Bangpu Nature Education Center

Thailand

EAAF NETWORK SITE CODE FOR OFFICE USE ONLY:

E	A	A	F	1	5	7

Site Information Sheet on East Asian-Australasian Flyway Network Sites (SIS) – 2017 version

Available for download from http://www.eaaflyway.net/about/the-flyway/flyway-site-network/

Categories approved by Second Meeting of the Partners of the East Asian-Australasian Flyway Partnership in Beijing, China 13-14 November 2007 - Report (Minutes) Agenda Item 3.13

Notes for compilers:

1. The management body intending to nominate a site for inclusion in the East Asian - Australasian Flyway Site Network is requested to complete a Site Information Sheet. The Site Information Sheet will provide the basic information of the site and detail how the site meets the criteria for inclusion in the Flyway Site Network. When there is a new nomination or an SIS update, the following sections with an asterisk (*), from Questions 1-14 and Question 30, must be filled or updated at least so that it can justify the international importance of the habitat for migratory waterbirds.

2. The Site Information Sheet is based on the Ramsar Information Sheet. If the site proposed for the Flyway Site Network is an existing Ramsar site then the documentation process can be simplified.

3. Once completed, the Site Information Sheet (and accompanying map(s)) should be submitted to the Secretariat. Compilers should provide an electronic (MS Word) copy of the Information Sheet and, where possible, digital versions (e.g. shapefile) of all maps.

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2. Date this sheet was completed *:

DD/MM/YYYY

22/04/2024

3. Country *:

Thailand

4. Name of the Flyway Network site *:

Accepted English transcription of the Site's name.

Bangpu Nature Education Center

5. Designation of new Flyway Network Site or update of existing Site:

This SIS is for (tick one box only):

a) Designation of a new FNS ☑; or

b) Updated information on an existing FNS □

If b), date (year) of previous SIS: YYYY and

Previous name of this FNS:

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

6a) Site boundary and area

The Flyway Network 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 reduced □

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 □

6b) Describe briefly any major changes to the ecological status of the Flyway Network Site, including in the application of the designation Criteria, since the previous SIS for the site:

7. Map of site *:

The most up-to-date available and suitable map of the wetland should also be appended to the SIS (only in digital format and shape file). The map must clearly show the boundary of the site. Please refer to the "Digitising Site Boundaries in Google Earth" file linked here

https://www.google.com/maps/d/u/0/edit?mid=1PVX3vnP1M1FcSUkvhh6a6gw9qSPsmz4&usp=sharing

Figure 1. Map of the Bangpu Nature Education Center (nomination of the Flyway Network Site)

8. Geographical coordinates (latitude/longitude, in decimal degrees) ***:**

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.

Latitude 13° 31' 3.35 "N and longitude 100° 39' 32.745''E

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

Elevation of the site is 0.5-1.5 meter above sea level.

10. Area *:

The total area of the site, in hectares. If the areas of discrete site units are known, please also list each of these together with the names (or labels) used to identify and differentiate these units.

Total area of the Bangpu Nature Education Center is 201 hectares.

11. General overview of the site *:

A brief (two sentences) summary of the site, mentioning principal physical and ecological functions, and its importance for migratory waterbirds

The Bangpu Nature Education Center (BNEC), also referred to as the Bangpu Bird and Biodiversity Area, has been proposed as a candidate for the Flyway Network Site under the name "Bangpu Nature Education Center (BNEC)". The Royal Thai Army and the Foundation of Environmental Education for Sustainable Development (FEED) jointly manage this center.
BNEC refers to a mangrove area located on the coast and in the estuary of the Inner Gulf of Thailand's northeastern region. BirdLife International has designated the site as an Important Bird and Biodiversity Area (IBA), recognizing it as one of the most significant locations for migratory waterbirds in Southeast Asia. Furthermore, this region is situated within the lower central basin and the Gulf of Thailand, which have been officially designated as nationally significant wetlands by a cabinet resolution on August 1, 2000. This site has been officially endorsed by the cabinet resolution on July 20, 2020, as a potential area within the inner Gulf of Thailand to be designated as a flyway network site for the East Asian-Australasian Flyway Partnership (EAAFP).

12. Justification of Flyway Site Network criteria *:

Please provide waterbird count information (with year of latest count) that demonstrates that the site meets the criteria of the Flyway Site Network (Annex 1). That is:

- it regularly supports > 20,000 migratory waterbirds: or,
- it regularly supports > 1 % of the individuals in a population of one species or subspecies of migratory waterbird; or,
- it supports appreciable numbers of an endangered or vulnerable population of migratory waterbird
- it is a “staging site” supporting > 5,000 waterbirds, or > 0.25% of a population stage at the site.

A listing of the populations of migratory waterbirds covered by the East Asian – Australasian Flyway Partnership and the 1% thresholds is attached (Annex 3).

The “staging site” criterion is particularly difficult to apply and application of this should be discussed with the Secretariat. Also note that some species have several populations that are very difficult to distinguish in the field.

Criterion i: It regularly supports >20,000 migratory waterbirds

Maximum migratory waterbird count per year (for each of the most recent five years of counts):

Species name	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Average annual count 2020 - 2024
Brown-headed Gull (*Chroicocephalus brunnicephalus*)	47,939	28,769	26,888	31,784	11,879	29,451.8
Whiskered Tern *Chlidonias hybrida*)	3,286	4,304	5,974	3,969	2,671	4,040.8
Black-tailed Godwit (*Limosa limosa*)	19,430	19,456	8,794	4,459	1,018	10,631.4
Black-headed Gull (*Chroicocephalus ridibundus*)	133	87	129	146	121	123.2
Common Tern (*Sterna hirundo*)	21	25	11	86	36	35.8
Little Ringed Plover (*Charadrius dubius*)	14	13	10	24	3	12.8
Common Redshank (*Tringa totanus*)	1,237	493	474	447	350	600.2
Great Egret (*Ardea alba*)	445	630	793	545	328	548.2
Little Egret (*Egretta garzetta*)	507	437	654	371	117	417.2
Medium Egret (*Ardea intermedia*)	17	93	32	95	26	52.6
Pacific Golden Plover (*Pluvialis fulva*)	603	370	325	340	108	349.2
Whimbrel (*Numenius phaeopus*)	87	73	131	105	33	85.8
Common Greenshank (*Tringa nebularia*)	116	149	67	112	49	98.6
Marsh Sandpiper (*Tringa stagnatilis*)	106	110	122	84	56	95.6
Wood Sandpiper (*Tringa glareola*)	17	24	24	21	6	18.4
Striated Heron (*Butorides striata*)	12	29	30	24	10	21
Slender-billed Gull (*Chroicocephalus genei*)	25	7	9	17	4	12.4
Little Tern (*Sternula albifrons*)	7	56	29	26	47	33
Tibetan Sandplover (*Charadrius atrifrons*)	1583	388	955	254	149	665.8
Greater Sandplover (*Charadrius leschenaultii*)	41	105	132	300	18	119.2
Common Sandpiper (*Actitis hypoleucos*)	31	31	23	22	4	22.2
Eurasian Curlew (*Numenius arquata*)	13	44	12	12	2	16.6

Species name	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Average annual count 2020 - 2024
Curlew Sandpiper (*Calidris ferruginea*)	183	27	28	43	1	56.4
Gray Heron (*Ardea cinerea*)	57	35	70	69	58	57.8
Chinese Pond-Heron (*Ardeola bacchus*)	2	23	21	16	13	15
Total waterbird count:	**75,912**	**55,778**	**45,737**	**43,371**	**17,107**	**47,581**

Available from: https://ebird.org/hotspot/L946060/bird-list

Criterion ii: It regularly supports >1% **of the individuals of a biogeographic population of a migratory waterbird**

Maximum migratory waterbird counts per year (for each of the most recent five years of counts):

Species name	Biogeographic population name	1% population threshold	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Average annual count 2020 - 2024	Average % of population size
Brown-headed Gull (*Larus brunnicephalus*)	C Asia (bre)	1,400	47,939	28,769	26,888	31,784	11,879	29,451.8	21.04
Black-tailed Godwit (*Limosa limosa*)	*melanuroides*	1,600	19,430	19,456	8,794	4,459	1,018	10,631.4	6.64
Tibetan Sandplover (*Charadrius atrifrons*)	*schaeferi*	300	1,583	388	955	254	149	665.8	2.22

Criterion iii: It regularly supports appreciable numbers of a biogeographic population of a globally threatened (Critically Endangered (CR), Endangered (EN) or Vulnerable (VU)) migratory waterbird species.

Maximum counts of Globally Threatened migratory waterbird species per year (for each of the most recent five years of counts):

Species	Global threat status (IUCN Red List CR, EN, VU categories)	1% population threshold	Year 2020	Year 2021	Year 2022	Year 2023	Year 2024	Average annual count 2020 - 2024	Average % of population size
Great Knot (*Calidris tenuirostris*) SE Asia, Australia (non-bre)	EN	4,300	191	150	23	0	0	72.8	0.02

** Bangpu Nature Education Centre has records of some other globally threatened waterbirds: Milky Stork (*Mycteria cinerea*): EN, Far-eastern Curlew (*Numenius madagascariensis*): EN, Spotted Greenshank (*Tringa guttifer*): EN, Black-legged Kittiwake (*Rissa tridactyla*): VU. But these appear to be only occasional records of single birds, and so their numbers are not sufficient for qualification under this Criterion. **

13. Habitat Types *:

List the wetland types present (see Annex 2). List the wetland types in order of their area in the Flyway Network site, starting with the wetland type with the largest area.

Coastal and marine wetlands
G: Intertidal mud, sand or salt flat
I: Intertidal forested wetlands
H: Intertidal marshes
Inland wetlands
Sp: Permanent saline/ brackish/ alkaline marshes/ pools
Ss: Seasonal/ intermittent saline/ brackish marshes/ pools

14. Jurisdiction *:

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

Territorial: Samut Prakan Province
Functional/sectoral: Department of Quartermaster of the Royal Thai Army, Ministry of Defence.

15. 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 and the title and/or name and email address/phone number of the person or persons in this office with direct responsibility for managing the wetland.

The Quartermaster Department of the Royal Thai Army controls the core operations of the Bangpu Recreation Center.
- Colonel Panya Mapiboon (Director of Bangpu Recreation Center)
The steering committee of rehabilitation center and vacation rental, Army Recreation Division, Royal Thai Army Quartermaster Department
Address:
Bangpu Recreation Center
164 Village 2, Bang Pu Mai Subdistrict, Mueang Samut Prakan District, Samut Prakan Province 10280
Tel: +66 2 323 9138

Department of Marine and Coastal Resources (DMCR) plays a key role in managing, conserving, and rehabilitating the country's marine and coastal environments, and responsible for various initiatives related to sustainable marine and coastal resource management for example protects mangroves, coral reefs, seagrass beds, and marine species.
Address: 120 village 3, 5th-9th floor, Ratchaprasasana Phakdi Building, 80th Anniversary Government Center, December 5, 2007, Chaeng Watthana Road, Thung Song Hong, Lak Si, Bangkok 10210.
Tel: +66 2 141 1299

Department of Fisheries (DoF) is responsible for managing, promoting, and regulating the fisheries, aquaculture, and marine industries in Thailand. Its primary goal is to ensure sustainable fisheries and aquatic resource management while supporting the livelihoods of fishers. There are many activities relate to conservation of aquatic resources such as protection of endangered marine species, restoration of mangroves, seagrass beds, and freshwater habitats.

Address: 50 Kaset Klang, Phahonyothin Road, Lat Yao, Chatuchak, Bangkok 10900.
Tel: +66 2 562 0600-15

16. Bibliographical references *:

A list of key technical references relevant to the wetland, including management plans, major scientific reports, and bibliographies, if such exist. Please list Web site addresses dedicated to the site or which prominently feature the site, and include the date that the Web site was most recently updated. When a large body of published material is available about the site, only the most important references need be cited, with priority being given to recent literature containing extensive bibliographies.

Bird and Nature Conservation Society of Thailand. Asian Waterbird Census Thailand 2010-2016 (in Thai). 2016.

Coastal Zone Management and Development in Thailand. Thailand Environmental Institute.2019. Available from: https://www.tei.or.th/coastal/thailand-coastal-zone-management.html

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Department of National Parks Wildlife and Plant Conservation. Report on Bird Census Thailand (2018 - 2022). 2024.

Foundation for Environmental Education for Sustainable Development (Thailand). (2021). Annual Report Bangpu Nature Education Centre, April 2020 - March 2021. Available from: http://www.feedthailand.org/wp-content/uploads/2021/06/B1AR2020_EN.pdf

Ministry of Natural Resources and Environnent, Department of Marine and Coastal Resources. Marine and Coastal Resource Information Samut Prakan Province. 2018.

Ministry of Environmental Resources and Environment, Department of Mineral Resources. Classification of zones for Geological and Mineral Resources management. 2016.

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Parr JWK, Trirach P, Teerayuth L. Bang Pu: Thailand's first urban nature education center. Nature History Bulletin of the Siam Society. 2012;58: ISSN 0080-9472.

Provincial Office of Natural Resources and Environment Samut Prakan. Fiscal year report 2023. 2023.

Royal Thai Army. Draft executive summary of Bangpu Nature Education Center for evaluation as an ASEAN Heritage Park. 2024.

Robinson GS, Ackery PR, Kitching I, Beccaloni GW, Hernández LM. HOSTS - a Database of the World's Lepidopteran Hostplants [Data set]. Natural History Museum. 2023. [cited 2024 February 3]. Available from: https://doi.org/10.5519/havt50xw

Round PD, Limparungpatthanakij W, Thai Bird Records Committee, Sargeant DE. Checklist Thai Birds 2022. [cited 2024 February 18]. Available from: https://www.bcst.or.th/report-archives/#1529666667045-75d1ff39-4a3b65f8-6235

The Monitoring and Surveillance Center for Zoonotic Disease from Wildlife and Exotic Animals (MoZwe). Gull in Thailand [Internet]. Thailand [cited 2024 March 6]. Available from: https://vs.mahidol.ac.th/mozwe/gull-bird-thailand

Cornell University. Bird List Bang Pu Recreation Center [Internet]. Samut prakan Thailand [cited 2024 April 7]. Available from: https://ebird.org/hotspot/L946060/bird-list

Foundation for Environmental Education for Sustainable Development (Thailand). Bangpu Nature Education center (BNEC) [Internet]. Samut pPakan, Thailand [cited 2024 April 12]. Available from: https://feedthailand.org/?page_id=326

17. 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.

The Bangpu Nature Education Center, situated in the northeastern part of the Inner Gulf of Thailand, presents a unique and diverse environment characterized by distinct geological and hydrological features. Here is a comprehensive description covering various aspects of the area: Sedimentary deposits from the Chao Phraya River and other smaller rivers primarily influence the geology of Bangpu Nature Education Center. These deposits consist mainly of alluvial sediments, including silt, clay, and sand. The geomorphology of the area features a combination of tidal flats, mangrove forests, and mudflats, which are typical of coastal and estuarine environments. The landscape is relatively flat, with elevations close to sea level, facilitating the formation of extensive wetlands. Although human activity has influenced certain aspects of its development, such as the creation of educational facilities and pathways for visitors, BNEC is primarily a natural area. We have preserved and managed the site to uphold its ecological integrity and promote conservation education. The Gulf of Thailand dominates the hydrology of the Bangpu Nature Education Center. The area experiences regular tidal cycles, which play a crucial role in shaping the wetlands and influencing the distribution of plant and animal species. The flow of freshwater from inland sources, particularly during the rainy season, also has an impact on the site's hydrology.

The soil in BNEC is predominantly alluvial, composed of fine sediments like silt and clay. These soils are rich in organic matter due to plant material decomposition in mangrove forests and mudflats, making them fertile and capable of supporting diverse vegetation.

Water quality in the area can vary depending on tidal cycles, freshwater inflows, and human activities. Generally, the water is brackish, with salinity levels fluctuating due to the mixing of seawater and freshwater. The presence of mangroves helps to filter pollutants, improving water quality. Monitoring programs maintain water quality to support local ecosystems.

The water depth in the BNEC varies with tidal cycles. During high tide, water levels can rise significantly, inundating the mudflats and lower areas of the mangroves. Conversely, during low tide, water levels drop, exposing extensive mudflats. Despite these fluctuations, certain parts of the wetlands retain water permanently, providing crucial habitats for aquatic species.

Tidal cycles primarily drive fluctuations in water levels. These regular changes are essential for the health of wetland ecosystems, as they facilitate nutrient exchange, sediment deposition, and provide habitats for various life stages of aquatic organisms.

Each day, the area experiences semidiurnal tides, with two high tides and two low tides. The tidal range can influence the extent of wetland inundation and exposure, affecting the distribution and behavior of wildlife, especially migratory birds.

The downstream area of BNEC flows into the Inner Gulf of Thailand, which is part of the larger Gulf of Thailand. This downstream connection is critical for maintaining hydrological balance and supporting the region's coastal and marine ecosystems.

The climate in the BNEC is tropical, characterized by a monsoon climate with distinct wet and dry seasons. The wet season typically occurs from May to October, bringing heavy rainfall and increased freshwater inflows. The dry season spans from November to April, with lower precipitation and higher temperatures. The average annual temperature ranges between 25°C and 30°C, and the area experiences high humidity year-round.

BNEC is a dynamic and ecologically rich area shaped by natural processes such as tides, riverine sedimentation, and seasonal climatic variations. These factors contribute to its importance as a conservation site and critical habitat for a wide range of species, particularly migratory waterbirds.

18. Physical features of the catchment area:

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

BNEC occupies a significant area in the northeastern part of Thailand's Inner Gulf. The exact surface area may experience slight variations due to tidal influences and seasonal fluctuations, but it typically includes vast wetlands, mudflats, and mangrove forests. This area's extensive expanse provides ample space for a wide variety of plant and animal species, particularly those that migrate, such as birds.

The sedimentary processes associated with the Chao Phraya River and other minor rivers primarily shape the geological composition of the Bangpu Nature Education Center. These rivers accumulate substantial quantities of alluvial sediments, such as silt, clay, and sand. The sedimentary processes have created a productive and ever-changing landscape that sustains a wide range of ecosystems.

The coastal and estuarine processes are responsible for shaping the geomorphological features of Bangpu. Key features include:

Tidal Flats: Extensive tidal flats are exposed during low tides and inundated during high tides, providing critical feeding grounds for shorebirds.

Mangrove forests serve as a protective barrier between the land and sea, effectively stabilizing the coastline and offering a suitable habitat for a diverse range of species. The tidal zones contain mudflats, which are rich in organic matter and support a variety of invertebrates and other wildlife.

Shallow Coastal Waters: Both marine and freshwater inputs influence these areas, resulting in a distinctive brackish environment. The soils at BNEC are primarily alluvial, composed of: Rivers and tidal actions deposit silt and clay, fine-grained sediments that foster plant growth.

Organic-Rich Soils: The decomposition of plant material, especially from the mangroves, enriches the soil with organic matter, enhancing its fertility.

Saline Soils: In areas regularly inundated by tidal waters, soils can be saline, influencing the types of vegetation that can thrive there.

The climate of BNEC is tropical monsoon, characterized by distinct wet and dry seasons. The southwest monsoon causes heavy rainfall during the Wet Season (May to October). The increased precipitation leads to higher freshwater inflows, which can cause seasonal flooding in some areas of the wetlands.

Dry Season (November to April): During the dry season, the northeast monsoon brings drier and cooler air, resulting in lower precipitation levels. This season is characterized by higher temperatures and reduced freshwater inflows, leading to more saline conditions in the coastal areas. The average annual temperature ranges between 25°C and 30°C, with slight variations between seasons. The warm and humid conditions are ideal for the diverse ecosystems supported by the center. Humidity remains high throughout the year, typical of tropical climates, supporting the lush vegetation and wetland habitats.

19. Hydrological values:

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

The wetlands at BNEC have a significant impact on groundwater replenishment. Water's gradual infiltration through the soil enables it to percolate into subterranean aquifers. This process is vital for preserving the water table and guaranteeing a steady provision of groundwater, which is crucial for fulfilling local water demands, particularly in times of drought.

Wetlands play a crucial role in flood control. During episodes of intense precipitation and elevated tides, the wetlands function as innate absorbent materials, assimilating and transiently retaining surplus water. The ability to retain substantial amounts of water aids in reducing the effects of floods and safeguarding nearby communities and agricultural regions against potential flood-related harm. The wetlands' ability to decelerate water flow also mitigates downstream flooding's velocity and intensity.

Wetlands exhibit a high level of efficiency in capturing and retaining sediments. As water passes through the wetland, thick vegetation and sluggish water movement result in sediment deposition. The sediment trapping process helps to prevent sediment buildup in downstream water bodies, thereby mitigating the potential negative impacts on water quality and aquatic habitats. Wetlands trap sediment, which helps to prevent waterway obstruction and reduces the need for dredging.

Because of their extensive root systems, the wetlands at BNEC aid in shoreline stabilization. Plants, particularly mangroves, stabilize the soil and sediments, thereby reducing erosion from waves, tides, and storm surges. Coastal stabilization is crucial for preserving the coastline's integrity, as it prevents erosion and safeguards nearby infrastructure and natural habitats.

In addition to their physical functions, wetlands serve as crucial habitats for a wide variety of species. These areas offer suitable habitats for a wide variety of bird species, including migratory waterbirds, by providing spaces for breeding, feeding, and resting. The wetlands also sustain a diverse range of fish, invertebrates, and plant species, thereby enhancing the overall biodiversity of the region. This biodiversity possesses significant value not only from an ecological standpoint but also in terms of its educational and ecotourism potential.
The wetlands function as natural filters, enhancing water quality by capturing pollutants, sediments, and nutrients. The plants and microorganisms present in wetlands decompose organic matter and assimilate surplus nutrients, such as nitrogen and phosphorus, that could otherwise cause eutrophication in nearby bodies of water. The filtration process improves the quality of water that enters the Gulf of Thailand, thus benefiting marine ecosystems.
Wetlands, especially mangroves, are proficient at carbon sequestration. Plants absorb carbon dioxide from the atmosphere via photosynthesis and store it in their biomass and soil. This process helps to mitigate climate change by decreasing the presence of greenhouse gases in the atmosphere.
BNEC offers substantial benefits in the realms of ecotourism and environmental education. It serves as a convenient location for wildlife observation, specifically birdwatching, as well as acquiring knowledge about wetland ecosystems. These activities foster ecological consciousness and bolster local economies through tourism.
The wetlands hold cultural and recreational importance for the nearby communities. They provide areas for leisure, rejuvenation, and communion with the natural environment. Moreover, educational initiatives can utilize them to impart knowledge about the significance of wetlands and the practice of conservation.

20. General ecological features:

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

BNEC comprises three main wetland categories: intertidal mangrove forests, brackish marshes, and intertidal to subtidal mud/sand flats. The site is situated in the Muang District of Samut Prakan Province, approximately 37 kilometers east of Bangkok. Two significant rivers, the Chao Phraya River and the Bang Pakong River, directly affect it. These rivers contribute to the formation of various intertidal environments, such as brackish marshes and secondary mangrove forests.
Mangroves and abandoned shrimp ponds once dominated the BNEC area. Presently, it is encompassed by residential and urban zones, along with commercial and industrial advancements, such as the Bangpu Industrial Complex. The intertidal mudflats at the location are abundant in nutrients, which are crucial for sustaining mangroves and diverse small animal species, as well as resident and migratory birds.
BNEC serves as a sanctuary for a wide range of marine and coastal biodiversity, according to biodiversity data from the Thailand Biodiversity Information Facility (TH-BIF). This includes a total of 566 species of fauna, encompassing birds, fish, crustaceans, and mollusks. Additionally, BNEC is home to at least 22 species of flora, which notably includes mangrove trees. Every year, an estimated 8,000 to 15,000 birds make use of the area, mainly foraging on the very fertile intertidal mudflats. Researchers have documented the site as home to a diverse range of avian species, including up to 80 resident birds like the Common Myna (*Acridotheres tristis*), Brahminy Kite (*Haliastur indus*), and Zebra Dove (*Geopelia striata*), in addition to over 160 species of migratory waterbirds. People have sighted the Great Knot (*Calidris tenuirostris*), a species at risk of extinction worldwide, in this location.
The mangrove forests within BNEC function as crucial habitats and breeding grounds for juvenile aquatic organisms, particularly the larvae of economically significant species such as crabs, shrimps, and mollusks. These forests are crucial for the survival of numerous marine species as they offer necessary sustenance and refuge, playing a pivotal role in their life cycles. Commercially significant marine species, including barramundi, sea bass, snappers, groupers, black tiger shrimp, white leg shrimp, oysters, mussels, cockles, mud crabs, blue swimming crabs, and marine crabs, rely on mangrove forests at certain stages of their life cycles.
Ecosystem services are the benefits that natural ecosystems provide to humans. One such service is groundwater recharge, which involves replenishing underground water sources. Additionally, ecosystems also play a role in flood control, helping to mitigate the impact of flooding events.
The wetlands at BNEC facilitate groundwater recharge by enabling water to infiltrate the soil, thus replenishing subterranean aquifers.

They function as innate flood mitigation systems by assimilating surplus precipitation and mitigating the consequences of inundation in adjacent urban regions.
Sediment Trapping and Shoreline Stabilization refer to the processes of capturing and retaining sediment particles and preventing erosion along the shoreline.
Mangrove roots and vegetation intercept and retain sediments transported by rivers and tides, thereby impeding erosion and upholding the stability of the shoreline. Sediment trapping enhances water quality by effectively filtering pollutants and preventing their entry into the open sea.
Biodiversity preservation: The varied habitats sustain a broad array of plant and animal species, thereby enhancing the overall biodiversity of the region. The coexistence of both resident and migratory bird species underscores the significance of the site for avian conservation, especially for species that are globally endangered. The purpose and role of the nursery and habitat are crucial. The mangroves and marshes function as breeding grounds for young fish, crustaceans, and mollusks, offering a secure habitat for their growth and maturation prior to migrating to deeper oceanic regions. These habitats also maintain an intricate food chain, supporting different levels of feeding and guaranteeing the well-being of the ecosystem.
Advantages in the realm of economics: Mangrove forests aid fisheries by providing breeding and nursery habitats for commercially valuable species.
The area's abundant variety of plant and animal life, as well as its picturesque landscapes, draw tourists, thereby bolstering the local economy through ecotourism.

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy 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 SIS.*

(Please add here the species which do not come under sec no 14)

BNEC features a prominent mangrove forest, renowned for its varied plant life and its crucial function in the nearby ecosystem. The mangrove forest at BNEC comprises a total of six families, eight genera, and eleven plant species. The Acanthaceae family is highly abundant, and *Avicennia alba* (white mangrove) is the species with the greatest density. *Avicennia marina*, also known as black mangrove, and *Xylocarpus granatum*, commonly referred to as cannonball mangrove, are the species that closely follow. Essential Flora *Avicennia alba*, also known as the White Mangrove, is the most prevalent species in the area, exhibiting the highest Important Value Index (IVI) of 232.33. This function is critical in maintaining the stability of coastlines and serving as a habitat for a variety of species.
Avicennia marina, commonly known as Black Mangrove, plays a crucial role in preserving the health and stability of the ecosystem, as evidenced by its impressive Importance Value Index (IVI) of 37.74.
Xylocarpus granatum, also known as Cannonball Mangrove, is a species that, despite being less prevalent with an IVI (Importance Value Index) of 13.25, plays a significant role in enhancing the biodiversity and structural intricacy of the mangrove forest.
The mangrove forest exhibits a mean density of approximately 116.09 trees per rai, which is equivalent to 0.16 hectares. The mean diameter at breast height (DBH) measures 14.81 centimeters, while the average height reaches 9.50 meters. The Shannon Wiener diversity index (H') is 0.934, Margalef's index (d) is 1.269, and Pielou's evenness index (J') is 0.389, suggesting a moderate level of diversity and species evenness.
Nypa fruticans, also known as the Nipa Palm, plays a significant ecological role by providing habitat and is valued for its utilization in traditional products and industries.
Hibiscus tiliaceus is renowned for its therapeutic properties and ecological advantages.
Sonneratia ovata is highly valuable because of its critical role in sediment stabilization and water quality enhancement.
The roots of *Rhizophora mucronata*, which is commonly known as Red Mangrove, and *Rhizophora apiculata*, which is also known as Bakau Minyak, are very important because they protect against coastal erosion and provide a good environment for many aquatic species.
The various benefits that humans receive from natural ecosystems are referred to as ecosystem services. These benefits may include the provision of clean air and water, climate regulation, crop pollination, and food and raw materials. Ecosystem services are essential for human well-being.
Ecological environment and breeding areas: Mangroves play a vital role as habitats and breeding grounds for a diverse range of aquatic species, including economically significant fish, crabs, and mollusks. They

offer refuge and nourishment to young aquatic organisms, thereby supporting the viability of nearby fisheries.
The varied plant species found in the mangroves provide habitat for a diverse array of bird and animal species, including some that are uncommon, at risk of extinction, or significant in terms of their geographic distribution. This encompasses both indigenous avian species such as the Common Myna (*Acridotheres tristis*) and avian species that migrate, such as the Great Knot (*Calidris tenuirostris*).
Protection of coastal areas: Mangroves serve as natural barriers against storm surges, powerful ocean waves, and coastal erosion. Their profound root systems play a critical role in stabilizing shorelines and safeguarding inland regions against flooding and sea level rise.
Enhancing Water Quality: Mangroves purify water by effectively removing pollutants, capturing sediments, and impeding their flow into open bodies of water. This improves the quality of the water and promotes the survival and growth of marine organisms.
Mangrove forests are highly efficient at carbon sequestration, meaning they can store large amounts of carbon dioxide and contribute to climate change reduction.
Conservation is important.
The preservation of BNEC's mangrove forests is crucial because of their ecological, economic, and protective roles. They provide critical support for a wide range of species, safeguard coastal regions, and sustain local communities' livelihoods by offering fisheries and other valuable resources. Preservation and restoration of these habitats are critical for ensuring the coastal ecosystem's well-being and adaptability.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 10. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the SIS.*

BNEC has a wide range of avian species as well as a diverse collection of land and water-dwelling invertebrates, making it an important location for biodiversity preservation.
Land-dwelling animals without a backbone:
Early 2024 saw the meticulous documentation of over 300 terrestrial invertebrates, primarily from the class Insecta, following thorough diagnosis. The Wildlife Protection Act of 1992 and its inclusion in CITES Appendix II make the Golden Birdwing (*Triodes aeacus*) a particularly notable species among these. Despite the species' protection, we have yet to identify any larvae or known host plants, highlighting the need for further research and conservation efforts.
Threatened Birds:
Bangpu Nature Education Centre has records of some other globally threatened waterbirds: Milky Stork (*Mycteria cinerea*): EN, Far-eastern Curlew (*Numenius madagascariensis*): EN, Spotted Greenshank (*Tringa guttifer*): EN, Black-legged Kittiwake (*Rissa tridactyla*): VU. But these appear to be only occasional records of single birds, and so their numbers are not sufficient for qualification under this Criterion.
Aquatic invertebrates:
Bangpu is well-known for its copious population of crabs, as evidenced by its name. The area is home to several noteworthy crab species, including the serrated mud crab (*Scylla olivacea*) and three types of "vinegar crabs": pink-fingered vinegar crab (*Episesarma chengtongense*), Thai vinegar crab (*Episesarma mederi*), and violet vinegar crab (*Episesarma versicolor*). In addition, BNEC harbors seven additional crab species, thereby enhancing the area's abundant aquatic biodiversity.
The site is home to two species of "horseshoe crabs" (Order: Xiphosurida), specifically the mangrove horseshoe crab (*Carcinoscorpius rotundicauda*) and the Indo-Pacific horseshoe crab (*Tachypleus gigas*). These species contribute to the distinct and varied invertebrate community found at the site.
One of the most notable and emblematic species present in mangrove ecosystems is the mudskipper. The BNEC houses four primary mudskipper species, namely the giant mudskipper (*Periophthalmodon schlosseri*), the blue-spotted mudskipper (*Boleophathalmus boddarti*), the gold-spot mudskipper (*Periophthalmus chrysospilos*), and the brown-spotted mudskipper (*Periophthalmus novemradiatus*). These species are critical for the site's ecological dynamics because they serve as prey for water birds and contribute to the area's overall biodiversity.
Importance for conservation:
The existence of various land and water invertebrates at BNEC highlights the importance of conserving the mangrove ecosystem. These species have both biogeographical importance and crucial roles in preserving ecosystem health and functionality. Given the escalating human activity and habitat loss, it is

imperative to take conservation measures to protect the distinctive invertebrate communities in mangrove habitats. These efforts are crucial for ensuring the long-term sustainability of the site's biodiversity.

23. Social, economic and cultural values:

23a**)** Describe if the site has any general social, economic 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:

The Bangpu Nature Education Center (BNEC) possesses substantial social, economic, and cultural significance, both in the past and at present.

Historical, archaeological, and religious significance

Cultural Heritage:

The site holds historical importance due to its previous mangrove coverage and its crucial role as a habitat for diverse species. Mangrove ecosystems have played a crucial role in the cultural heritage of coastal communities in Thailand, providing resources and means of sustenance for many generations.

Religious Significance:

Although BNEC does not have any specific religious sites, mangrove forests in general are considered spiritually important in Thai culture. People highly regard mangroves for their ecological significance and connect them to generations-old beliefs and customs.

Archaeological Sites:

Although not explicitly stated, mangrove ecosystems may contain archaeological sites or artifacts from previous human activities along the coastline. These websites may offer valuable information about the past utilization of the region by native communities or early colonizers.

Contemporary socio-economic values

BNEC functions as a significant center for education and ecotourism, drawing in visitors who are keen on gaining knowledge about mangrove ecosystems, the preservation of biodiversity, and the responsible management of the environment. The center provides guided tours, educational programs, and interpretive exhibits to promote awareness of the significance of wetland conservation.

The mangrove forests of BNEC play a crucial role in supporting local fisheries and aquaculture by serving as habitats for commercially significant species, including crabs, shrimps, and fish. Mangroves function as habitats and feeding areas for young marine organisms, thereby enhancing the long-term viability of coastal fisheries.

The picturesque allure of BNEC's mangrove forests and coastal landscapes entices visitors seeking leisurely pursuits such as birdwatching, photography, and nature walks. The website provides prospects for recreation and rejuvenation, promoting the establishment of relationships between individuals and the natural environment.

Cultural Identity:

Coastal communities in Thailand intricately link mangrove ecosystems to their cultural identity. They function as representations of fortitude, flexibility, and interdependence with the environment. Conserving mangrove habitats at BNEC plays a crucial role in protecting cultural heritage and traditional knowledge linked to coastal lifestyles.

23b**)** 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? (Double-click the checkbox to check and choose Checked" under "Default Value" from Check Box Form Field Options" window)

-

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 Flyway Network site:

The Quartermaster Department of the Royal Thai Army, Ministry of Defence.

b) In the surrounding area:

The land in the surrounding area is owned by local communities or private sector.

25. Current land (including water) use:

a) Within the Flyway Network site:

The Bangpu Nature Education Centre serves as an educational facility for students and weekend visitors. The Royal Thai Government and the Foundation for Environmental Education for Sustainable Development (FEED) jointly manage it.

b) In the surroundings/catchment:

Residential and urban areas, as well as commercial and industrial areas, including the Bangpu Industrial Complex, encompass the site.

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 Flyway Network site:

Past and Current Adverse Factors
- Urbanization and Development
- Land Use Changes
- Pollution (Industrial discharge, agricultural runoff, and untreated sewage from urban areas)
- Overfishing and Illegal Harvesting
- Invasive Species

Potential Future Threats
- Climate Change
- Sea Level Rise/Coastal erosion
- Infrastructure Development
- Human Activities

b) In the surrounding area:

Past and Current Adverse Factors
- Urbanization and Industrialization
- Conversion of Natural Habitats
- Pollution (Industrial discharge, agricultural runoff, and untreated sewage from urban areas)
- Alteration of Hydrological Regimes
- Invasive Species

Potential Future Threats
- Climate Change
- Infrastructure Development
- Excessive resource consumption

27. Conservation measures taken:

27a**)** List national and/or international category and legal status of protected areas, including boundary relationships with the Flyway Network 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.

BNEC is located within the 190-kilometers-long section of the coastal zone of the Inner Gulf of Thailand, defined as an Important Bird and Biodiversity Area (IBA) by BirdLife International.
The site is currently included in the nationally important wetland areas, which are part of the Gulf of Thailand, as per the cabinet resolutions from November 3, 2009. Additionally, the cabinet resolution from July 20, 2010, designates it as a potential Flyway Network Site in Thailand.
BNEC is also in the process of nominating ASEAN Heritage Parks through the ASEAN Declaration on Heritage Parks and Reserves on November 29, 1984.
On January 29, 2020, organize World Wetlands Day to raise awareness about wetland, which helps mitigate natural disasters and climate change.

27b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate, see Annex 3):

Ia ☐; Ib ☐; II ☐; III ☐; IV ☐; V ; ☐ VI ☒ ; N/A ☐

27c) Does an officially approved management plan exist ? :

No

27d) Describe any other current management practices:

BNEC is in the process of nomination for recognition as a Flyway Network Site under the East Asian-Australasian Flyway Partnership (EAAFP) and endorsed the ASEAN Heritage Park (AHP) as the 63rd on December 10, 2024.

A management plan is necessary to ensure the preservation of natural resources, the safeguarding of the environment, and the maintenance of ecosystem services. The site is developing five management strategies for preserving and administering natural resources.

1. Cultivate and expand a volunteer base committed to the preservation of natural resources, strengthening and enhancing the conservation network. Furthermore, establish a collaborative network focused on natural resource and environmental conservation.
2. The goal is to promote and spread knowledge about conservation by establishing educational resources, particularly those focused on mangrove ecosystems. We will achieve this by showcasing the distinctiveness of the center through various media platforms. We will also share information and methods for conserving and restoring various types of natural resources. Furthermore, there will be an emphasis on raising awareness about marine and coastal wetland ecosystems and the valuable services they provide.
3. Preserve and rehabilitate the site's resources through conservation techniques, including: 1) executing the strategic plan for managing the mangrove area, encompassing aquatic species and birds; 2) safeguarding traditional community lifestyles; 3) rigorously enforcing laws and monitoring resources in the area through participatory methods; and 4) meticulously constructing wave barriers (bamboo walls) to conserve mangrove resources. 5) Holding meetings to understand the principles of natural resource conservation. This encompasses the administration of resources, the process of repairing damaged natural areas, and the observation and evaluation of resource changes for the purpose of restoration.
4. Facilitate the generation of knowledge for the preservation of resources by incorporating research into the management of natural resources, utilizing academic data as a foundation for management and conservation efforts, and fostering collaboration in research endeavors to tackle management challenges in the region.

28. Conservation measures proposed but not yet implemented:

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

This step is critical for ensuring the long-term preservation and responsible management of BNEC and its adjacent regions. The development of a comprehensive management plan necessitates the cooperation of diverse stakeholders and experts to tackle the ecological, social, economic, and cultural aspects of a site, along with its conservation difficulties.
The management plan could incorporate the following key elements:
1. Ecological Conservation
Prioritise the preservation of critical habitats, such as mangrove forests, brackish marshes, and intertidal mudflats, in order to maintain biodiversity and ecosystem function. Enact strategies to combat dangers such as the destruction of natural habitats, contamination, the introduction of non-native species, and the consequences of climate change.
2. Community Engagement
Engage local communities, indigenous groups, and stakeholders in decision-making processes and conservation initiatives. Promote sustainable resource use by educating and building the community's capacity, as well as providing livelihood opportunities to foster stewardship and awareness.
Conduct scientific research and monitoring programs to assess the ecological condition of BNEC, track changes over time, and provide information for adaptive management strategies. Observe and track important measures such as water quality, species diversity, habitat health, and different species populations. Implement land-use zoning plans, regulations, and guidelines to encourage sustainable practices that achieve a harmonious balance between conservation and socio-economic development. Ensure that development projects comply with environmental standards and minimize their impact on wetland ecosystems.
3. Climate Change Adaptation
To strengthen BNEC's resilience against climate-related risks such as rising sea levels, severe weather events, and temperature fluctuations, incorporate climate change adaptation measures into management strategies. Execute initiatives focused on habitat restoration, shoreline protection, and natural infrastructure projects to minimize negative effects and enhance the ability of ecosystems to withstand and recover from disturbances. Establish alliances and cooperation with government agencies, non-governmental organizations, academic institutions, private sector entities, and international organizations to utilize resources, specialized knowledge, and assistance for conservation projects. Engage in cooperative endeavours to improve the results of conservation through research, funding, capacity building, and outreach activities.
Education and Interpretation: Create educational initiatives, interpretive resources, and visitor engagements to enhance understanding of the ecological importance of BNEC, foster environmental knowledge, and encourage conservation efforts among visitors and the wider community.
4. Policy and Advocacy
Promote policy changes, legal safeguards, and status elevation to improve BNEC's conservation status and recognition at both national and international levels. Initiate dialogue with policymakers, legislators, and government officials regarding wetland preservation and the promotion of sustainable development.

29. Current scientific research and facilities:

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

Monitoring Program
1. Annual Waterbird Census Thailand (every year in January), collaborated with the Department of National Park, Wildlife, and Plant conservation (DNP), and Bird Conservation Society of Thailand (BCST).
2. The Monitoring and Surveillance Center for Zoonotic Disease from Wildlife and Exotic Animals (MoZwe), Thailand National Wildlife Health Center, and the Faculty of Veterinary Science, Mahidol University, have been monitoring and studying the migratory flyway of wild birds in the wild for the purpose of early warning and monitoring of avian influenza (HPAI H5N1) epidemic situation. From the early stages of the H5N1 epidemic in Thailand to the present, gulls are a key species to monitor for avian influenza in this area.
3. The coastal areas of Samut Prakan Province has changes with the seasons. The coastline is affected by severe coastal erosion more than 5 meter/year.
Research

1. Detection and characterization of *Vibrio parahaemolyticus* isolated from seawater at Bangpu, Samut Prakarn Province, Thailand, conducted by students of the Department of Public Health, Mahidol University.
2. Surface Water Quality of Samut Prakan Provinces is rather deteriorated state due to Samut Prakan is end of rivers and canals, resulting in wastewater.
3. Charoensap, K. Work Experience at the Foundation for Environmental Education for Sustainable Development (Thailand). Student report, Naresuan University. 2021.
4. Thongkam, S. Work Experience at the Foundation for Environmental Education for Sustainable Development (Thailand) - Bangpu Nature Education Centre. Student report, Naresuan University. 2021.
5. Architectural design to improve the Bangpu Nature Education Center (BNEC) and Recreation Center of the Bangpu Wetland Site, conducted by a 4th year student of the Department of Architecture, Town Plan and Fine and Applied Arts, Mahasalakram University.
6. Architectural design in the resort (recreation center) of the Bangpu to support eco-tourism, conducted by 4th year students of the Department of Architecture and Town Plan, Thammasat University.

Research Projects conducted at BNEC during 2020.
1. Rajamangala University of Technology Phra Nakhon. Testing natural dyes from marigolds and mangrove mud. 2020.
2. Rajabhat Thonburi University. Types and volumes of marine waste at Bangpu. 2020.
Kasetsart University. Impacts of “mangrove dieback” at Bangpu. 2020.
3. Chulalongkorn University. Assessing the success of mangrove rehabilitation planting in the “Toyota Mangrove Planting project”. 2020.

Facilities
Site and facilities development and maintenance 2020-2021. Part of BNEC’s role at Bangpu is the development and maintenance of facilities. During 2020 activities or developments included: 1. “Sunrise” boardwalk collapse 2. “Bruda gardens” development 3. management of vegetation around a bird hide 4. walk trail and boardwalk maintenance 5. walk trail improvements, with an area prone to flooding having a stone resurfacing 6. design, production and replacement of some signs 7. improvements to the garden and other vegetation around the office.

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.

Communication
- Organize World Wetlands Day on January 29, 2020. Wetlands play a crucial role in reducing the impact of natural disasters and climate change. This event served as a platform to convey the importance of wetlands to the general public and stakeholders.
- On August 2, 2024, the Office of Natural Resources and Environmental Policy and Planning (ONEP) organized a project to honor His Majesty King Rama X by communicating through the citizen science approach with students. This project aimed to raise awareness and highlight the importance of wetland ecosystems, which serve as habitats for migratory waterbirds.
- Furthermore, October 12, 2024 is World Migratory Bird Day and also 'October Big Day' for birders. We joined them together to make our own 'Bangpu Big Bird Day' as our way to mark the occasions. We have celebrated 'Bangpu Big Bird Day' with a special activity for beginning birders, which you'll have to learn about of the basics of bird biology, as well as heading out to explore big birds, small birds and shore birds at the Bangpu Education Center.

Education
BNEC serves as a vital ecotourism site for education, research, and recreation. Each year, a wide variety of visitors come to this place, and its mangrove forest is particularly important as an educational setting, especially for student groups participating in educational tours. The Foundation for Environmental Education for Sustainable Development (FEED) implements extensive natural and environmental education initiatives, involving almost all students who visit.
The Environmental Education Programs at the Nature Education Center aim to instruct children and visitors on the significance of the area, its biodiversity, habitats, migratory patterns, and conservation methods. These programs encompass a wide range of subjects, including mangrove forests, bird species, intertidal, animals, marine debris, coastal conservation, and environmental camps. They aim to cultivate a more profound comprehension of environmental conservation and sustainability.

Participation

BNEC actively engages visitors in a variety of environmental activities with the goal of promoting biodiversity development and restoration. The activities offered involve planting trees, releasing local aquatic animals, and collecting marine debris. These activities aim to engage visitors in conservation efforts and encourage them to contribute to the ecosystem's preservation.
The center enhances public awareness about biodiversity and mangrove ecosystems through a variety of facilities and activities. The center purposefully designs the bird observation hides, mangrove treetop observation towers, canopy walkways, mangrove boardwalks, nature trails, exhibition hall, and meeting room to educate visitors about the significance of wetlands and the need for their preservation. In addition, the center facilitates corporate social responsibility (CSR) initiatives, such as planting mangrove seedlings and collecting marine debris, to enhance awareness and encourage responsible environmental stewardship among visitors and the wider community.

31. Current recreation and tourism:

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

Indeed, both recreational and tourist purposes utilize the wetland area at BNEC. The western section of the site, which includes small roads and more than 20 structures, functions as a recreational facility for both military personnel and the general population. Additionally, the terminus of a 500-meter-long bridge, commonly known as the Suk Ta Bridge, hosts restaurants. Parties, wedding ceremonies, and weekend social dances, including ballroom dancing gatherings, frequently take place at these restaurants and their surrounding areas.
The recreation facility's projected utilization is significant, with over 150,000 visitors per year. The majority of these visitors are local residents who use the area for physical activity and family time. In addition, the site also draws tourists from other regions, especially during the migratory season, who come for leisure and bird observation.
The vicinity offers a wide range of leisure activities, including cycling, jogging, strolling, and picnicking, enhancing its appeal as a recreational spot for both residents and visitors.

32. Threats *:

Which of the following threats is present historically – when the threat stopped but the effects are still there (H), currently (C) or potentially (P)?

	Historically	Currently	Potentially
Residential and commercial development			
housing and urban areas	☐	☐	☒
commercial and industrial areas	☐	☐	☒
tourism and recreation areas	☐	☐	☒
Agriculture and aquaculture			
annual and perennial non-timber crops	☐	☐	☐
wood and pulp plantations	☐	☐	☐
livestock farming and ranching	☐	☐	☐
marine and freshwater aquaculture	☐	☐	☒
Energy production and mining			
oil and gas drilling	☐	☐	☐

mining and quarrying	☐	☐	☐
renewable energy	☐	☐	☐
Transportation and service corridors			
roads and railroads	☐	☐	☒
utility and service lines	☐	☐	☐
shipping lanes	☐	☐	☐
flight paths	☐	☒	☐
Biological resource use			
hunting and collecting terrestrial animals	☐	☐	☐
gathering terrestrial plants	☐	☐	☐
logging and wood harvesting	☐	☐	☐
fishing and harvesting aquatic resources	☐	☒	☒
Human intrusions and disturbance			
recreational activities	☐	☒	☐
war, civil unrest, and military exercises	☐	☐	☐
work and other activities	☐	☐	☐
Natural system modifications			
fire and fire suppression	☐	☐	☐
dams and water management/use	☐	☐	☐
other ecosystem modifications	☐	☒	☒
Invasive and other problematic species and genes			
invasive non-native/alien species	☐	☒	☒
problematic native species	☐	☐	☐
introduced genetic material	☒	☒	☒
Pollution			
household sewage and urban wastewater	☐	☒	☒
industrial and military effluents	☐	☒	☒
agricultural and forestry effluents	☐	☒	☒
garbage and solid waste	☒	☒	☒
air-borne pollutants	☐	☐	☒

excess energy	☐	☐	☐
Geological events			
Volcanoes	☐	☐	☐
earthquakes/tsunamis	☐	☐	☐
avalanches/landslides	☐	☐	☐
Climate change and severe weather			
habitat shifting and alteration	☐	☒	☒
Droughts	☐	☐	☐
temperature extremes	☐	☐	☒
storms and flooding	☐	☒	☒

Please write here any additional threats and comments/queries you have on the threats.

Sea level rise/coastal erosion

Annex 1: Ramsar Classification System for Wetland Type

The codes are based upon the Ramsar Classification System for Wetland Type as approved by Recommendation 4.7 and amended by Resolutions VI.5 and VII.11 of the Conference of the Contracting Parties. The categories listed herein are intended to provide only a very broad framework to aid rapid identification of the main wetland habitats represented at each site.

To assist in identification of the correct Wetland Types to list in section 19 of the RIS, the Secretariat has provided below tabulations for Marine/Coastal Wetlands and Inland Wetlands of some of the characteristics of each Wetland Type.

Marine/Coastal Wetlands

A -- **Permanent shallow marine waters** in most cases less than six metres deep at low tide; includes sea bays and straits.

B -- **Marine subtidal aquatic beds**; includes kelp beds, sea-grass beds, tropical marine meadows.

C -- **Coral reefs**.

D -- **Rocky marine shores**; includes rocky offshore islands, sea cliffs.

E -- **Sand, shingle or pebble shores**; includes sand bars, spits and sandy islets; includes dune systems and humid dune slacks.

F -- **Estuarine waters**; permanent water of estuaries and estuarine systems of deltas.

G -- **Intertidal mud, sand or salt flats**.

H -- **Intertidal marshes**; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.

I -- **Intertidal forested wetlands**; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.

J -- **Coastal brackish/saline lagoons**; brackish to saline lagoons with at least one relatively narrow connection to the sea.

K -- **Coastal freshwater lagoons**; includes freshwater delta lagoons.

Zk(a) – **Karst and other subterranean hydrological systems**, marine/coastal

Inland Wetlands

L -- **Permanent inland deltas**.

M -- **Permanent rivers/streams/creeks**; includes waterfalls.

N -- **Seasonal/intermittent/irregular rivers/streams/creeks**.

O -- **Permanent freshwater lakes** (over 8 ha); includes large oxbow lakes.

P -- **Seasonal/intermittent freshwater lakes** (over 8 ha); includes floodplain lakes.

Q -- **Permanent saline/brackish/alkaline lakes**.

R -- **Seasonal/intermittent saline/brackish/alkaline lakes and flats**.

Sp -- **Permanent saline/brackish/alkaline marshes/pools**.

Ss -- **Seasonal/intermittent saline/brackish/alkaline marshes/pools**.

Tp -- **Permanent freshwater marshes/pools**; ponds (below 8 ha), marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season.

Ts -- **Seasonal/intermittent freshwater marshes/pools on inorganic soils**; includes sloughs, potholes, seasonally flooded meadows, sedge marshes.

U -- **Non-forested peatlands**; includes shrub or open bogs, swamps, fens.

Va -- **Alpine wetlands**; includes alpine meadows, temporary waters from snowmelt.

Vt -- **Tundra wetlands**; includes tundra pools, temporary waters from snowmelt.

W -- **Shrub-dominated wetlands**; shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils.

Xf -- **Freshwater, tree-dominated wetlands**; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils.

Xp -- **Forested peatlands**; peatswamp forests.

Y -- **Freshwater springs; oases**.

Zg -- **Geothermal wetlands**

Zk(b) – **Karst and other subterranean hydrological systems**, inland

Note: "**floodplain**" is a broad term used to refer to one or more wetland types, which may include examples from the R, Ss, Ts, W, Xf, Xp, or other wetland types. Some examples of floodplain wetlands are seasonally inundated grassland (including natural wet meadows), shrublands, woodlands and forests. Floodplain wetlands are not listed as a specific wetland type herein.

Human-made wetlands

1 -- **Aquaculture** (e.g., fish/shrimp) **ponds**

2 -- **Ponds**; includes farm ponds, stock ponds, small tanks; (generally below 8 ha).

3 -- **Irrigated land**; includes irrigation channels and rice fields.

4 -- **Seasonally flooded agricultural land** (including intensively managed or grazed wet meadow or pasture).

5 -- **Salt exploitation sites**; salt pans, salines, etc.

6 -- **Water storage areas**; reservoirs/barrages/dams/impoundments (generally over 8 ha).

7 -- **Excavations**; gravel/brick/clay pits; borrow pits, mining pools.

8 -- **Wastewater treatment areas**; sewage farms, settling ponds, oxidation basins, etc.

9 -- **Canals and drainage channels, ditches.**

Zk(c) -- **Karst and other subterranean hydrological systems**, human-made

Tabulations of Wetland Type Characteristics

Marine/Coastal Wetlands:

Saline water	Permanent	< 6 m deep	A
		Underwater vegetation	B
		Coral reefs	C
	Shores	Rocky	D
		Sand, shingle or pebble	E
Saline or brackish water	Intertidal	Flats (mud, sand or salt)	G
		Bivalve (shellfish) reefs	Ga
		Marshes	H
		Forested	I
	Lagoons		J
	Estuarine waters		F
Saline, brackish or fresh water	Subterranean		Zk(a)
Fresh water	Lagoons		K

Inland Wetlands:

Fresh water	Flowing water	Permanent	Rivers, streams, creeks	M
			Deltas	L
			Springs, oases	Y
		Seasonal/intermittent	Rivers, streams, creeks	N
	Lakes and pools	Permanent	> 8 ha	O
			< 8 ha	Tp
		Seasonal/intermittent	> 8 ha	P
			< 8 ha	Ts
	Marshes on inorganic soils	Permanent	Herb-dominated	Tp
		Permanent/ Seasonal/intermittent	Shrub-dominated	W
			Tree-dominated	Xf
		Seasonal/intermittent	Herb-dominated	Ts
	Marshes on peat soils	Permanent	Non-forested	U
			Forested	Xp
	Marshes on inorganic or peat soils	High altitude (montane)		Va
		Tundra		Vt
Saline, brackish or alkaline water	Lakes	Permanent		Q
		Seasonal/intermittent		R
	Marshes & pools	Permanent		Sp
		Seasonal/intermittent		Ss
Fresh, saline, brackish or alkaline water	Geothermal			Zg
	Subterranean			Zk(b)

Annex 2: IUCN Protected Areas Categories System

For further guidance on the IUCN Protected Areas Categories for completing SIS section 27b, see: https://portals.iucn.org/library/sites/library/files/documents/PAG-021.pdf

IUCN protected area management categories classify protected areas according to their management objectives. The categories are recognized by international bodies such as the United Nations and by many national governments as the global standard for defining and recording protected areas and as such are increasingly being incorporated into government legislation.

Ia Strict Nature Reserve

Category Ia are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphical features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values.

Ib Wilderness Area

Category Ib protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

II National Park

Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.

III Natural Monument or Feature

Category III protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.

IV Habitat/Species Management Area

Category IV protected areas aim to protect particular species or habitats and management reflects this priority. Many Category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.

V Protected Landscape/ Seascape

A protected area where the interaction of people and nature over time has produced an area of distinct character with significant, ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

VI Protected area with sustainable use of natural resources

Category VI protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems.