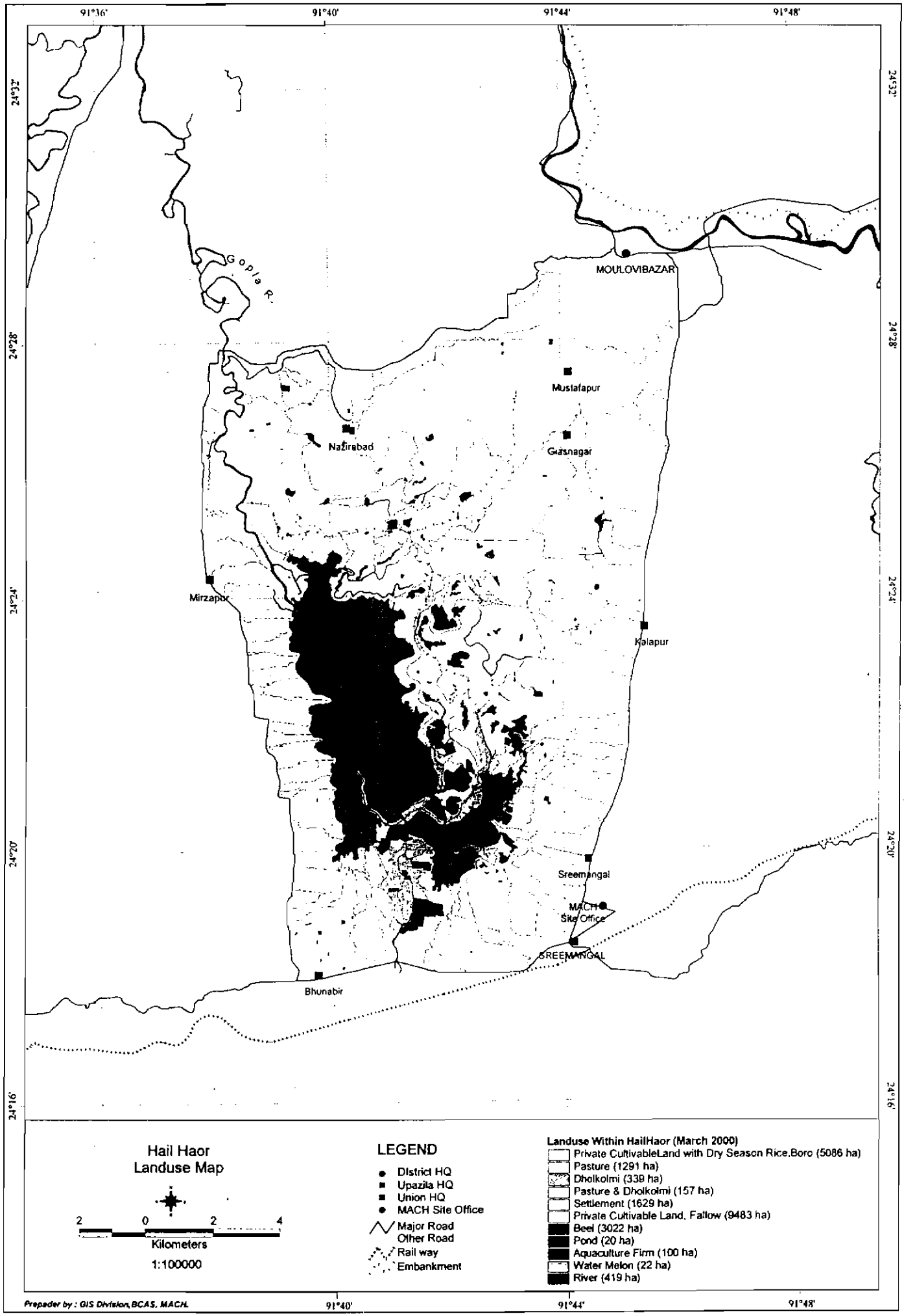
LEGEND
District HQ
Upazila HQ
Union HQ
MACH Site Office
Boundary of Hail Haor Including Buffer Zone
Baikka Beel Sanctuary
Major Road
Other Road
Rail way
Embankment
International Boundary
District Boundary
Upazila Boundary
Paurashava Boundary
River
Settlement
Hail Haor Wetland Average of Annual Maximum Water Area (1999-2005)
Prepared by : GIS Division, BCAS, MACH.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Mustafapur
Nazirabad
Gazinagar
Mirzapur
Kalapur
Sreemangal
MACH Site Office
SREEMANGAL
Bhunabir
Hail Haor Landuse Map
2 0 2 4
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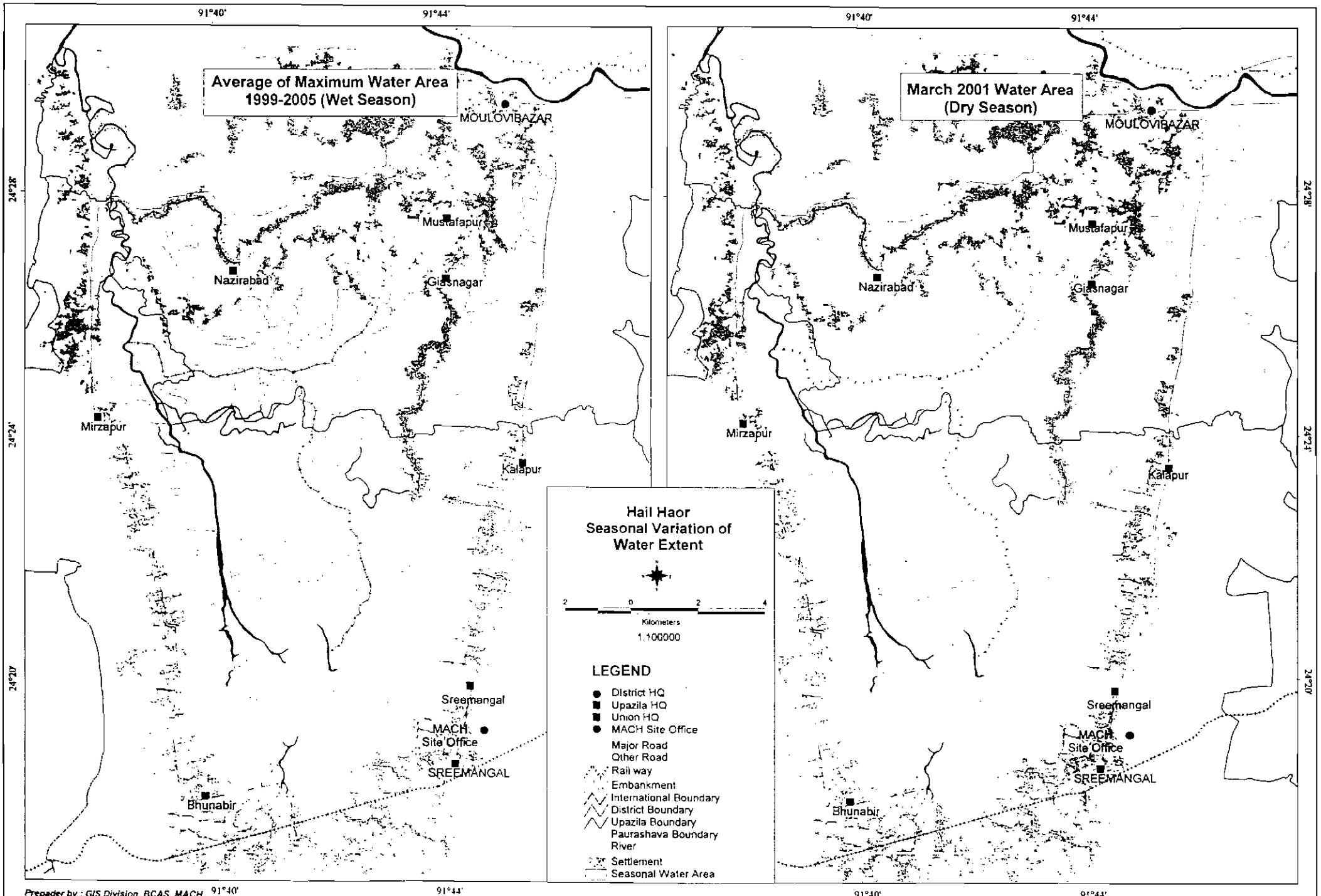
LEGEND
District HQ
Upazila HQ
Union HQ
MACH Site Office
Major Road
Other Road
Rail way
Embankment
Landuse Within HailHaor (March 2000)
Private CultivableLand with Dry Season Rice,Boro (5086 ha)
Pasture (1291 ha)
Dholkolmi (339 ha)
Pasture & Dholkolmi (157 ha)
Settlement (1629 ha)
Private Cultivable Land, Fallow (9483 ha)
Beel (3022 ha)
Pond (20 ha)
Aquaculture Firm (100 ha)
Water Melon (22 ha)
River (419 ha)
Prepared by : GIS Division,BCAS, MACH


Average of Maximum Water Area
1999-2005 (Wet Season)
March 2001 Water Area
(Dry Season)
Hail Haor
Seasonal Variation of
Water Extent
91°40'
91°44'
24°28'
24°24'
24°20'
MOULOVIBAZAR
Mustafapur
Nazirabad
Giasnagar
Mirzapur
Kalapur
Sreemangal
MACH
Site Office
SREEMANGAL
Bhunabir
2 0 2 4
Kilometers
1.100000
LEGEND
District HQ
Upazila HQ
Union HQ
MACH Site Office
Major Road
Other Road
Rail way
Embankment
International Boundary
District Boundary
Upazila Boundary
Paurashava Boundary
River
Settlement
Seasonal Water Area
Prepader by : GIS Division, BCAS, MACH.

HAIL HAOR, BANGLADESH

RAMSAR INFORMATION SHEETS

ANNEX 1:
FAUNA AND FLORA SPECIES LISTS FOR HAIL HAOR

ANNEX 1.1 BIRDS RECORDED FROM HAIL HAOR, BANGLADESH

Since the late 1970s a total of 165 bird species have been recorded in Hail Haor up to the end of 2006; of these about 92 (56%) are wetland dependent and nine are globally threatened or near-threatened. Hail Haor has long been known as an important wetland nationally and internationally and it was recently recognised by Birdlife International as one of only 19 Important Bird Areas (IBA) of international significance located in Bangladesh (BirdLife International 2004). 43% of Asia's IBAs are outside any formally protected areas.

Since 2004 Baikka Beel has been set aside as a wetland sanctuary by the government with support of MACH project and managed and protected by the local community (Resource Management Organization). So far 102 bird species have been recorded in this 100 ha sanctuary area within the 14,000 ha haor. Conservation measures taken up by the eight RMOs in the wider haor, and in particular this important sanctuary, not only protect fish stocks but also the diverse wildlife and wetland landscape of this national treasure. This list shows all species known to have been recorded from Hail Haor.

Birds recorded in Hail Haor based on mid-winter surveys, with details of counts from Baikka Beel Wetland Sanctuary since 2002.

No.	Species name	Scientific name	Seasonality	Status in Hail Haor	Global threat status	Hail Haor		Baikka Beel				
						21-23 Feb 1992	2 Feb 1993	Status in sanctuary	13 Dec 2002	28 Jan 2004	24 Jan & 10 Feb 2005	1&3 Feb 2006
	Observers →					AK, SR	AK, SR		EH, WC	EH, WC	PT, EH	PT
	DUCKS, GEESE, SWANS	*ANATIDAE*										
1	Fulvous Whistling-duck	*Dendrocygna bicolor*	W	c				c				1500
2	Lesser Whistling-duck	*Dendrocygna javanica*	W	c				c	460		18	2500
3	Bar-headed Goose	*Anser indicus*	W	r								
4	Ruddy Shelduck	*Tadorna ferruginea*	W	r				1			2	
5	Cotton Pygmy-goose	*Nettapus coromandelianus*	R	uc				uc	4	8		50
6	Gadwall	*Anas strepera*	W	uc				uc				50
7	Eurasian Wigeon	*Anas penelope*	W	r				r				
8	Spot-billed Duck	*Anas poecilorhyncha*	W	uc								
9	Northern Shoveler	*Anas clypeata*	W	r				uc			1	4
10	Northern Pintail	*Anas acuta*	W	c				c			100	700
11	Garganey	*Anas querquedula*	W	c		140		c			30	200
12	Common Teal	*Anas crecca*	W	uc				uc			100	300
13	Common Pochard	*Aythya ferina*	W	uc								
14	Ferruginous Pochard	*Aythya nyroca*	W	uc	Near-threatened			uc				87
15	Baer's Pochard	*Aythya baeri*	W	l	Vulnerable							
16	Tufted Duck	*Aythya fuligula*	W	r				1				
	WOODPECKERS	*PICIDAE*										
17	Eurasian Wryneck	*Jynx torquilla*	W	r				1				
	HOOPOE	*UPUPIDAE*										
18	Common Hoopoe	*Upupa epops*	R	r				1				

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No.	Species name	Scientific name	Seasonality	Status in Hail Haor	Global threat status	Hail Haor		Baikka Beel				
						21-23 Feb 1992	2 Feb 1993	Status in sanctuary	13 Dec 2002	28 Jan 2004	24 Jan & 10 Feb 2005	1&3 Feb 2006
	ROLLERS	*CORACIIDAE*										
19	Indian Roller	*Coracias benghalensis*	R	uc								
	KINGFISHERS	*ALCEDINIDAE*										
20	Blyth's Kingfisher	*Alcedo hercules*	V	l	Near-threatened							
21	Common Kingfisher	*Alcedo atthis*	R	c				c			common	common
22	White-throated Kingfisher	*Halcyon smyrnensis*	R	c				c				1
23	Pied Kingfisher	*Ceryle rudis*	R	uc				uc				
	BEE-EATERS	*MEROPIDAE*										
24	Green Bee-eater	*Merops orientalis*	R	r								
25	Blue-tailed Bee-eater	*Merops philippinus*	S	uc				uc				
	CUCKOOS	*CUCULIDAE*										
26	Pied Cuckoo	*Clamator jacobinus*	S	r				2				
27	Indian Cuckoo	*Cuculus micropterus*	S	uc								
28	Lesser Cuckoo	*Cuculus poliocephalus*	V	l								
29	Plaintive Cuckoo	*Cacomantis merulinus*	R	uc				uc			1	1
30	Lesser Coucal	*Centropus bengalensis*	R	2				2				
	PARROTS	*PSITTACIDAE*										
31	Rose-ringed Parakeet	*Psittacula krameri*	R	c								
	TYPICAL OWLS	*STRIGIDAE*										
32	Spotted Owlet	*Athene brama*	R	uc				r				
	PIGEONS, DOVES	*COLUMBIDAE*										
33	Oriental Turtle Dove	*Streptopelia orientalis*	R	uc								
34	Spotted Dove	*Streptopelia chinensis*	R	c				c			few	few
35	Red Collared Dove	*Streptopelia tranquebarica*	R	c								
36	Eurasian Collared Dove	*Streptopelia decaocto*	R	c				uc				
	RAILS, COOTS	*RALLIDAE*										
37	Slaty-breasted Rail	*Gallirallus striatus*	R	l				l				
38	Ruddy-breasted Crake	*Porzana fusca*	R	r				3	1		2	
39	Watercock	*Gallicrex cinerea*	S	r								
40	Purple Swamphen	*Porphyrio porphyrio*	W	c		1		c	29	8	21	300
41	Common Moorhen	*Gallinula chloropus*	W	c		7		c	48	4	13	100
42	Common Coot	*Fulica atra*	W	uc				uc				48
	SNIPES, SANDPIPERS	*SCOLOPACIDAE*										
43	Pintail Snipe	*Gallinago stenura*	W	c		14		r				1
44	Swinhoe's Snipe	*Gallinago megala*	v	l		2						
45	Common Snipe	*Gallinago gallinago*	W	c		55	245	uc	12	1		1
46	Jack Snipe	*Lymnocryptes minimus*	W	r								
47	Black-tailed Godwit	*Limosa limosa*	W	uc				uc			75	

No.	Species name	Scientific name	Seasonality	Status in Hail Haor	Global threat status	Hail Haor		Baikka Beel				
						21-23 Feb 1992	2 Feb 1993	Status in sanctuary	13 Dec 2002	28 Jan 2004	24 Jan & 10 Feb 2005	1&3 Feb 2006
48	Bar-tailed Godwit	*Limosa lapponica*	W	l								
49	Spotted Redshank	*Tringa erythropus*	W	uc				uc			47	1
50	Common Redshank	*Tringa tetanus*	W	r								
51	Marsh Sandpiper	*Tringa stagnatilis*	W	uc			6	uc			14	
52	Common Greenshank	*Tringa nebularia*	W	uc				uc	14		3	
53	Green Sandpiper	*Tringa ochropus*	W	uc				r	2	1		
54	Wood Sandpiper	*Tringa glareola*	W	c		45	962	uc			5	6
55	Common Sandpiper	*Actitis hypoleucos*	W	r				r		2	1	
56	Little Stint	*Calidris minuta*	W	r				r	5		10	
57	Temminck's Stint	*Calidris temminckii*	W	c		15		uc				
58	Curlew Sandpiper	*Calidris ferruginea*	W	r			3					
59	Ruff	*Philomachus pugnax*	W	c		62	1286	c	73	115	350	400
	PAINTED SNIPE	*ROSTRATULIDAE*										
60	Greater Painted-snipe	*Rostratula benghalensis*	R	r								
	JACANAS	*JACANIDAE*										
61	Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	R	c		4	9	c	7		20	111
62	Bronze-winged Jacana	*Metopidius indicus*	R	c		3		c				30
	STILTS, AVOCETS	*RECURVIROSTRIDAE*										
63	Black-winged Stilt	*Himantopus himantopus*	W	c		1	64	c	37		42	2
	PLOVERS	*CHARADRIIDAE*										
64	Pacific Golden Plover	*Pluvialis fulva*	W	c		40	40	c		30		20
65	Grey Plover	*Pluvialis squatarola*	W	l								
66	Long-billed Plover	*Charadrius placidus*	V	l								
67	Little Ringed Plover	*Charadrius dubius*	W	c		6	23	c			13	3
68	Kentish Plover	*Charadrius alexandrinus*	W	r								
69	Lesser Sand Plover	*Charadrius mongolus*	W	l				r	30			
70	Grey-headed Lapwing	*Vanellus cinereus*	W	c		61	63	c		70	116	108
71	Red-wattled Lapwing	*Vanellus indicus*	R	r								
	PRATINCOLES	*GLAREOLIDAE*										
72	Oriental Pratincole	*Glareola maldivarum*	R	uc			97					
73	Small Pratincole	*Glareola lactea*	R	l								
	GULLS	*LARIDAE*										
74	Brown-headed Gull	*Larus brunnicephalus*	W	l								
	TERNS	*STERNIDAE*										
75	Common Tern	*Sterna hirundo*	V	l								
76	Whiskered Tern	*Chlidonias hybridus*		c			15	uc			15	
	OSPREY	*PANDIONIDAE*										
77	Osprey	*Pandion haliaetus*	W	2								

No.	Species name	Scientific name	Seasonality	Status in Hail Haor	Global threat status	Hail Haor		Baikka Beel				
						21-23 Feb 1992	2 Feb 1993	Status in sanctuary	13 Dec 2002	28 Jan 2004	24 Jan & 10 Feb 2005	1&3 Feb 2006
	HAWKS, EAGLES	*ACCIPITRIDAE*										
78	Black-shouldered Kite	*Elanus caeruleus*	R	r								
79	Black (Pariah) Kite	*Milvus migrans*	R	c			156	c			1	few
80	Brahminy Kite	*Haliastur Indus*	R	c			8	c			3	6
81	Pallas's Fish Eagle	*Haliaeetus leucoryphus*	R	uc	Vulnerable		1	uc			1 imm	3 (1 ad)
82	Grey-headed Fish Eagle	*Ichthyophaga ichthyaetus*	R	2	Near threatened	1						
83	White-rumped Vulture	*Gyps bengalensis*	R	uc	Critical	29						
84	Eurasian Griffon	*Gyps fulvus*	V	1								
85	Himalayan Griffon	*Gyps himalayensis*	V	1								
86	Crested Serpent Eagle	*Spilornis cheela*	R	r			1					
87	Western Marsh Harrier	*Circus aeruginosus*	W	c		6	6	c			4	1
88	Eastern Marsh Harrier	*Circus spilonotus*	W	c				c				
89	Hen (Northern) Harrier	*Circus cyaneus*	W	3								
90	Pied Harrier	*Circus melanoleucos*	W	c		3	1	r				
91	Shikra	*Accipiter badius*	R	1								
92	Eurasian Sparrowhawk	*Accipiter nisus*	W	r								
93	Indian Spotted Eagle	*Aquila hastata*	W	1	Vulnerable			1				
94	Greater Spotted Eagle	*Aquila clanga*	W	uc	Vulnerable	1		uc			1	2
95	Steppe Eagle	*Aquila nipalensis*	W	r		1	2	1				
96	Imperial Eagle	*Aquila heliaca*	V	1	Vulnerable			1				
	FALCONS	*FALCONIDAE*										
97	Common Kestrel	*Falco tinnunculus*	W	r								
98	Eurasian Hobby	*Falco subbuteo*	W	2								
	GREBES	*PODICEPEDIDAE*										
99	**Little Grebe**	*Tachybaptus ruficollis*	W	uc		2	1	uc		4		4
	DARTERS	*ANHINGIDAE*										
100	**Oriental Darter**	*Anhinga melanogaster*	W	r	Near-threatened			1				
	CORMORANTS	*PALACROCORACIDAE*										
101	**Little Cormorant**	*Phalacrocorax niger*	R	c				c	3	7	11	50
102	**Great Cormorant**	*Phalacrocorax carbo*	W	1				1				
	HERONS	*ARDEIDAE*										
103	**Little Egret**	*Egretta garzetta*	R	c		7	14	c	17	11	20	10
104	**Grey Heron**	*Ardea cinerea*	W	uc		135	86	c		11	13	25
105	**Purple Heron**	*Ardea purpurea*	R	r		4	1	uc	2		1	1
106	**Great Egret**	*Casmerodius albus*	R	c		15	395	c		1	26	70
107	**Intermediate Egret**	*Mesophoyx intermedia*	R	c		50	78	c	136	1	12	180
108	**Cattle Egret**	*Bubulcus ibis*	R	c		5	695	c	27		30	79
109	**Indian Pond Heron**	*Ardeola grayii*	R	c		55	315	c		22	8	6

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						21-23 Feb 1992	2 Feb 1993	Status in sanctuary	13 Dec 2002	28 Jan 2004	24 Jan & 10 Feb 2005	1&3 Feb 2006
110	**Chinese Pond Heron**	*Ardeola bacchus*	V	1								
111	**Black-crowned Night Heron**	*Nycticorax nycticorax*	R	2				1				
112	**Yellow Bittern**	*Ixobrychus sinensis*	R	r				r			3	
113	**Cinnamon Bittern**	*Ixobrychus cinnamomeus*	R	r								
114	**Black Bittern**	*Dupetor flavicollis*	R	1								
	IBISES	*THRESKIORNITHIDAE*										
115	**Black-headed Ibis**	*Threskiornis melanocephalus*	R	uc	Near-threatened			uc			3	2
	STORKS	*CICONIIDAE*										
116	**Asian Openbill**	*Anastomus oscitans*	R	uc			162	uc			49	
	SHRIKES	*LANIIDAE*										
117	Brown Shrike	*Lanius cristatus*	W	c				uc				
118	Long-tailed Shrike	*Lanius schach*	R	c				uc			few	few
	CROWS	*CORVIDAE*										
119	Rufous Treepie	*Dendrocitta vagabunda*	R	c								
120	Large-billed (Jungle) Crow	*Corvus macrorhynchos*	R	c				c			common	
	DRONGOS	*DICRURIDAE*										
121	Black Drongo	*Dicrurus macrocercus*	R	c				c			common	common
	THRUSHES, CHATS	*MUSCICAPIDAE*										
122	Siberian Rubythroat	*Luscinia calliope*	W	r								
123	Bluethroat	*Luscinia svecica*	W	uc				1				
124	Oriental Magpie Robin	*Copsychus saularis*	R	uc				r				
125	Common Stonechat	*Saxicola torquata*	W	c				uc			few	
	STARLINGS, MYNAS	*STURNIDAE*										
126	Chestnut-tailed Starling	*Sturnus malabaricus*	W	1				1				
127	Asian Pied Starling	*Sturnus contra*	R	c				c			common	common
128	Common Myna	*Acridotheres tristis*	R	c				c			common	
129	Jungle Myna	*Acridotheres fuscus*	R	uc				uc				2
	SWALLOWS, MARTINS	*HIRUNDINIDAE*										
130	Sand Martin	*Riparia ripari*	W	c				uc				
131	Plain Martin	*Riparia paludicola*	R	uc								
132	Barn Swallow	*Hirundo rustica*	W	c				c			common	several
133	Red-rumped Swallow	*Hirundo daurica*	W	uc								
	BULBULS	*PYCNONOTIDAE*										
134	Red-vented Bulbul	*Pycnonotus cafer*	R	uc				uc				1
	CISTICOLAS, PRINIAS	*CISTICOLIDAE*										
135	Zitting Cisticola	*Cisticola juncidis*	R	c								
	WARBLERS, BABBLERS	*SYLVIIDAE*										
136	Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	W	1								

No.	Species name	Scientific name	Seasonality	Status in Hail Haor	Global threat status	Hail Haor		Baikka Beel				
						21-23 Feb 1992	2 Feb 1993	Status in sanctuary	13 Dec 2002	28 Jan 2004	24 Jan & 10 Feb 2005	1&3 Feb 2006
137	Paddyfield Warbler	*Acrocephalus agricola*	W	c				uc				1
138	Blyth's Reed Warbler	*Acrocephalus dumetorum*	W	uc				uc				
139	Clamorous Reed Warbler	*Acrocephalus stentoreus*	R	c				uc			few	
140	Thick-billed Warbler	*Acrocephalus aedon*	W	r								
141	Dusky Warbler	*Phylloscopus fuscatus*	W	c				uc				
142	Striated Babbler	*Megalurus palustris*	R	r				r				
143	Striated Grassbird	*Turdoides earlei*	R	c				c			common	common
	LARKS	*ALAUDIDAE*										
144	Rufous-winged Bushlark	*Mirafra assamica*	R	c				r				
145	Oriental Skylark	*Alauda gulgula*	R	c								
	SUNBIRDS	*NECTARINIIDAE*										
146	Purple-rumped Sunbird	*Nectarina zeylonica*	R	r								
147	Purple Sunbird	*Nectarinia asiatica*	R	1								
	SPARROWS, WAGTAILS	*PASSERIDAE*										
148	House Sparrow	*Passer domesticus*	R	c				uc				
149	White Wagtail	*Motacilla alba*	W	c				uc			common	1
150	White-browed Wagtail	*Motacilla maderaspatensis*	R	1								
151	Citrine Wagtail	*Motacilla citreola*	W	c				c				few
152	Yellow Wagtail	*Motacilla flava*	W	c				c				
153	Richard's Pipit	*Anthus richardi*	W	c								
154	Paddyfield Pipit	*Anthus rufulus*	R	c				uc				
155	Tawny Pipit	*Anthus campestris*	W	1								
156	Rosy Pipit	*Anthus roseatus*	W	c				uc			several	
157	Black-breasted Weaver	*Ploceus benghalensis*	R	uc								
158	Streaked Weaver	*Ploceus manyar*	R	r								
159	Baya Weaver	*Ploceus philippinus*	R	c				c			common	common
160	Indian Silverbill	*Lonchura malabarica*	R	uc								
161	Scaly-breasted Munia	*Lonchura punctulata*	R	c								
162	Black-headed Munia	*Lonchura malacca*	R	c								
	FINCHES, BUNTINGS	*FRINGILLIDAE*										
163	Chestnut-eared Bunting	*Emberiza fucata*	W	r								
164	Little Bunting	*Emberiza pusilla*	W	1								
165	Yellow-breasted Bunting	*Emberiza aureola*	W	uc				uc				

Bold = waterbirds

Seasonality: R = resident, W = winter visitor, S = summer/monsoon visitor, V = vagrant.

Status: c = common, uc = uncommon, r = rare, number = number of records if up to 5.

Observers: AK - Anisuzaman Khan; SR - SMA Rashid; EH - Enam Ul Haque; WC - WJ Collis; PT - Paul M Thompson.

Also includes records from the haor including Baikka Beel from: R Halder; DL Johnson; D Millin; DA Scott; PM Thompson; JD Woolner.

ANNEX 1.2 FISH SPECIES RECORDED IN HAIL HAOR 1999-2005

No.	Species (Bengali Name)	*Species (Scientific Name)*	national threat	Comments and common synonyms	Presence						Percentage of catch					
					1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
	Feather backs	**Notopteridae**														
1	Chital	*Chitala chitala*	en	*Notopterus chitala;* some re-establishment	X	X	X	√	√	X	0.0	0.0	0.0	0.1	0.0	0.0
2	Foli	*Notopterus notopoterus*	vu		√	√	√	√	√	√	1.0	3.5	4.2	6.2	3.9	2.2
	Snake eels	**Ophichthidae**														
3	Kecho Bime	*Pisodonophis boro*		*Ophichthys boro*	√	X	X	X	X	X	0.0	0.0	0.0	0.0	0.0	0.0
	Shads, herrings etc.	**Clupeidae**														
4	Kachki	*Corica soborna*			√	X	X	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
5	Chapila	*Gudusia chapra*			√	√	√	√	√	√	0.0	0.0	0.0	0.1	0.0	0.2
6	Afila	*Gudusia varigata*	dd		X	X	X	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
7	Hilsha (Jatka)	*Tenualosa ilisha*			X	X	X	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
	Carps, minnows and barbs	**Cyprinidae**														
8	Dhela	*Amblypharyngodon microlepis*			X	X	X	X	√	X	0.0	0.0	0.0	0.0	0.0	0.0
9	Mola	*Amblypharyngodon mola*			√	√	√	√	√	√	7.9	24.3	3.4	2.6	0.7	1.8
10	Bighead Carp	*Aristechthys nobilis*		introduced - escape	X	X	X	√	X	√	0.0	0.0	0.0	0.0	0.0	0.4
11	Thai Shor Puti	*Barbonymus gonionotus*		*Puntius gonionotus* introduced, may have become established	√	√	√	√	√	√	0.0	0.1	0.0	0.6	0.2	0.8
12	Catla	*Catla catla*			√	X	√	√	√	√	0.0	0.0	0.1	0.6	0.5	8.0
13	Chep Chela	*Chela laubuca*	en		√	√	√	√	√	√	0.0	0.1	0.0	0.0	0.0	0.0
14	Mrigel	*Cirrhinus cirrhosus*		*Cirrhinus mrigala*	√	√	√	√	√	√	0.1	0.1	0.1	0.4	0.4	1.3
15	Raek	*Cirrhinus reba*	vu		X	X	X	√	X	√	0.0	0.0	0.0	0.0	0.0	0.1
16	Tatkini	*Crossocheilus latius*	en		X	√	X	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
17	Grass Carp	*Ctenopharyngodon idellus*		introduced, not established	√	√	√	√	√	√	0.0	0.0	0.6	0.3	0.6	1.8
18	Comon Carp/Karfu	*Cyprinus carpio*		introduced may have naturalised	√	√	√	√	√	√	0.0	0.2	0.9	1.0	0.9	2.7
19	Silver Carp	*Hypophthalmichthys molitrix*		introduced, not established	X	√	X	√	√	√	0.0	0.0	0.0	0.3	0.1	1.5
20	Vangra	*Labeo boga*	cr		√	X	√	X	X	X	0.0	0.0	0.1	0.0	0.0	0.0
21	Kalibaush	*Labeo calbasu*	en	some re-establishment	√	√	√	√	√	√	0.1	0.1	0.1	0.3	0.2	0.9
22	Goinna	*Labeo gonius*	en	some re-establishment	√	√	√	√	√	√	0.1	0.2	1.2	1.7	0.6	1.2

No.	Species (Bengali Name)	*Species (Scientific Name)*	national threat	Comments and common synonyms	Presence						Percentage of catch					
					1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
23	Rui	*Labeo rohita*		some stock enhancement	√	√	√	√	√	√	0.2	1.4	1.7	2.3	2.3	5.8
24	Moa	*Osteobrama cotio*	en	*Rohtee cotio*	X	√	√	√	X	√	0.0	0.0	0.0	0.0	0.0	0.0
25	Chola Puti	*Puntius chola*			√	√	X	√	√	√	0.0	0.0	0.0	0.0	0.0	0.1
26	Kanchan Puti	*Puntius conchonius*			√	√	√	√	√	√	0.2	1.7	2.5	2.2	2.4	1.6
27	Jhili Puti	*Puntius gelius*		dd	√	√	√	√	√	√	0.3	0.7	0.3	0.1	0.9	0.8
28	Mola Puti	*Puntius guganio*			X	X	√	√	X	√	0.0	0.0	0.0	0.0	0.0	0.0
29	Futani Puti	*Puntius phutunio*			√	√	√	√	X	X	0.1	0.2	0.0	0.0	0.0	0.0
30	Shar Puti	*Puntius sarana*	cr	some re-establishment	X	X	√	√	X	√	0.0	0.0	0.7	0.2	0.0	0.0
31	Jat Puti	*Puntius sophore*			√	√	√	√	√	√	14.5	17.1	12.4	12.1	8.3	9.8
32	Teri Puti	*Puntius terio*			√	X	X	√	√	X	0.0	0.0	0.0	0.0	0.0	0.0
33	Tit Puti	*Puntius ticto*	vu		√	√	√	√	√	√	0.6	0.9	1.5	1.0	2.1	1.3
34	Dankina	*Rasbora daniconius*			√	√	√	√	√	√	0.9	1.6	1.5	1.7	1.4	1.4
35	Elong	*Rasbora elanga*	en	*Bengala elanga*	√	X	X	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
36	Narkeli Chela	*Salmostoma bacalia*		*Oxygaster bacalia*	√	√	√	√	X	√	0.0	0.0	0.0	0.0	0.0	0.0
37	Chela	*Salmostoma pholo*		*Oxygaster pholo*	√	√	√	√	√	√	0.4	0.9	0.3	0.4	0.1	1.0
	Loaches	**Balitoridae**														
38	Buth Koi/Bali Chata /Balitora	*Acanthocobitis botia*	dd	*Nemacheilus botia*	X	√	√	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
	Loaches	**Cobitidae**														
39	Rani	*Botia dario*	en		√	√	√	√	√	√	0.0	0.0	0.0	0.1	0.0	0.1
40	Gutum	*Lepidocephalichthys guntea*		*Lepidocephalus guntea*	√	√	√	√	√	√	0.4	0.7	1.7	1.0	0.8	0.9
41	Gora Gutum/Ganga Shagor	*Somileptes gongota*			√	√	√	X	√	√	0.0	0.1	0.0	0.0	0.0	0.0
	Bagrid catfish	**Bagridae**														
42	Bajri Tengra	*Mystus tengara*			√	√	√	√	√	√	0.0	0.5	0.5	0.5	1.0	1.6
43	Golsa	*Mystus bleekeri*		some re-establishment	√	√	√	√	√	√	0.1	0.6	1.8	0.4	0.2	0.3
44	Tengra	*Mystus vittatus*			√	√	√	√	√	√	3.4	4.4	2.9	6.7	3.6	3.1
45	Kabasi Tengra	*Mystus cavasius*	vu		X	X	X	√	√	√	0.0	0.0	0.0	0.3	0.5	0.8
46	Rita	*Rita rita*	cr		X	X	X	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
47	Air	*Sperata aor*	vu	*Mystus/Aorichthys aor* some re-establishment	√	√	X	√	√	√	0.1	0.0	0.0	0.1	0.0	0.1
48	Guzi air/Guzkata	*Sperata seenghala*	en	*Mystus/Aorichthys seenghala*	X	X	X	X	√	X	0.0	0.0	0.0	0.0	0.0	0.0
	Butter cat fishes etc	**Siluridae**														

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					1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
49	Kani Pabda	*Ompok bimaculatus*	en		√	√	√	√	√	√	0.1	0.3	1.3	1.2	1.1	2.1
50	Madhu Pabda	*Ompok pabda*	en		√	√	√	√	√	√	0.0	0.1	0.1	0.3	0.2	0.2
51	Boal	*Wallago attu*			√	√	√	√	√	√	8.7	1.4	2.5	1.5	0.6	6.2
	Schilbeid catfish	**Schilbeidae**														
52	Baspata/Kazuli	*Ailia coila*			X	X	X	√	X	X	0.0	0.0	0.0	0.0	0.0	0.0
53	Ghaura	*Clupisoma garua*	cr		√	X	X	X	X	X	0.0	0.0	0.0	0.0	0.0	0.0
54	Bacha	*Eutropiichthys vacha*	cr		√	√	√	√	√	√	0.0	0.0	0.0	0.0	0.0	0.1
55	Batasi	*Pseudeutropius atherinoides*		*Clupisoma atherinoides*	X	X	X	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
	Pangas	**Pangasiidae**														
56	Thai Pangas	*Pangasius hypophthalmus*		*Pangasius sutchi* introduced - escape, not established	X	X	X	√	X	√	0.0	0.0	0.0	0.0	0.0	0.1
	Catfish	**Sisoridae**														
57	Bagair	*Bagarius bagarius*	cr	Regularly caught in Gopla River within the site but not covered by the monitoring program												
58	Senia (Eusufi)	*Gagata cenia*			X	√	√	X	X	X	0.0	0.0	0.0	0.0	0.0	0.0
	Air breathing catfish	**Clariidae**														
59	Magur	*Clarius batrachus*			√	√	√	√	√	√	0.6	1.4	2.7	2.6	2.7	1.0
60	African Magur	*Clarias gariepinus*		introduced - escape not established	X	√	X	X	X	X	0.0	0.0	0.0	0.0	0.0	0.0
	Stinging catfish	**Heteropneustidae**														
61	Shing	*Heteropneustes fossilis*			√	√	√	√	√	√	2.4	1.6	3.0	1.9	2.5	1.0
	Square head catfishes	**Chacidae**														
62	Chaka/Gangina/Kowakata	*Chaca chaca*			√	√	√	√	√	√	0.0	0.0	0.0	0.0	0.0	0.0
	Gars	**Belonidae**														
63	Kaikla	*Xenentodon cancila*			√	√	√	√	√	√	1.4	3.2	3.0	4.5	3.6	3.2
	Top minnows	**Aplocheilidae**		(Cyprinodontidae)												
64	Tin Chokha	*Aplocheilus panchax*			√	√	√	√	√	√	0.0	0.0	0.1	0.0	0.0	0.1
	Mud eels	**Synbranchidae**		(Cuchiidae)												
65	Kuicha	*Monopterus cuchia*	vu	*Cuchia cuchia*	√	√	√	√	√	√	0.1	0.2	0.2	0.0	0.0	0.1
	Glass perch	**Ambassidae**		(Centropomidae)												
66	Lamba Chanda	*Chanda nama*	vu		√	√	√	√	√	√	0.1	0.4	0.5	0.6	0.9	1.1
67	Ranga Chanda	*Parambassis ranga*	vu	*Chanda ranga*	√	√	√	√	√	√	0.5	2.3	0.5	0.5	0.4	0.4

No.	Species (Bengali Name)	*Species (Scientific Name)*	national threat	Comments and common synonyms	Presence						Percentage of catch					
					1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
68	Gol Chanda	*Pseudambassis baculis*	dd	*Chanda baculis*	√	√	√	√	√	√	0.5	1.0	1.6	1.8	2.4	1.9
	Jew fish, croakers	**Sciaenidae**														
69	Poa	*Otolithoides pama*		*Pama pama*	X	√	X	√	√	X	0.0	0.0	0.0	0.0	0.0	0.0
	Mud perch	**Nandidae**														
70	Meni/Bheda	*Nandus nandus*	vu		√	√	√	√	√	√	13.0	6.9	9.0	7.7	9.0	5.4
	Badis	**Badidae**														
71	Kali/Napti Koi	*Badis badis*	en		√	√	√	√	√	√	0.2	0.3	0.7	0.6	0.8	0.3
	Mullets	**Mugilidae**														
72	Khalla/Kharshulla	*Rhinomugil corsula*		*Mugil corsula*	X	X	√	X	X	X	0.0	0.0	0.0	0.0	0.0	0.0
	Gobies	**Gobiidae**														
73	Bele	*Glossogobius giuris*			√	√	√	√	√	√	0.1	1.2	2.5	1.4	1.3	2.7
	Climbing perch	**Anabantidae**														
74	Koi	*Anabas testudineus*			√	√	√	√	√	√	8.7	0.7	2.1	1.9	2.5	0.8
	Gouramies	**Osphronemidae**		**(Belontiidae/ Anabantidae)**												
75	Khalisha	*Colisa fasciata*		*Colisa fasciatus*	√	√	√	√	√	√	13.8	3.7	6.3	7.1	10.1	4.0
76	Boicha Chuchra	*Colisa labiosa*	dd	*Colisa labiosus*	√	√	√	√	√	√	1.9	1.5	1.9	1.2	1.4	0.8
77	Lal Khalisha	*Colisa lalia*		*Colisa lalius*	√	√	√	√	√	√	1.4	0.8	0.5	0.8	0.7	0.5
78	Naftani/Berkul	*Ctenops nobilis*	en	*Osphronemus nobilis*	√	√	√	√	√	√	0.0	0.1	0.3	0.4	0.3	0.3
79	Reckha Kholisha; Madha Boicha; Sheel Boicha	*Trichogaster chuna*		*Colisa sota; Colisa chuna*	√	√	√	√	√	√	0.1	0.1	0.1	0.0	0.0	0.0
	Tilapia	**Cichlidae**														
80	Telapia	*Oreochromis mossambicus*		introduced, possibly established *Telapia mossambicus*	√	√	√	√	X	√	0.0	0.0	0.1	0.0	0.0	0.1
81	Nailotika	*Oreochromis niloticus*		introduced, not established	X	X	X	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
	Snakeheads	**Channidae**														
82	Cheng	*Channa gachua*	vu		√	√	√	√	√	√	0.3	0.0	0.3	0.3	0.4	0.0
83	Gojar	*Channa marulius*	en		√	√	√	√	√	√	0.7	1.4	2.5	2.6	7.3	2.9
84	Taki	*Channa punctata*		*Channa punctatus*	√	√	√	√	√	√	8.3	5.2	9.3	7.3	6.8	3.3
85	Shol	*Channa striata*		*Channa striatus*	√	√	√	√	√	√	3.1	1.9	4.3	4.5	8.0	2.9
	Spiny eels	**Mastacembelidae**														
86	Tara Baim	*Macrognathus aculeatus*	vu	Regarded as this species and not *M. aral* as stated in IUCN 2000	√	√	√	√	√	√	1.3	0.7	0.3	1.0	0.9	1.5

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					1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
87	Guchi Baim	*Macrognathus pancalus*		*Mastacembelus pancalus*	√	√	√	√	√	√	1.6	2.6	3.3	3.2	2.7	2.2
88	Boro Baim	*Mastacembelus armatus*	en		√	√	√	√	√	√	0.1	0.6	0.6	0.7	0.8	1.2
	Puffer fish	**Tetraodontidae**														
89	Potka	*Chelonodon patoca*		*Tetraodon patoca*	√	√	√	√	X	X	0.0	0.1	0.5	0.1	0.0	0.0
90	Tepa/Futkora	*Tetraodon cutcutia*			√	√	√	√	√	√	0.3	1.1	1.2	1.1	0.9	1.5
	Fresh water prawn	**Palaemonidae**														
	Thengua Echa	*Macrobrachium birmanicus*			√	√	√	√	√	√	0.1	2.3	2.2	1.3	2.0	1.5
	Gura Echa	*Macrobrachium lamarrei*			√	√	√	√	√	√	1.2	1.1	2.0	1.0	1.2	1.0
	Satka Chingri	*Macrobrachium malcolmsonii*			X	X	√	√	√	X	0.0	0.0	0.3	0.1	0.1	0.0
	Golda Echa	*Macrobrachium rosenbergii*			X	X	X	X	X	√	0.0	0.0	0.0	0.0	0.0	0.0
	Dimua/Kathalia Echa	*Macrobrachium villosimanus*			√	√	X	√	√	√	0.0	0.0	0.0	0.0	0.0	0.0
	Boiragi Echa	*Prawn Sp.*			√	X	X	X	X	X	0.0	0.0	0.0	0.0	0.0	0.0

Notes:

Family sequence follows IUCN Bangladesh (2000)
Sequence within a family is alphabetical
Scientific names follow FishBase (November 2006 download) where available, and otherwise IUCN Bangladesh (2000)
Bangla name follows local usage reported in Hail Haor
Presence and proportion of catch are based on detailed monitoring conducted in 7 sampling locations covering 1,174 ha every 10 days since April 1999.
National threat status is from IUCN Bangladesh (2000)

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ANNEX 1.3 LIST OF HYDROPHYTE SPECIES (WETLAND PLANTS) OBSERVED DURING 2000-2001 IN HAIL HAOR

Sl no	Local Name	Scientific Name	Family	Use
	Emergent			
1)	Shechishak	*Alternanthera philoxeroides*	Amaranthaceae	FV
2)	Vat Shola	*Aeschynomene aspera*	Leguminosae	FB
3)	Sechishak	*Alternanthera sessilis*	Amaranthaceae	FV
4)	Hijal	*Barringtonia acutangula*	Lecythidaceae	TS
5)	Jali bet	*Calamus rotang*	Palmae	OT
6)	Panighash	*Ceratopteris thalictroides*	Pteridophyta	OT
7)	Kochu	*Colocasia esculenta*	Araceae	FV
8)	Borun	*Crataeva nurvala*	Capparidaceae	FU
9)	Panigoicha	*Cyanotis aristata*	Commelinaceae	OT
10)	Ful Ghash	*Cyperus rotang*	Cyperaceae	FP
11)	Ful Ghash	*Cyperus sp.*	Cyperaceae	FP
12)	Chatiogol	*Cyperus tagetum*	Cyperaceae	FP
13)	Bhui pat	*Dentella repens*	Rubiaceae	OT
14)	Paura	*Echinochloa crussgalli*	Gramineae	FP
15)	Borochesra	*Eleocharis dulcis*	Cyperaceae	FP
16)	Deyokolum	*Ipomoea fistulosa*	Convolvulaceae	FV
17)	Phul ghash	*Kyllinga melanosperma*	Cyperaceae	FP
18)	Panichapra	*Limnophila heterophylla*	Scrophulariaceae	OT
19)	Panichapra	*Limnophila cana*	Scrophulariaceae	OT
20)	Bamni dopra	*Limnopoa meeboldies*	Gramineae	FP
21)	Tikiokra	*Melochia corchorifolia*	Sterculiaceae	OT
22)	Kechur	*Monochoria hastata*	Pontederiaceae	FP
23)	Ghash	*Oldenaldia brachypoda*	Rubiaceae	OT
24)	Jhoradhan	*Oryza rufipogon*	Gramineae	FP
25)	Dhan	*Oryza sp*	Gramineae	FS
26)	Baksha	*Panicum paludosum*	Gramineae	FP
27)	Panigoicha	*Paspalum scrobiculatum*	Gramineae	FP
28)	Lal Kukra	*Pesicaria ocreocarpa*	Polygonaceae	OT
29)	Lal Kukra	*Pesicaria dichotoma*	Polygonaceae	OT
30)	Erali Ghash	*Pseudoraphis brunoninana*	Gramineae	FP
31)	Erali Ghash	*Pseudoraphis spinescens*	Gramineae	FP
32)	Karoch	*Pongamia pinnata*	Leguminosae	OT
33)	Chesra	*Pycreus stramineus*	Cyperaceae	FP
34)	Choto Chesra	*Schoenoplectus articulatus*	Cyperaceae	FP
35)	Ikr	*Scherlostachya fusca*	Gramineae	OR
	Submerged			
36)	Shaola	*Blyxa japonica*	Hydrocharitraceae	OT
37)	Biral Lazur	*Ceratophyllum desmersum*	Ceratophyllaceae	OT
38)	Shaola	*Ceratophyllum sp.*	Ceratophyllaceae	OT
39)	Pani ghash	*Dopartium junceum*	Scrophulariaceae	OT
40)	Kata Shaola	*Hydrilla verticillata*	Hydrocharitraceae	OT
41)	Pani Ghash	*Myriophyllum sp.*	Haloraceae	OT
42)	Gura Shaola	*Najas gramineae*	Najadaceae	OT
43)	Gura Shaola	*Najas sp.*	Najadaceae	OT
44)	Pattera	*Vallisnaria spiralis*	Limnaceae	OT
45)	Shaola	*Nitella sp.*	Algae (BGA)	OT
	Submerged / floating			
46)	Bicha Shaola	*Utricularia stellaris*	Lentibulariaceae	OT
47)	Bicha Shaola	*Utricularia aurea*	Lentibulariaceae	OT

Sl no	Local Name	Scientific Name	Family	Use
48)	Bicha Shaola	*Utricularia exoleata*	Lentibulariaceae	OT
	Floating leaved			
49)	Baithapata	*Aponogeton appendiculatus*	Aponogetonaceae	OT
50)	Phokol	*Euraile ferox*	Nymphaeaceae	FS
51)	Futki	*Hygroryza aristata*	Gramineae	FP
52)	Kolmi Shak	*Ipomoea aquatica*	Convolvulaceae	FV
53)	Paniaga	*Ludwigia repens*	Onagraceae	OT
54)	Amrail Shak .	*Mersilea minuta*	Mersileaceae	OT
55)	Shapla	*Nymphaea nouchali*	Nymphaeaceae	OR
56)	Nilshapla	*Nymphaea stellata*	Nymphaeaceae	OR
57)	Lal Shapla	*Nymphaea rubra*	Nymphaeaceae	FV
58)	Zinari ghash	*Nymphoides indicum*	Menyanthaceae	OT
59)	Shaola	*Nymphoides aurantiacum*	Menyanthaceae	OT
60)	Padma	*Nelumbo nucifera*	Nymphaeaceae	FS
61)	Pata shaola	*Potemogeton sp*	Potemogetonaceae	OT
62)	Shingrai	*Trapa natans*	Trapaceae	FS
63)	Shingrai	*Trapa maximoiczii*	Trapaceae	FS
	Free floating			
64)	Kutipana	*Azolla pinnata*	Salviniaceae	FT
65)	Dal	*Eichhornia crassipes*	Pontederiaceae	FP
66)	Topa pana	*Pistia stratiotes*	Araceae	OT
67)	Indurkani pana	*Salvinia cuculata*	Salviniaceae	OT
68)	Indurkani pana	*Salvinia natans*	Salviniaceae	OT
	Marginal			
69)	Borohatisure	*Acalypha hispida*	Euphorbiaceae	OT
70)	Chaptapata	*Axonopus affinis*	Gramineae	FP
71)	Kanta gach	*Amaranthus viridis*	Amaranthaceae	FV
72)	Dopra	*Cynodon dactylon*	Gramineae	FP
73)	Ful Ghash	*Cyperus cephalotes*	Cyperaceae	FP
74)	Ful Ghash	*Cyperus tenuispica*	Cyperaceae	FP
75)	Phul ghash	*Digitaria sanguinalis*	Gramineae	FP
76)	Tandera	*Echinochloa sp.*	Gramineae	FP
77)	Helencha	*Enhydra fluctuans*	Compositae	FV
78)	Phul ghash	*Eragrostis uniloides*	Gramineae	FP
79)	Babnilota	*Evolvulus sp*	Convovulaceae	OT
80)	Chatki Ghash	*Fimbristylis miliacea*	Cyperaceae	FP
81)	Chockfuta	*Helianthus tuberosus*	Compositae	OT
82)	Chailla	*Hemarthia protensa*	Gramineae	FP
83)	Panichapra	*Limnophila sessiliflora*	Scrophulariaceae	OT
84)	Panichapra	*Limnophila sp*	Scrophulariaceae	OT
85)	Panichapra	*Limnophila indica*	Scrophulariaceae	OT
86)	Phulghash	*Launaea asplefolia*	Compositae	OT
87)	Pani Ghash	*Lindernia rotundifolia*	Scrophulariaceae	OT
88)	Pisach	*Lippia gamenica*	Lippiaceae	OT
89)	Lota	*Micania scandens*	Compositae	OT
90)	Ghash	*Paspalum conjugatum*	Gramineae	FP
91)	Lal Kokra	*Polygonum lanatum*	Polygonaceae	OT
92)	Lal Kokra	*Polygonum glabrum*	Polygonaceae	OT
93)	Lal Kokra	*Polygonum pedunculare*	Polygonaceae	OT
94)	Boro Kokra	*Polygonum tomentosum*	Polygonaceae	OT
	Additional species reported by NERP (1992-93)			
95)		*Aponogeton natans*	Aponogetonaceae	
96)		*Echinochloa colonum*	Gramineae	

Sl no	Local Name	Scientific Name	Family	Use
97)		*Nymphoides cristatus*	Menyanthaceae	
98)		*Ottelia alismoides*		
99)		*Polygonum berbatum*	Polygonaceae	
100)		*Sagittaria guayanensis*		
101)		*Setaria glauca*		

Sources:

MACH (no date but apparently 2002) Impact Report (Year 1) on Fisheries, Vegetation, Wildlife and Protein Consumption. Center for Natural Resources Studies, Dhaka. (unpublished report).

NERP species from FAP 6 (1993) Flood Action Plan Northeast Regional Water Management Project Wetland Resources Special Study Report.(prepared by Shawinigan Lavalin (1991) Inc. and Northwest Hydraulic Consultants), Bangladesh Water Development Board and Flood Plan Coordination Organisation, Dhaka.

ANNEX 1.4 LIST OF TERRESTRIAL PLANT SPECIES OBSERVED DURING 2000-2001 FROM HAIL HAOR AND ITS CATCHMENT

Sl no	Local Name	Scientific Name	Family	Dry	Wet
	Shrubs				
1.	Bashok	*Adhatoda vasica*	Acanthaceae	N	Y
2.	Jali bet	*Calamus rotang*	Palmae	Y	Y
3.	Pepe	*Carica papaya*	Caricaceae	Y	Y
4.	Choto kalkesunda	*Cassia tora*	Leguminosae	Y	Y
5.	Labu	*Citrus limmon*	Rutaceae	Y	Y
6.	Murta	*Clinogyne dichotoma*	Maranthaceae	N	Y
7.	Vat	*Clerodendrum squamatum*	Verbenaceae	Y	Y
8.	Vat	*Clerodendrum viscosum*	Verbenaceae	Y	Y
9.	Jhonjhoni	*Crotalaria saltiana*	Leguminosae	Y	Y
10.	Golokbet	*Daemonorops jenkinsianus*	Palmae	Y	Y
11.	Motmoti	*Glycosmis arborea*	Rutaceae	Y	Y
12.	Sthalpadma	*Hibiscus mutabilis*	Malvaceae	Y	Y
13.	Joba(single)	*Hibiscus rosa-sinensis*	Malvaceae	Y	Y
14.	Deokolum	*Ipomoea fistulosa*	Convolvulaceae	Y	Y
15.	Lanton kanta	*Lantana camara*	Verbenaceae	Y	Y
16.	Mendi	*Lawsonia inermis*	Lythraceae	Y	Y
17.	Nishi	*Melastoma malabathricum*	Melastomataceae	Y	Y
18.	Chitki	*Phyllanthus reticulatus*	Euphorbiaceae	Y	Y
19.	Moankanta	*Randia dumetorum*	Rubiaceae	Y	Y
20.	Venna	*Ricinus communis*	Euphorbiaceae	Y	Y
21.	Korobi	*Sarchochlamys pulcherrima*	Urticaceae	Y	Y
22.	Tit begun	*Solanum filicifolium*	Solanaceae	Y	Y
23.	Tagor	*Tabernaemontana divaricata*	Apocynaceae	Y	Y
24.	Medla	*Tephrosia candida*	Leguminosae	Y	Y
25.	Chaa	*Thea sinensis*	Theaceae	Y	Y
26.	Phul jharu	*Thysanolaena maxima*	Gramineae	Y	Y
	Small tree				
27.	Sorifa	*Anona reticulata*	Annonaceae	Y	Y
28.	Ataphal	*Anona squamosa*	Annonaceae	Y	Y
29.	Kamranga	*Averrhoa carambola*	Averrhoeae	Y	Y
30.	Jambura	*Citrus grandis*	Rutaceae	Y	Y
31.	Malta	*Citrus sinensis*	Rutaceae	Y	Y
32.	Tomal	*Diospyros cordifolia*	Ebenaceae	Y	Y
33.	Ipil-Ipil	*Leucaena leucocephala*	Leguminosae	Y	Y
34.	Bokul	*Mimosops elengi*	Sapotaceae	Y	Y
35.	Khami	*Mitragyne pervifolia*	Rubiaceae	Y	Y
36.	Sajna	*Moringa oliefera*	Moringaceae	Y	Y
37.	Tut	*Morus indica*	Moraceae	Y	Y
38.	Nagassar	*Mesua nagassarium*	Guttiferae	Y	Y
39.	Aurboroi	*Phyllanthus acidus*	Euphorbiaceae	Y	Y
40.	Peyara	*Psidium guajava*	Myrtaceae	Y	Y
41.	Dalim	*Punica granatum*	Punicaceae	Y	Y
42.	Shaora	*Styreblus asper*	Urticaceae	Y	Y
43.	Boroi	*Zizyphus mauritiana*	Rhamnaceae	Y	Y
44.	Holdekorobi	*Thevetia peruviana*	Apocynaceae	Y	Y
	Tree like				
45.	Borua bansh	*Bambusa balcoa*	Gramineae	Y	Y
46.	Nol jai	*Bambusa longispiculata*	Gramineae	Y	Y
47.	Bakal bansh	*Bambusa teres*	Gramineae	Y	Y

Sl no	Local Name	Scientific Name	Family	Dry	Wet
48.	Jai bansh	*Bambusa vulagaris*	Gramineae	Y	Y
49.	Narikel	*Cocos nucifera*	Palmae	Y	Y
50.	Lathi bansh	*Dendrocalamus strictus*	Gramineae	Y	Y
51.	Muli bansh	*Melocanna bacifera*	Gramineae	Y	Y
52.	Khejur	*Phoenix sylvestris*	Palmae	Y	Y
	Tree				
53.	Mangium	*Acacia mangium*	Leguminosae	Y	Y
54.	Akashi	*Acacia moniliformis*	Leguminosae	Y	Y
55.	Agor	*Aquilaria agallocha*	Thymeliaceae	N	Y
56.	Gunallay	*Acrocarpus fraxinifolius*	Leguminosae	Y	Y
57.	Bel	*Aegle marmelos*	Rutaceae	Y	Y
58.	Sheel koroi	*Albizia lucida*	Leguminosae	Y	Y
59.	Sada koroi	*Albizia odoratissum*	Leguminosae	Y	Y
60.	Malacana	*Albizia malacana*	Leguminosae	N	Y
61.	Root chambol	*Albizia sp*	Leguminosae	N	Y
62.	Tetlia cham	*Albizi richarodia*	Leguminosae	Y	Y
63.	Chaitan	*Alstonia schlaris*	Apocynaceae	Y	Y
64.	Kadom	*Anthocephalus chinensis*	Rubiaceae	Y	Y
65.	Khudijum	*Antidesma ghasembilla*	Euphorbiaceae	Y	Y
66.	Rata	*Aphanamixis polystachya*	Meliaceae	Y	Y
67.	Supari	*Areca catechu*	Palmae	Y	Y
68.	Chapalish	*Artocarpus chaplasha*	Moraceae	Y	Y
69.	Kanthal	*Artocarpus heterophyllus*	Moraceae	Y	Y
70.	Deua	*Artocarpus lakoocha*	Moraceae	Y	Y
71.	Neem	*Azadirahcta indica*	Meliaceae	Y	Y
72.	Hijal	*Barringtonia acutangula*	Lecythidaceae	Y	Y
73.	Semul	*Bombax ceiba*	Bombacaceae	Y	Y
74.	Tal	*Borassus flabellifer*	Palmae	Y	Y
75.	Chaur	*Caryota urens*	Palmae	Y	Y
76.	Bandorlathi	*Cassia fistula*	Leguminosae	Y	N
77.	Tali koroi	*Cassia occidentalis*	Leguminosae	Y	Y
78.	Tejpata	*Cinnamomum tamala*	Lauraceae	Y	Y
79.	Bottle brush	*Callistemon linearis*	Myrtaceae	N	Y
80.	Chickrassi	*Chickrassia tabularis*	Meliaceae	Y	Y
81.	Borun	*Crataeva nurvala*	Capparidaceae	Y	Y
82.	Sishu	*Dalbergia sissoo*	Leguminosae	Y	Y
83.	Krishnachura	*Delonix regia*	Leguminosae	Y	Y
84.	Harish	*Derris robusta*	Leguminosae	Y	N
85.	Chalta	*Dillenia indica*	Dilleniaceae	Y	Y
86.	Gab	*Diospyros peregrina*	Ebenaceae	Y	Y
87.	Telia gorjon	*Dipterocarpus turbinatus*	Dipetrocarpaceae	N	Y
88.	Gorjon	*Dipterocarpus costatus*	Dipetrocarpaceae	Y	Y
89.	Rongi	*Dysoxylum binectariferum*	Meliaceae	Y	Y
90.	Jolpai	*Elaeocarpus robustus*	Elaeocarpaceae	N	Y
91.	Kalauza	*Ehretia acuminata*	Boranginaceae	Y	Y
92.	Kanta mandar	*Erythrina indica*	Leguminosae	Y	Y
93.	Eucalyptus	*Eucalyptus sp*	Myrtaceae	Y	Y
94.	Pani jum	*Eugenia formosa*	Myrtaceae	Y	Y
95.	Bot	*Ficus benghalensis*	Moraceae	Y	Y
96.	Bot (Pakur)	*Ficus lacor*	Moraceae	Y	Y
97.	Zogdumur	*Ficus glamerata*	Moraceae	Y	Y
98.	Dungra	*Ficus hispida*	Moraceae	Y	Y
99.	Gamar	*Gmelina arborea*	Verbenaceae	Y	Y
100.	Dhulza	*Grewia orbiculata*	Tiliaceae	Y	Y

Sl no	Local Name	Scientific Name	Family	Dry	Wet
101.	Rubber	*Hevea brasiliensis*	Euphorbiaceae	Y	Y
102.	Telsure	*Hopea odorata*	Dipterocarpaceae	N	Y
103.	Jarul	*Lagerstromia pervifolia*	Lythraceae	Y	Y
104.	Litchu	*Litchi chinensis*	Sapindaceae	Y	Y
105.	Amm	*Mangifera indica*	Anacardiaceae	Y	Y
106.	Boisha neem,	*Mellia sempervirens*	Meliaceae	Y	Y
107.	Champa	*Michelia champaca*	Magnoliaceae	Y	Y
108.	Kat golap	*Plumeria acutifolia*	Apocynaceae	Y	Y
109.	Rokto chandon	*Pterocarpus santalinus*	Leguminosae	N	Y
110.	Bish jarul	*Prema benghalensis*	Verbenaceae	Y	Y
111.	Ratebuja	*Samanea saman*	Leguminosae	Y	Y
112.	Panch guti	*Schima wallichi*	Theaceae	Y	Y
113.	Vela	*Semicarpus anacardium*	Anacardium	Y	Y
114.	Shal	*Shorea robusta*	Dipterocarpaceae	Y	Y
115.	Jungli amra	*Spondius dulce*	Anacardiaceae	Y	Y
116.	Amra	*Spondius pinnata*	Anacardiaceae	Y	Y
117.	Udal	*Sterculia villosa*	Sterculiaceae	Y	Y
118.	Mehogoni	*Swietenia macrophylla*	Meliaceae	Y	Y
119.	Jum	*Syzygium cumini*	Myrtaceae	Y	Y
120.	Golap jum	*Syzygium jambos*	Myrtaceae	Y	Y
121.	Jungli jum	*Syzygium wallichii*	Myrtaceae	Y	Y
122.	Tetul	*Tamarindus indica*	Leguminosae	Y	Y
123.	Segun	*Tectona grandis*	Verbenaceae	Y	Y
124.	Arjun	*Terminalia arjuna*	Combretaceae	Y	Y
125.	Bohera	*Terminalia belerica*	Combretaceae	Y	Y
126.	Ziga	*Trema orientalis*	Ulmaceae	Y	Y
127.	Mera	*Tewia polycarpa*	Euphorbiaceae	Y	Y
128.	Khakra	*Webera campaniflora*	Rubiaceae	Y	Y
129.	Lohakath	*Xylia dolabiformis*	Leguminosae	N	Y
130.	Bajna	*Xanthoxylum rhesta*	Rutaceae	Y	Y

Note: Y = Present, N = Absent

Source: MACH (no date but apparently 2002) Impact Report (Year 1) on Fisheries, Vegetation, Wildlife and Protein Consumption. Center for Natural Resources Studies, Dhaka. (unpublished report)

ANNEX 1.5 AMPHIBIANS, REPTILES AND MAMMALS RECORDED IN HAIL HAOR

Sl no	Common Name	Scientific Name	Status	NERP	1999-2000	2000-2001
	Amphibian					
		BUFONIDAE				
1.	Common Toad	*Bufo melanostictus*		√	√	√
		RANIDAE				
2.	Skipper Frog	*Euphlyctis cyanophlyctis*		√	√	√
3.	Bull Frog	*Hoplobatrachus tigerinus*		√	√	√
4.	Cricket Frog	*Limnonectus lymnocharis*		√	√	√
5.	Boulenger's Frog	*Rana alticola (tytleri)*	vu	√		
	Reptile					
	TURTLES/TERRAPINS	*BATAGURIDAE*				
1.	Brahminy River Turtle	*Hardella thurjii*	en	√	√	√
2.	Brown Roofed Turtle	*Kachuga smithii*	en		√	-
3.	Indian Roofed Turtle	*Kachuga tecta*		√	√	√
4.	Indian Eyed Turtle	*Morenia petersi*	vu	√		
	TURTLES	*TRIONYCHIDAE*				
5.	Peacock-marked Softshell Turtle	*Aspideretes hurum*	en	√	√	-
6.	Asiatic Softshell Turtle	*Chitra indica*	VU, cr	√		
7.	Spotted Flapshell Turtle	*Lissemys punctata*	vu	√		
	GECKOES	*GEKKONIDAE*				
8.	Wall Lizard	*Gekko gecko*		√	√	√
9.	House Lizard	*Hemidactylus brookii*		√	√	√
10.	House Lizard	*Hemidactylus frenatus*		√	√	√
	LIZARDS	*AGAMIDAE*				
11.	Common Garden Lizard	*Calotes versicolor*		√	√	√
	SKINKS	*SCINCIDAE*				
12.	Common Skink	*Mabuya carinata*		√	√	√
	MONITORS	*VARANIDAE*				
13.	Bengal Monitor	*Varanus bengalensis*	vu	√	√	√
14.	Yellow Monitor	*Varanus flavescens*	en	√		
	WORM SNAKES	*TYPHLOPIDAE*				
15.	Common Worm Snake	*Ramphotyphlops braminus*			√	√
	PYTHONS	*BOIDAE*				
16.	Rock Python	*Python molurus*	en		√	√
	COLUBRID SNAKES	*COLUBRIDAE*				
17.	Common Vine Snake	*Ahaetulla nasutus*	vu		√	√
18.	Stripped Keelback	*Amphiesma stolata*			-	√
19.	Olive Keelback	*Atretium schistosum*		√	√	√
20.	Rat Snake	*Coluber mucosus*	vu		√	√
21.	Common Smooth Water Snake	*Enhydirs enhydirs*			√	√
22.	Checkered Keelback	*Xenocrophis piscator*		√	√	√
		ELAPIDAE				
23.	Banded Krait	*Bungarus fasciatus*	en	√	√	√
24.	Monocellate Cobra	*Naja kaouthia*	vu	√	√	√
25.	Binocellate Cobra	*Naja naja*	en		√	√

Sl no	Common Name	Scientific Name	Status	NERP	1999-2000	2000-2001
	Mammal					
	INSECTIVORA					
1.	Grey Musk Shrew	*Suncus murinus*			√	√
	CHIROPTERA					
2.	Flying Fox	*Pteropus giganteus*			√	√
3.	False Vampire	*Megaderma lyra*			√	-
4.	Indian Pipistrelle	*Pipistrellus coromandra*			√	√
	CARNIVORA					
5.	Asiatic Jackal	*Canis aureus*	vu		√	√
6.	Bengal Fox	*Vulpes bengalensis*	vu, DD		√	√
7.	Fishing Cat	*Felis viverrina*	en		√	√
8.	Small Indian Mongoose	*Herpestes auropunctatus*			√	√
9.	Common Mongoose	*Herpestes edwardsi*	vu		√	√
10.	Common Otter	*Lutra lutra*	cr		√	√
11.	Large Indian Civet	*Viverra zibetha*	en		√	√
12.	Small Indian Civet	*Viverricula indica*	vu		√	√
	RODENTIA					
13.	Bandicoot Rat	*Bandicota indica*			√	√
14.	Indian Field Mouse	*Mus boduga*			√	√
15.	House Mouse	*Mus musculus*			√	√
16.	Common House Rat	*Rattus rattus*			√	√
	LAGOMORPHA					
17.	Rufous-tailed Hare	*Lepus nigricollis*	en		√	√

Note: species that were listed in the original source but are known to have been recorded in nearby forests and not from the wetland site proposed for designation have been omitted. No NERP data on mammals recorded is available.

Status: small case = national threat status, upper case = global threat status; source IUCN Bangladesh (2000).
Vu/VU = vulnerable; en/EN = endangered; cr/CR = critically endangered; dd/DD data deficient.

Sources:

NERP data: Khan, M.A. (1997) Ecology of Floodplains in the Northeastern Region of Bangladesh. In Tsai, C. and Ali M.Y. (Eds.) *Openwater Fisheries of Bangladesh*. The University Press Ltd, Dhaka. Pp153-182

1999-2000 and 2000-2001 data: MACH (no date but apparently 2002) *Impact Report (Year 1) on Fisheries, Vegetation, Wildlife and Protein Consumption*. Center for Natural Resources Studies, Dhaka. (unpublished report)

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