

Designation date: 11/01/2002 Ramsar Site no. 1153

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

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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DD MM YY

Designation date Site Reference Number

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

Name: Qi Huang

Institution: Bureau of Shankou Mangrove National Nature Reserve, Guangxi

Add: 30 Aiweidong, Lianzhou Town, Hepu County, Guangxi Province, China

Zip: 536100

Tel: +86-(0)779-7192076

Fax: +86-(0)779-7192076, +86-(0)779-7196298

E-mail: skhsl@tom.com

2. Date this sheet was completed/updated:

October 12, 2007

3. Country:

The People's Republic of China

4. Name of the Ramsar site:

Shankou Mangrove Nature Reserve

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

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

a) Site boundary and area

The Ramsar site's boundary and area has not changed. √

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**

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:

Afforestation of mangrove forests has been carried out since 2002. Approximately 200 ha mangrove forests have been restored. The biodiversity tends to be richer.

The Criterion 1 and 3 are added.

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.

The boundary of the site is within the Shankou Mangrove National Nature Reserve, including the core area and the most parts of the buffer area, beginning from Ximi River, extending southward to the bank of Yingluogang Bay, bordering the Zhanjiang Mangrove Nature Reserve of Guangdong Province in the east, and lying across three towns of Shankou, Baisha, and Shatian.

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.

Center: 21°28'N, 109°43'E

Boundary: 109°37'-109°47'E ; 21°28'-21°37'N

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.

Located in Shankou Town, Beihai, Guangxi Province, the Ramsar site is about 105 km east to the Beihai City.

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

The average, maximum and minimum elevations are 20, 40 and 0 meters, respectively.

11. Area: (in hectares)

4000 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.

With a typical mangrove forest in the continental coast of China, the reserve is located in the tropical monsoon climate zone and tropical rainforest region. The landform is primarily characterized by alluvial terrace. Long and narrow marine-deposition plains are formed among the terraces, shorelines and estuaries. Marine erosion exists in some parts of the plains. The coastal terraces experience gentle slopes. The seawater usually submerges the terminals of the river valleys, and liman bays are formed in the estuaries. Due to the small size of the rivers and the small sand amount from the whole catchment, although there is some sand accumulation in the bay head area and some other local parts, the characters of liman bay is obvious. The intertidal mudflat is wide and flat with deep silts.

The site is affluent in animals and plants. There are 15 mangrove species, 170 macrobenthos species, 5 nekton species, 26 zooplankton species, 19 plant plankton species, 108 bird species and 273 insect species. In the region, *Rhizophora stylosa* forests in continuous patches are rare in China. The site is an important habitat for many rare birds, such as *Platalea minor*.

The annual average temperature is 23.4 °C, and the annual average precipitation is 1700 mm. Thunderstorms, typhoons and strong tides frequently occur in spring and summer.

This area is rich in aquatic products and maintains colorful fishery culture. It is not only a paradise for the wetland wild animals but also a recreation resort for bird-watching.

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
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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 1:

The reserve is possessed of the largest continuous mangrove patches of *Rhizophora stylosa* forests in China. It holds 15 mangrove species accounting for 41% of all the mangrove species in China. The reserve is also an important habitat of many halobios and birds, and plays important roles in maintaining ecosystems and seawater quality. The mangrove forests in the reserve are representative in the tropical/subtropical coastal mangrove types in China, as well as important components of China's mangrove ecosystems.

Criterion 2:

There is one endangered species (*Platalea minor*) in the IUCN Red List.

Criterion 3:

The reserve is rich in biodiversity of coastal wetland. The mangrove forests and mudflats with abundant organic matters provide favorite habitats for lots of wetland plants and animals. Numerous benthos provide plenty foods for waterfowls. According to surveys, there are 15

mangrove species with pure forests of *Rhizophora stylosa* and *Bruguiera gymnorrhiza* in patches, 108 bird species, 95 fish species, 170 macrobenthos species, 273 insect species, 26 zooplankton species and 19 plant plankton species. Overall, this site plays an important role in supporting regional biodiversity.

Criterion 4:

Shankou Reserve is located on the important migratory route of migrant birds among the East Asia continent, China-India Peninsula, the Pacific islands and Australian continent. In annual migratory seasons, a great number of migrants rest or inhabit temporarily in this reserve. The reserve provides an important shelter for these migratory birds.

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:

South China region, sino-india sub-division, oriental realm.

b) biogeographic regionalisation scheme (include reference citation):

The Biogeography of Fauna in China (Zhang Rongzu, 1999)

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.

Geology: The site is mainly composed of soft sediments of the Quaternary Period, olive basalts and basic volcanic rocks. The mudflats are wide and open with numerous shallow tidal creeks.

Geomorphology: The Geomorphology is mainly characterized by the alluvial terraces. Long and narrow marine-deposition plains are formed among the terraces, shorelines and estuaries, with marine erosion in some local parts. The coastal terraces hold gentle slopes. Liman bays are formed in the estuaries. The intertidal lands are wide and flat with deep silts.

Hydrology: There are 4 rivers flowing into this site altogether, including Wuliu River, Ximi River, Daba River and Najiao River. The annual water flux is up to 500 000 000 cubic meters.

Water quality: The highest, lowest and average chlorinity of the sea water is 33.2‰, 16.3‰ and 28.9‰, respectively. While in Sanjiang estuary which is the hinterland of the mangroves, the highest, lowest and average chlorinity of the sea water is 15.9‰, 9.41‰ and 12.6‰, respectively.

Tide: The tidal type is irregular diurnal tide in this site. In a year, the diurnal and semidiurnal tides account for 60% and 40%, respectively.

Soil: The main soil type in the reserve is the mangrove intertidal solonchak, covering approximately 930 ha. And its distribution is basically consistent with the mangrove forests. The

soil is affluent in organic matters and sulfate ions, and the acidity is relatively high. The soil profile usually shows dark gray. The content of organic matters in the middle-lower layer is usually higher than the surface layer.

Climate: Located in the transitional region from the north tropical to the south subtropical zone, it is greatly influenced by monsoon climate and marine climate. The mean annual temperature in this site is 23.4 °C, with an extreme lowest temperature of 2 °C. The mean annual precipitation is 1 500-1 700 mm. The difference between the dry season and wet season is distinctive. The rainfall concentrates from April to September. Typhoons and storms, mostly accompanying with thunders, often happen between April and September as well. The typhoon can bring storms and waves to strike the sea coast, producing huge destructive force.

17. Physical features of the catchment area:

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

The catchment area is about 120 000 ha, the annual water flow is about 5×10^8 m³. All the water flows converge in Yingluogang and then flows southward into Beibu Gulf. The land is mainly composed of soft sediments of the Quaternary Period. The bays in the catchment are typical liman bays, and the intertidal zone expands outward from the estuaries. The land is primarily represented as hills and mountainous regions, with gentle slopes and abundant vegetation. The nearshore land is fertile with high phosphor content. There are abundant rainfall and long sunshine hours, with an annual average temperature of 23.4 °C. These climatic conditions are advantageous to the growth of the tropical and subtropical plants. The main crops in the catchment are rice, peanut and cassava, and the aquaculture of shrimp and shellfish is well developed.

18. Hydrological values:

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

Mangrove forests of this site can effectively alleviate coastal erosion and damages of typhoon, protect the coastline and purify water.

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	<u>G</u>	H	<u>I</u>	J	K	Zk(a)
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Inland:

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

1	2	3	4	5	6	7	8	9	Zk(c)
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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.

G: Intertidal mudflats account for 62% of the site;

I: Mangrove forests account for 38% of the site.

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.

In the mangrove forests, there are five dominant communities such as the *Rhizophora stylosa* and *Bruguiera gymnorhiza* communities. The mangrove forest usually develops three layers. The upper layer is dominated by *Bruguiera gymnorhiza*, the mid layer by *Kandelia candel* and the under layer by *Aegiceras corniculatum* and *Aricennia marina*. Mangrove forests are the main habitats for umbrettes such as *Butorides striatus*.

The intertidal mudflats nourish many benthic fishes such as *Periophthalmus Cantnensis* and *Pisoodonophis boro*, and Molluscs such as *Tegillarca granosa* and *Meretrix meretrix*. These species are of high economic value, not only serving as the foods of grallatores such as *Tringa tetanus* and *Charadrius mongolus*, but also being important economic resources for local residents.

Shallow sea waters support prolific zooplankton and phytoplankton, and they are also favorite habitats for swimming birds such as *Anas falcate* and most fish species.

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.**

Mangrove is the main natural plant community in the site. The reserve holds 10 true mangrove species and 5 semi-mangrove species. In Pearl Bay there are 135.5-ha mangrove forests growing on the mudflat under average sea level, which is rare and is a representative characteristic of the mangrove in the reserve. The site is also an important region where sea grass ecosystems

are distributed. In the peripheral region of the mangrove forest in Pearl Bay, *Zostera marina* sea grass communities flourish in the low tide areas. Moreover, the reserve is the only growing place of natural population of *Heritiera littoralis* along the coast in the Beibu Gulf of Guangxi Province. The main plant communities in this site are listed as follows:

i) *Aricennia marina* association:

This kind of association is widely distributed in the areas with different mudflat positions or soil textures (silt, semi-sediment or sand). It has a height of 1.0-2.5 m, showing a silver gray color. The coverage ranges between 40% and 90%. Species composition is relatively simple, with *Aricennia marina* as the dominant species. The growing status of *Aricennia marina* varies with mudflat positions and soil textures: It can grow very well in the silt habitat of middle/inner mudflats, within which the height can reach 2.5 m, and the basal diameter can reach 18 cm with obvious trunks. While in other habitats, the growth is not good as those above, and the plant branches at the neck of roots, forming shrub clumps without obvious trunks. The association is usually accompanied with *Aegiceras corniculatum*. Occasionally, there are some other scattered species such as *Kandelia candel*. The structure of the community shows mono-layer or double-layer. The soil surface is densely covered by bamboo shoot-like pneumatophore in the community.

ii) *Kandelia candel* association:

The distribution of this kind of association is wide in the site. However, it often shows small isolated patches on the mudflats, despite some parts where relatively large continuous patches exist. It can be often seen from the middle mudflats to the middle outer mudflats, where soils are semi-sediments. The community takes on a turquoise color, with a height range of 1.8-2.5 m and a coverage range of 60%-85%. For those that are often lopped, the association appears like shrubs with a height of 1.0-1.5m. The predominant species is *Kandelia obovada*, which has undeveloped buttress roots. And the companion species are *Aegiceras corniculatum* and *Aricennia marina*. The community structure generally exhibits double-layer.

iii) *Excoecaria agallocha* association:

This kind of association usually grows along the high-tide line. The communities are often repeatedly lopped and are shaping shrubs with heights of 0.8-6m and coverage of 30%-50%. The predominant species is *Excoecaria agallocha*, but on some partial mudflat locations there are *Kandelia obovada*, *Aegiceras corniculatum* and some other species. The community structure is represented as mono-layer or double-layer.

iv) *Bruguiera gymnorhiza* association:

This kind of association is mainly distributed inside the Pearl Harbor, forming a pattern of narrow belt along the interior edge of the mudflat. The soil is silt or half-hardened silt, the community has a regular formation in deep green color, or exhibits rough surface with mixed color of yellow and green. The height of the community is 3.0-6.5m, and the coverage is 60%-85%. The community is dominated by *Bruguiera gymnorhiza*, accompanied by *Aegiceras corniculatum*, and with some scattering species, such as *Kandelia candel*. The community structure is usually represented as double-layer.

v) *Aegiceras corniculatum* association:

This kind of association is mostly distributed on the exterior edge of the mudflats and the junctions of the estuaries. The whole community is in olive green, the height is 1.0-1.8m, and the coverage is 50%-95%. *Aegiceras corniculatum* is the dominant species, with a shrub-like

formation. In some areas, *Aricennia marina*, *Bruguiera gymnorhiza* and *Kandelia candel* are mixed and form simple-structured communities with mono-layer.

vi) *Rhizophora stylosa* association:

This kind of association of small size is artificially built from the 1980s to 1998, being distributed between the interior mudflat and the middle-interior mudflat. The soil is argillaceous silt, the entire community is in dark green, the height is 3.5-6.5 m and the coverage is 80%-90%. *Rhizophora stylosa* is the dominant species. Its extremely developed prop roots can form arciform prop root system with a height of 1.0-2.0 m. In addition, a small amount of *Bruguiera gymnorhiza*, *Kandelia candel* and *Aegiceras corniculatum* are scattered. The community structure is simple with mono-layer.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. 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.***

There are 170 macrobenthos species in the site, including 27 polychete species under 24 genera, 48 mollusk species under 34 genera (including 29 bivalve species under 22 genera and 19 gastropod species under 12 genera), 35 crustacean species under 23 genera, 1 echinoderm species under 1 genus, 5 benthos fish species under 5 genera and other 8 animal species under 7 genera. Fish species number is up to 95.

There are also 108 bird species under 49 families of 16 orders, including one endangered species in the IUCN Red List.

Besides, there are 26 zooplankton species, 10 mammalian species, 25 reptile species and 11 amphibian species.

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:

Mangrove wetland has particular significance in scientific research, cultural education, tourism, community service and environmental monitoring. Also, it is of great value in developing marine fishery, aquaculture and agriculture. Within the wetland, the main industries are prawn, fish and shellfish culture, together with rice culture and forestry, which are the important income sources for the native residents. Moreover, the reserve has become the education base for primary and middle school students to learn about natural protection and the practice base for college students.

This site is the largest mangrove wetland in China, which is of vital significance in protecting biodiversity of mangrove forests.

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?

No.

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:
- 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:

State ownership. The utilization right belongs to the reserve.

b) in the surrounding area:

State ownership. The local collective has the right to use the land.

25. Current land (including water) use:

a) within the Ramsar site:

Natural mangroves, mudflats and shallow sea waters are the main wetland types within the Ramsar site. Most of the wetland is being strictly protected, despite a small part remained as the fishing field for nearby villagers. Meanwhile, it is the important place for wetland research and mangrove ecological education. This site is located within the reserve, including the core area and the most parts of the buffer area.

The core area of the reserve is composed of 2 regions. One is Yingluogang Core Area located in the east of Shatian Peninsula. It covers an area of 800 ha and includes most of the mangrove forests and the related mudflats in Yingluogang Bay. The other is Dandou Sea Core Area, located at the Yongan coastal section on the west side of Shatian Peninsula and covering an area of 24 ha.. In the core areas, there is no residential area, and the human disturbance is little.

The buffer area is 3 600 ha. Besides the coastal mudflats, there is also a certain area of natural

or artificial forests with young ages. As the species composition is relatively simple and the distribution is relatively scattered, their ecological functioning is vulnerable. There is no residential area in this area.

The experiment area occupies 3 576 ha. Its major functions are to artificially restore the mangrove ecosystem, to develop scientific experiments, to cultivate mangrove seedlings, and to develop forest tourism, diverse management, education practices and sea exploitations of the people in the surrounding areas.

b) in the surroundings/catchment:

Ponds and farmlands are prevailing. Aquiculture and rice cultivating are the main agricultural activities.

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:

None.

b) in the surrounding area:

The aquacultural activities (mainly represented as shrimp production) in the surrounding areas could influence the wetland.

27. Conservation measures taken:

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

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

None

d) Describe any other current management practices:

The national nature reserve was set up in 1990, became a UNESCO Biosphere Reserve in 2000 and became a Ramsar Site in January, 2002. In 1999, the reserve made an agreement with the Mangrove Middle School, through which the reserve would be a permanent educational base of the school to improve social participation. Capability constructions of the reserve were strengthened, and wetland propaganda and education activities were enhanced to raise public

awareness on wetland protection. Legislation and law-execution are both strengthened as well.

This site is not listed in the Montreux record.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No.

29. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

- i) In 2005, the reserve participated in the “Demonstration Project of Biodiversity Management along the South Coast of China”, and became one of the international demonstration districts.
- ii) Since 2004, conventional investigations of the reserve have been carried out.
- iii) Wetland monitoring programs were initiated in 2002. The monitoring items include: surface and ground water quality, climate, hydrology, plants, birds, fishes, zoobenthos, invasive species and etc.
- iv) Since 2005, the technologies of *Rhizophora stylosa* cultivation have been generalized in silvicultural activities. And some achievements have been obtained.
- v) In 2005, one plant nursery of 0.5 ha, one reading room of 30 m², one specimen room of 50 m² were established. Three vehicles and one survey ship were equipped.

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.

- i) In 2003, the reserve organized many primary and middle school students visiting the reserve to propagandize the importance of mangrove and waterfowl conservation and thus to promote the public awareness of conservation.
- ii) In 2004, the reserve published mangrove brochures and built 2000-m visiting bridges.
- iii) In 2007, a website of the reserve was established. Eco-tourism was developed in the Yingluo mangrove forests.

31. Current recreation and tourism:

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

In recent years, the mangrove wetland has become a new highlight of tourism, and the eco-tourism has been developed in the reserve with science popularization and education as the major goal. Every year, there are nearly 100 000 tourists throughout the country spontaneously spending their holidays touring and sightseeing in the mangrove wetlands. At present, it is an educational base for science popularization authorized by the departments of environmental protection, science and technology and education in Guangxi Province.

32. Jurisdiction:

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

Territorially, the reserve is under the jurisdiction of the state.

Functionally, the reserve is supervised by the Department of Land and Resources of Guangxi Province and State Oceanic Administration of China.

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.

Institution: Bureau of Shankou Mangrove National Nature Reserve of Guangxi

Principal: Wuzheng Li (Director)

Address: Lianzhou Town, Hepu County, Guangxi Province, China

Zip: 536100

Tel: +86-(0)779-7192076, +86-13707890338

34. Bibliographical references:

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

- [1] Fan Hangqing. 2000. Mangroves: Guards of the Coast. Beijing: China People's Press.
- [2] Huang Wenqing. 2005. Mangrove in China. Beijing: High Education Press.
- [3] Lin Peng, Fu qin. 1995. China's mangrove environmental ecology and economic utilization. Beijing: High Education Press, 11~39.
- [4] Lin Peng. 1984. The Mangrove. Beijing: Ocean Press of China.
- [5] Zhang Rongzu. 1999. The Biogeography of Fauna in China. Beijing: Science Press.