

# **Information Sheet on Ramsar Wetlands**

**(RIS)**

Name of the Site: Napahai Wetland

# Information Sheet on Ramsar Wetlands (RIS)

*Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.*

Note 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. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Bureau. Compilers are strongly urged to provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of maps.

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

Mr. Zhihong Yu,  
The Management Office of  
Napahai Nature Reserve, Shangri La County  
Diqing Prefecture, Yunnan Province, 674400  
Tel.: (86)887 829045  
Fax: (86)887-822261

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Designation date Site Reference Number

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**2. Date this sheet was completed/updated:**

December 12, 2003 / October 10, 2004

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**3. Country:**

The People's Republic of China

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**4. Name of the Ramsar site:**

Napahai Wetland

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**5. Map of site included:**

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps.

a) **hard copy** (required for inclusion of site in the Ramsar List): *yes*  -or- *no*

b) **digital (electronic) format** (optional): *yes*  -or- *no*

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**6. Geographical coordinates** (latitude/longitude):

N 27°47'~27°55', E 99°35'~99°40'

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**7. General location:**

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Napahai Wetland is located in the territory of Shangri La County (Former Zhongdian County) of Diqing Tibetan Autonomous Prefecture in Yunnan Province in Southwest China. Geographically, it

lies in the northern side of the Shangri La County seat in the core zone of the Hengduan Mountains, approximately 8 km from the county capital.

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**8. Elevation:** (average and/or max. & min.)  
Average: 3,260 asl.

**9. Area:** (in hectares)  
2,083 ha

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**10. Overview:**

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Napahai Wetland is a unique type of wetland in China that is situated in the upper reaches of the Yangtze River in the core zone of the Hengduan Mountains Biogeographical Region, one of the three major floral diversity centres in China. The conservation targets of the nature reserve include important water birds, e.g. *Grus nigricollis*, as well as the alpine wetland ecosystems. Located in low latitude but high elevation, the wetland is a seasonal karst marsh composed of meadow, wetlands, water surface and surrounding forests. The water body of Napahai Wetland is 500 ha, the rest of which are marshes and meadows.

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**11. Ramsar Criteria:**

Circle or underline 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).

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8

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**12. Justification for the application of each Criterion listed in 11. 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).

**Justifications for the Criteria**

**Criterion 1:** It is a unique wetland type in China, which can be justified by its location in the core zone of Hengduan Mountains Biogeographical Region with abundant biodiversity concentration, namely, in the core zone of the three new endemic centres of floral diversity in China.

Pertaining to its hydrological significance, Napahai is endowed with the following features:

- As one of the key wetlands in the Jinsha River Watersheds (the upper reaches of the Yangtze River) in the Qinghai-Tibet Plateau, Napahai captures the runoff from rainfall, melting snow and ice, which plays a critical role in effective flood prevention and control.
- Seasonal accumulation of lake water in Napahai outflows from karst caves on the lake bottom. The underflow dives more than 10 km and then exposes as surface rivers draining into the Jinsha River. They play an important role in maintaining the discharge and regulating water level for the lower reaches of the Yangtze River.
- Napahai belongs to *karst* wetland. Its outflow connects with underground rivers that form integral components of the underground hydrological and fountain systems. Together with surface flow, water from melting snow and ice, as well as exposed fountains, they support the wetland hydrology and maintain the equilibrium of the ecosystems.
- Napahai belongs to a seasonally-flooded natural wetland and riparian system.
- Napahai Wetland exerts significant hydrological impacts on regulating and ameliorating regional climatic changes, and is representative of peat system of carbonaceous aggradations.

**Criterion 2:** It is an important wetland that plays a critical role in the survival of rare and endangered species.

- Napahai supports the survival of such important water birds as *Grus nigricollis*, *Ciconia nigra*, *Gypaetus barbatus*, *Haliaeetus albicilla* (Grade I national protection), and *Platalea leucorodia*, *Cygnus cygnus*, *Grossoptilon crossoptilon* (Grade II national protection), as well as the protected species of *Tadorna ferruginea* listed in the China-Japan Treaty on Protected Species.

Napahai Wetland possesses extremely high value in preserving threatened ecological systems,

- Napahai is the lowest limits of the distribution of Form. *Hippuris vulgaris*, a species of extreme alpine distribution. The size of its distribution has been declining evidently from records of recent research (Tian Kun, 2004).

**Criterion 3:**

- Napahai is situated in a biodiversity hotspot with abundant species repository.
- Napahai is located in the new endemic centre of the tree major centres of endemic flora diversity, and is endowed with a broad array of endemic species.
- Napahai Wetland covers the entire scope of biological diversity in the area. A diverse range of habitats that are composed of meadow, marshes, water surface and the surrounding forests can be found in the region.

**Criterion 4:**

Napahai is situated on the routes of migratory wintering birds, and forms an important wintering site and staging post for numerous valuable, rare and endangered wintering birds. Most importantly, Napahai is a critical wintering habitat system for the endemic plateau crane – the black-necked crane, an endangered species under Grade I national protection. The wetland is designated by the government of Yunnan Province as “Conservation Site for the Wintering Habitats of the Black-necked Crane”

**Criterion 5:** Statistics of periodically resident birds of *Tadorna ferruginea*, *Anas platyrhynchos* and *Anser indicus* is as follows: 2001 - 55,000; 2002- 64,000 and 2003-70,000.

**Criterion 6:** The wetland periodically (as its wintering birds) accommodates greater than 1% of the individual population of *Grus nigricollis*, one of the fifteen crane species that survive in plateau ecosystems. The entire population of *Grus nigricollis* is the world totally merely 6,000, of which, 96% is found in China. The total population of wintering Black-Necked Crane in Napahai reaches about 200, or 3% of the world's total.

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**13. 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:**

Napahai Wetland falls into the Palearctic Region (A), in Qinghai-Tibet Plateau and the Himalaya Region (IV), Qinghai-Tibet Plateau (23), southeast of Qinghai-Tibet Plateau (23A); Zhongdian-Deqin Mountain and Gorge Region.

**b) biogeographic regionalisation scheme** (include reference citation):

#### **14. 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 and physiognomy**

Napahai Wetland is located in the eastern region of three great parallel rivers of the Hengduan Mountains Range in the southeastern edge of the Qinghai-Tibet Plateau. It is an alpine wetland and marshes inlaid in the incised faults of the gorges in the Hengduan Mountains. In tectonic structures, it fits into the Zhogndian-Jianchuan lithofaces in the West Yunnan Geosynclines of the Indio-China Faults in the Palaeozoic Group. Distributed in area is limestone from the various eras ranging from the Cambrian to the Trias and massive distribution of morainal debris, alluvial/diluvia/lake and slope remnants from the Quaternary Series.

Physiognomy of the region is rather complex composing of glacial, mullah, incisions from surface runoff, lake topography, karst and structural complex. The lake is surrounded by chains of mountain ridges. From the center of the lake basin to the shoreline are large parcels of aquatic and terrestrial vegetation, and distributed in the lake shoal are large areas of marshes and meadows. On the mountains surrounding the lake are hard leaved evergreen broadleaved forests of *Picea meyeri* Rehd. et Wils, *Abies* spp. and shrubbery. The lake basin is developed on limestone parental rock of the Zhongdian Plateau. On one side of the lake basin is the main sunder of Zhongdian, whereas on the other side are broad and elongate shallow water in the shape of a dustpan, extending 12 km from south to north and 6 km from east to west. Due to the vigorous impacts of the Karst formation, the bottom of the Napahai was eroded into large underground crevices.

##### **● Origin**

The origin of the Napahai Wetland is entirely natural. It is a negative physiognomy of compensatory plateau lake basin developed from multitudinous impacts of glaciers, incision encroachment and deposition, etc. In the process of drastic escalation of the Zhongdian Plateau, disparate rising and relative descending, or depression from incised erosion shaped the prototype of the lowlands, which was subsequently transformed by glacial movements and accumulated with massive moraine and glacial debris. After the retreat of glaciers, the lake was created by surface flow into a concave relief of plateau basin.

##### **● Hydrology**

Water replenishment, reaching an annual total of  $2.57 \times 10^4 \text{ m}^3$  is supplied mainly from rainfall (annual average rainfall at 619.9 mm), surface runoff, water from melting snow and ice, as well as from fountains gushing from faults aligned along the two sides of the lake. Affected by southwest monsoon, the lake received the largest share of rainfall from the beginning of June; but because of the leakage in limestone structures, the level of lake water retreats after August. In around October in the process of retreating autumn monsoons, water level raises again, expanding the entire water surface area up to 3,125 ha, which again shrinks towards the end of November. After retreating of lake water, the lake water surface shrinks drastically. Lake water drains into underground streams through nine limestone caves in the northwest corner, sinking for 10 km through the northern minor anticline and exposed to become one of the important tributaries of the Yangtze River. During the dry seasons, lake water surface reduces to about 500 ha, exposed lake bottom becomes large tracts of shallow water marshes and meadow.

- **Soil types and the chemical properties**

The main soil types in Napahai are morass soils and bog peat, which are typically alkali soils (pH=8.02). Content of organic matters in soil averages 85.30g/kg, total nitrogen 2.71g/kg and hydrolyzed nitrogen 324.76 mg/kg, rapid effective phosphorous at 3.7 – 5.7 mg/kg and rapid effective potash at 124.81 mg/kg, belonging to typical fertile soil types.

- **Water depth and fluctuations**

Napahai Wetland is shallow-water marshes with less than 20 cm of water depth on average. In dry seasons, water depth in the lake centre lower down to 1cm and reaches 4 – 5 meters in seasons with full precipitation.

- **Climates**

Napahai is located in a transitional zone between regions of abundant and scarce precipitations. Annual average rainfall totals 619.9 mm, belonging to western monsoon climate in the plateau monsoon zone in the temperate zone. Due to the impact of south-north parallel terrains and atmospheric circumfluence, southerly and south-westerly winds overwhelm throughout the year. Dry and wet seasons are distinctive: From November to May the next year is the season and from May to November the humid seasons. Although Napahai is located in the vertical zonal climate of the central subtropics, it is characterized with distinctive plateau climate as it is situated on the south-eastern extension of the Qinghai-Tibet Plateau. Solar radiation is intensive and reaches an annual average of 2,180.3 hrs. Annual temperature difference is insignificant whereas daily variations sharp. Long winter, absent summer and short spring and autumn is typical. Annual temperature averages 5.4°C with highest at 13.2°C in July and lowest at -3.7°C in January. Active cumulative temperature totals 1,529.8°C. Comparative annual temperature difference is 16°C and comparative daily temperature difference 20°C, yet soaring to 30°C in dry seasons.

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### **15. Physical features of the catchment area:**

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

Catchment of Napahai Wetland belongs to the Jinsha River watersheds, totalling 660 km<sup>2</sup>. Geology and physiognomy is the same as described above. Physiognomy is concave relief composed of surrounding alpine forests and marsh/lake landscape. Nachi, Wanchi, Gongbi and Qinglongtan rivers, together with numerous creeks, drain into the lake. Soil types include brown, dark brown and brown coniferous forest soils to sub-alpine meadow. Content of organic matters in the soils is abundant. And despite the very high total nutrient content, effective nutrients, especially rapid effective phosphorus is very low and soils are largely acidic (pH: 5 to 6). Electropositive is less than saturated and intensity of cation exchange maintains intermediate or low. Land use include forests and pastures, as well as some portion of agriculture. Climate belongs to west monsoon, but is distinctive of plateau climatic features (as described previously).

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### **16. Hydrological values:**

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

Napahai captures water from melting snow, ice and runoff from rainfall. The large amount of water, besides replenishing underground water, leaks into underground Karst caves and becomes underground rivers that extends 10 km before exposing to ground. Such retarded release of lake water is effective in flood control. Seasonal fluctuation of water surface sustains large areas of shallow-water marshes and wetland, providing the survival environs for a great number of water birds, especially wading birds. It plays a critical role in supporting the life processes of such valuable, rare and endangered wading birds as *Grus nigricollis*, *Ciconia nigra* and *Haliaeetus albicilla* etc. On another

hand, large amounts of surface soils carried with surface runoff are deposited in Napahai. The average annual sedimentation reaches as high as  $6.1 \times 10^4 \text{ m}^3$ , contributing significantly to the capacity of flood control in the lower and middle reach of the Yangtze River.

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## 17. 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.

U, Va, P, Zk(b).

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## 18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, and plant and animal communities present in the Ramsar site.

Napahai Wetland Nature Reserve is located in the more north-western region of Yunnan province and connects with the Qinghai-Tibet Plateau. It is composed of wetland ecosystems composed of shallow-water marshes, lake surface, wetland and the surrounding forest vegetation. Outstanding elevation differences have nurtured diverse vegetation types. Common vegetation formations in Napahai Wetland include sub-alpine marshes/meadow vegetation, associations of emergent plants, floating-leaf plants and submerging plants. Dominant species in the sub-alpine marshes and meadows include *Carex pleistogyna*, *Blysmus sinocompressus*, *Eleocharis louisiana*, *Deschampsia caespitosa*, *Sanguisorba filiformis*, *Kobresia capillifolia*, *Pedicularis longiflora* var. *tubiformis*, etc. Dominant species of aquatic vegetations include *Hippuris vulgaris*, *Sparganium simplex*, *Potamogeton tepperi*, *Myriophyllum spicatum*, *Ceratophyllum demersum*, *Potamogeton lucens*, *P. maackianus* and *Polygonum hydropiper*, etc. Natural indigenous vegetations in the adjacent areas are mainly temperate conifers of Form. *Abies* and *Picea* distributed between 3,200 and 4,000 m asl., encompassing such dominant species as *Picea brachytyla* var. *complanata*, *P. likiangensis*, *Abies georgei*, *A. forrestii*, *A. forrestii* var. *smithii*. Community is characterized by multistrata and high species richness, including *Rhododendrom* spp., *Fargesia* spp., *Lonicera* spp., *Rosa* spp., *Sorbus* spp., *Gentiana* spp., *Primula* spp., etc.. Common species in the tree strata are broadleaved trees, e.g. *Quercus* spp., *Acer* spp. and *Betula utilis* var. *sinensis*. Shrubbery of polar origin typical in northern cold temperate conifers is absent.

So far no alien or invasive species have been found in the ecosystems of Napahai Wetland which is mainly composed of shallow-water marshes nourishing good quantities of fishes and shrimps, considerably large area of water body and communities of high grass. All these are broad food sources and concealments for wading and swimming birds, and have supported hundreds and

thousands of cranes and ducks. Some raptors and ravines in the family *Corvidae* are also attracted from the surrounding forests of the lake for food, constituting a stable food chain system.

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### 19. Noteworthy flora:

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. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Although Napahai is located in a mountain environment at above 3,200 m asl., which is not favourable for the expansion of aquatic vegetation, associations of aquatic plants and the floral composition is much richer than those in the lakes and wetlands in the middle and lower reaches of the Yangtze River. Boyang Lake, at a much lower elevation, deeper water (about 6 m) and with the size a hundred times larger than that of Napahai, has a vegetative cover of 80.80% of the lake area, but associations of aquatic plants in Napahai is 3 more than those found in Boyang Lake. On the other side, comparing to those in the lakes and wetlands in the middle and lower reaches of the Yangtze River, composition of aquatic vegetation in Napahai is much more complex. The floral composition is prominent of temperate elements, but encompassing 6 geographical elements of the world wide-ranging distribution, northern temperate zone distribution, East Asian distribution, extreme alpine geographical elements as endemic communities of fresh water lakes. More importantly, the share of valuable, rare and endangered as well as endemic species is high. Not only most of the aquatic plant associations in the wetlands in China are found, but also the northern alpine associations (Form. *Hippuris vulgaris*) absent from the plain wetland in the middle and lower reaches of the Yangtze River are present in the region. World wide-ranging species, e.g. Form *Potamogeton lucens*, Form. *Scirpus tabernaemontani*, Form *Alectoria virens* Tayl and Form. *Phragmites communis* Trin, find the upper limits of distribution in the region, whereas Form. *Hippuris vulgaris*, a species of highest alpine distribution, finds its lowest limit of distribution in the zone.

Most representative of important flora in Napahai is Form. *Hippuris vulgaris*. *Hippuris vulgaris* and *Sparganium simplex* are plant species of special significance in Napahai Wetland. *Hippuris vulgaris* is element of highest alpine distribution and emergent associations that is most cold resistant. It is a polar-alpine distribution type that is unavailable in plateau lakes and streams. Napahai is the base zone of its distribution that extends into the alpine areas. Form *Scirpus tabernaemontani* is a distribution type of the northern temperate zone but not found in the lakes in the middle and lower reaches of the Yangtze River, and is also an ancient species (whose pollen was excavated from the stratum of the Cretaceous Period. Because of such marginalized distribution, its habitats are extremely fragile. Decreasing population or extinction indicates a clear tendency in shrinking and degrading alpine lakes and wetlands.

Napahai Wetland also accommodates species distinctive in the region, e.g. *Cordyceps sinensis*, *Tricholoma matsutake* and *Picea brachytyla* var. *complanata*. All these species are endemic to this biogeographical region and have been listed as Grade II national protected species. *P. brachytyla* is a key framework species in the natural forests of *Picea* and *Abies* communities in the surrounding areas that play an important role in conserving headwater, preventing erosion and sustaining the equilibrium of the ecosystems in Napahai Wetland. *Cordyceps sinensis* and *Tricholoma matsutake* are edible and medicinal mushrooms, and are key income sources for local residents. They are very important material basis for the effective conservation of the Napahai Wetland. They contribute significantly to sustain the ecological balance, improving the livelihood environs of the community population, and to the stability and prosperity of the border ethnic areas in this part of China.

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### 20. 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.*

Fauna in Napahai Wetland is dominated by species of the Oriental Realm, esp. those in its southwest region. Fauna from the north and south are confluent in the region with a high degree of vertical zonal speciation and endemism. Many of the endemic species of narrow distribution in the Hengduan Mountains were found. Vertebrates are characterized by small population groups, low quantity and a high share of endangered and protected species.

In the composition of insects, there is a high concentration of alpine insects. Large quantities of grasshoppers are rich and important food sources for birds.

Amongst the amphibians, important fauna include genera of the Hengduan Mountains, e.g. *Bufo tibetanus*;

Birds take an exclusively important role in the fauna of Napahai Wetland. Most outstanding in the bird fauna are the rich endemic elements of the Hengduan Mountains and of the local areas. Many of the valuable, rare and endangered species of national protection status are found in the region, e.g. *Grus nigricollis*, *Ciconia nigra*, *Cypaetus barbatus*, *Haliaeetus albicilla* (Grade I) and *Platalea leucorodia*, *Cygnus cygnus*, *Crossoptilon crossoptilon* (Grade II) as well as *Tadorna ferrugineai* listed in the China-Japan Protection Treaty. Most important in the fauna is *Grus nigricollis*: of the 15 cranes species, it is the only species inhabiting in alpine habitats. Besides, there are 31 species of swimming birds and wading birds with a high population that can not survival without living in water environment. e.g. wide-ranging species such as *Anas platyrhynchos*, *Podiceps ruficollis*, *Anser indicus*, *Anas platyrhynchos*, *Tadorna ferruginea*. The total population reached nearly 10,000. It is very important evidence for the fact that Napahai is a crucial wintering site for a great number of water birds and a staging post as well as breeding habitat for migratory birds on their migratory routes.

In fish fauna, the most important species is *Ptychobarbus chungtienensis chungtienensis*, an endemic species of narrow distribution. Its distribution was identified in the past, but no much trace can be retrieved now.

All the fauna population is extremely important for Napahai Wetland, and is closely associated with the wetland. Decreasing population or extinction indicates the shrinking and degradation of the alpine wetlands. Reciprocally, shrinking and degradation of the Napahai Wetland will adversely affect the survival of the collection species.

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## 21. Social and 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.

Similar to other wetlands in other parts of Yunnan, Napahai is not only isolated and scattered but also lack connecting water courses with other wetlands, creating rich endemic fauna of flora. Such extraordinary endemism determines the fragility and instability of the ecosystems that deserve high values for ecological conservation and scientific research.

The artistic conception “an earthly paradise” of “harmonious coexistence between human and nature” in Shangri La has turned it into a hotspot tourist destination. Napahai Wetland is located in the hinterland of Shangri-La in Northwest Yunnan. However, due to the constraints from natural conditions, productivity in Shangri La County is very low, and the annual per capita GDP equals to merely 23.5% of the national average, belonging to an extremely poor region. In the recent years, sightseeing and bird watching have brought about tremendous economic benefits for the region, and

have also brought about very sound social benefits. Tourism has become a priority growth point for local economy. It is therefore obvious that conservation-based ecotourism will also benefit the protection of the ecosystems of Napahai Wetland.

On the other hand, Napahai Wetland is located in a Karst region that is ecologically very fragile in the Hengduan Mountains. Its location of being in the upper reaches of the Yangtze River implies its special function in its ecological services. In one way, it plays an important role not only in regulating water from melting snow and ice, surface runoff and stream discharge but also in erosion control and stabilizing water level and discharge in the lower reaches of the Yangtze River, as well as in ameliorating regional climate. The wetland provides complex and intact habitats for the rich fauna and flora, and has nurtured abundant biological diversity. It has become the habitat and breeding sites for numerous valuable, rare and endangered wildlife species. Such diversity and its role as natural pasture also provide rich resources for local livelihood, claiming its very important social values.

Tibetan is an ethnic nationality whose entire people have religious belief. In the traditional ethnic culture of the Tibetans, there are countless traditions and folklores that treasure caring for nature and harmony with the nature. Tibetans have pure “visions of humans and the earth” that advocate harmony between man and nature. They believe both humans and animals are lives of the nature. In Tibetan, the term “animal” has two means of “life” and “nostalgia”, which has nurtured their traditional practices of not injuring any living organism. Stork is regarded in the Tibetan area as a “folk messenger”, vulture as “heavenly bird” and fishes as “sacred fish”. All such unadorned traditions and ecological ethics of worshipping nature and cherishing life, no killing and not eating fish have been beneficial to the ecological balance and is an incarnation of the harmony between human and nature. In Napahai and its adjacent communities, a blending of Tibetan culture with nature is a special feature of the region, which contributes significantly to nature conservation, especially to the protection of wild animals.

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## **22. Land tenure/ownership:**

(a) within the Ramsar site:

Napahai Wetland Nature Reserve claims sole property rights, management rights and users’ rights of all the lands (*Forest Tenure Certificate No. 679, Zhongdian County of Yunnan Province*).

(b) in the surrounding area:

The wetland is surrounded by forests and 177.4 ha of farm land. The Management Office of Napahai Wetland Nature Reserve claims sole property rights, management rights and users’ rights of all the lands within the border of the nature reserve (*Forest and Mountain Tenure Certificate No. 679, Zhongdian County of Yunnan Province*).

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## **23. Current land (including water) use:**

(a) within the Ramsar site:

With the wetland areas, water body is relatively small and has been well preserved. No human uses are deployed. The marshes and meadows are used for grazing and tourism.

(b) in the surroundings/catchment:

The adjacent zone of Napahai covers 246 households of 7 communes with a total population of 1,240 Tibetans. Presently, an area of 177.4 ha is being used for farming by local residents. This part of the wetland has been included as key management areas in the wetland restoration projects and natural forest conservation project. In the immediate catchment areas surrounding the lake there are shrubberies regenerated from degradation of primary vegetation, as well as conifers of *Abies* and *Picea*

spp.. All these areas have been covered in the natural forest conservation project, as they play a very important role in conservation soil, head water sources, and in stabilizing the hydrology and ecological equilibrium in Napahai Wetland.

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**24. 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:

Negative impacts on the wetland ecosystems of natural sources in Napahai are mainly karst process; whereas human-induced impacts are mainly over extraction of wetland resources. The natural process leads to discharge of huge amount of lake water, and is the major causes for shrinking wetland area. Intensive impacts from human activities, e.g. draining, land reclamation, over grazing and unmanaged tourism are also main constraints that adversely affect the ecological environment of Napahai.

Residents living in the vicinity of the wetland area, in one way, drain the water area to claim land to grow buckwheat, on the other, they use the meadows. The meadows in Napahai are the largest natural plain pasture for winter in Shangri La. Overgrazing has damaged the balance between pasture resources and animal husbandry, and has exceeded the carrying capacity of the wetland resources. Palatable grasses are being exhausted. Trampling of large cattle herds induced soil compaction that could destroy landcover and surface soils. Local people also use the vast pastures for tourism activities. All these overlapping human activities pose negative impacts on water birds that rely on the wetland for the survival, e.g. the decrease of the aquatic plant, Form *Hippuris vulgaris*, a highest alpine distribution species.

(b) in the surrounding area:

Logging in the adjacent zone of the wetland in the past has caused erosion, to some extent, posing negative impacts on the wetland ecological environment. These areas have already been included in the natural forest protection program, which hopefully will halt the damages to the vegetation cover in the catchment zone.

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**25. Conservation measures taken:**

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Napahai has been approved by the People's Government of Yunnan Province as a provincial nature reserve since 1984 for the protection of the crane. All the territory of the nature reserve is wetland. In order to implement effective nature reserve development and management, The Management Office of Napahai Wetland Nature Reserve formulated clear management goals, including baseline resources inventory, formulation of the master management plan, building institutional structures, as well as developing the detailed management plan for the nature reserve. These plans have been approved by the government of Yunnan Province. In accordance with the Management Plan, the nature reserve management agencies have implemented awareness education of the laws and regulations, including the Forest Law, the Pasture Law, the Wildlife Protection Law, the Nature Reserve Management Regulations, Wild Plant Protection Regulations, etc.. Meanwhile, a number of large scale campaigns to track down indiscriminate poaching and fishing have been launched. Management efforts and patrolling frequencies are intensified, contributing to better regulated nature reserve management and effective checking of wetland damages. Besides, long-term monitoring of ecological environment on fixed sites in Napahai is also being carried out. In 1997, the Management Office included the marshes, meadows and wetland areas that still have better habitat conditions into its core zone for management as an approach to enhancing the protection of Napahai as the

wintering sites for migratory water birds. In 2002, co-management agreements were established with 14 communities in the adjacent zone of Napahai Wetland Nature Reserve. Through years of management practices and experiences, fragile ecosystems of Napahai Wetland, together with the valuable, rare and endangered species have been effectively conserved. Few cases of poaching and fishing now occur.

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## **26. Conservation measures proposed but not yet implemented:**

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

Zhongdian County Forestry Bureau has ever planned to merge Bitahai, Napahai provincial nature reserves with Shudu Lake into a large Bitahai Nature Reserve. The goal of the plan is to upgrade the protection status of these areas to a national nature reserve so as to implement more effective protection of the existing resources. Based on the multidisciplinary comprehensive baseline inventory conducted by scientists from Southwest Forestry College since 1998, the Planning, Inventory and Designing Institute of the State Forestry Administration formulated the Master Plan for Bitahai (including Napahai) Nature Reserve in Yunnan in 2001. The plan was ratified by the Provincial Nature Reserve Evaluation Committee in March 2002, but was rejected at the National Nature Reserve Evaluation Committee; consequently, many of the conservation measures designed in the Master Plan were not implemented, including land reclamation for lake area, building water gate at the exit to restore wetland areas. Presently, the Management Office of Napahai Nature Reserve has developed *The Awareness Education and Publicity Project Plan for Protecting the Wild Animal and Plant Resources in Napahai Wetland Nature Reserve*. The plan proposes such measures as to build wildlife rescue stations and the centre for awareness education, publicity and exhibition for nature conservation, etc. The plan has been submitted to the Wildlife Conservation Office of the Yunnan Provincial Forestry Department.

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## **27. Current scientific research and facilities:**

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

Nature reserves are complex ecological and biological systems that encompass broad range of complex research themes. Main research projects implemented in Napahai Wetland Nature Reserve include:

1. *The Degradation Process, Rules and Driving Mechanism of Napahai Wetland* conducted since 2001 by Prof. Tian Kun, etc.;
2. *The Baseline inventory and formulation of the Master Plan* organized and implemented by the Fifth Surveying Team of the Yunnan Provincial Forestry Department in 1982.
3. *The multidisciplinary comprehensive inventory of Napahai Wetland Nature Reserve* implemented by Southwest Forestry College in 1998;
4. *The terrestrial wild animal inventory* conducted by Kunming Institute of Zoology (KIZ), Chinese Academy of Sciences (CAS) in 1997, and *the inventory of valuable, rare and endangered wild animals and plants* conducted in 2000;
5. *The magnetized ratio and its environmental implications of sediments in Napahai Lake* conducted by Mr. Yan Yong, etc.
6. *Study on the distribution and status quo of habitats of crane species in alpine wetlands in Yunnan Province (including Napahai)* by Yang Lan, etc..
7. *Study on the environmental impacts of pilot ecotourism sites in Shangri La in Northwest Yunnan in the Hengduan Mountains* by Yang Guihua, etc..

8. *Study on the causes, distribution and main types of wetlands in Northwest Yunnan (including Napahai) in the Hengduan Mountains* by Sun Guangyou;
9. *Study on the vegetation types of vertical zonal features of lakes (including Napahai) in Northwest Yunnan in the Hengduan Mountains* by Zhao Kuiyi, etc..
10. *Study on the vegetation of lakes (including Napahai) in the Hengduan Mountains* by Li Heng, etc.;
11. Study on the vegetation of Bitahai (including Napahai) Wetland by Du Fan, etc., and
12. GEF-funded small research project – *Study on the environmental impacts of tourism on the nature reserve.*

Research equipment and facilities of the Napahai Wetland Nature Reserve is very much lacking. There is only one patrol vehicle and simple equipment for daily observation of birds. There are no means to conduct more in-depth research, e.g. research on environmental change of habitats and biological traits of valuable and rare wildlife species.

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### **28. Current conservation education:**

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

In total 21 person times of the staff in the Management Office of Napahai Wetland participated in the training in nature reserve management, laws and regulations and biodiversity conservation. Staff and leaders of the country forestry bureau and the nature reserve agencies have persistently conducted awareness education and publicity in the adjacent zone of the nature reserve. Also, each year, bird conservation education was conducted on the National Bird Loving Day. Weekly newsletter "Green Homegarden" is released and a total of 10,000 pamphlets were printed for awareness education. Publicity of law and regulations has been one of the key aspects of awareness education. Through the TV network, radio broadcast and newspapers, etc. as well as printing posters and pamphlets, large campaigns of awareness education were conducted and substantial outcome has been achieved. Local resident gradually come to recognize the significance of the nature reserve and nature conservation, and their conservation awareness had been enhanced to some extent. However, due to its location of being in a plateau poor ethnic region in northwest Yunnan, overall working conditions is harsh and economy underdeveloped. There is a general lack of infrastructures and facilities for awareness education and no awareness education centre is built. Taking into account of the fact that the nature reserve has many sites, large areas and long routes for patrol, and the low education profile of the nature reserve agencies, the entire management tasks are still very challenging. Moreover, unmanaged tourism development the local communities have been operating and growing number of tourists are posing ever increasing pressures on the nature reserve. Limited funds are hard to take care of awareness education for all visitors and horse packs, consequently, conservation efforts of Napahai Wetland are very much weakened.

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### **29. Current recreation and tourism:**

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

Presently, there are no recreation or tourist facilities in the nature reserve, nor large scale tourism development in Napahai Wetland. Only community-organized horse-riding services are provided by the communities. The annual number of visitors surpassed 10,000 person/times. Tourism facilities include basically sightseeing with horse riding and bird watching.

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### **30. Jurisdiction:**

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

(a) The government agencies that are authorized with the jurisdiction over Napahai Wetland Nature Reserve include the government of Yunnan Province, Diqing Tibetan Autonomous Prefecture and Shangri La County government;

(b) The management sector who are authorized with rights for functional management of the nature reserve include the State Forestry Administration (SFA), Yunnan Provincial Forestry Department, Diqing Prefecture Forestry Bureau and Shangri La County Forestry Bureau.

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**31. 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.

The Management Office of Napahai Nature Reserve is in direct charge of site management. The office is set up as part of and inside the Shangri La County Forestry Bureau in Diqing Tibetan Autonomous Prefecture. Mr. Hongzhong Yu is the director of the Management Office to take charge of the daily management and operation of Napahai Wetland Nature Reserve.

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**32. Bibliographical references:**

scientific/technical references only. If biogeographic regionalisation scheme applied (see 13 above), list full reference citation for the scheme.

1. *The Master Plan of Bitahai (including Napahai) Nature Reserve*, the Inventory, Planning and Design Institute of the State Forestry Administration, March 2003.
2. *Report of the Multidisciplinary Comprehensive Inventory of Bitahai (including Napahai) Nature Reserve*, Southwest Forestry College, etc., February 2002;
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4. Xianji Wen, Lai Yang and Xiaojun Yang, *Distribution of Water Birds in Plateau Wetlands of Yunnan*. Editor Yiyu Chen, *China Wetland Research*, Jilin Science and Technology Publishing House, Changchun. 1995 P. 248~255.
5. Tian kun, Lu Mei, Chang Fenglai et al., The Ecological Environment Degradation and Degradation Mechanism of Napahai Karst Wetland in Southwestern Yunnan Plateau, *Journal of Lake Science*, 2004, 16(1):35~42
6. Yan Xie , *Study on Biographical Division of China*. Biodiversity and Conservation , 13:1391~1471.
7. Yuming Yang, *Biogeographical Regionalization of Yunnan Province* (PhD. Dissertation).

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Please return to: **Ramsar Convention Bureau, Rue Mauverney 28, CH-1196 Gland, Switzerland**  
Telephone: +41 22 999 0170 • Fax: +41 22 999 0169 • e-mail: [ramsar@ramsar.org](mailto:ramsar@ramsar.org)