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BANG PU: THAILAND'S FIRST URBAN NATURE EDUCATION CENTRE

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ABSTRACT

One of the last remnant patches of mangrove in the Gulf of Thailand, protected within the Royal Thai Army Recreation and Convalescence Centre at Bang Pu in Samut Prakan Province, was developed as Thailand's first urban nature education centre in partnership by the Royal Thai Army, WWF–Thailand and the corporate sector. This article describes this development and the strategic role of the Bang Pu Nature Education Centre as a high profile flagship for a conservation organization and for the conservation of wetlands and nature education in Thailand and in the Region.

Keywords Bangkok, Gulf of Thailand, mangrove, mudflats, nature education, wetland education centre

INTRODUCTION

The Recreation and Convalescence Centre at Bang Pu, Bang Pu Mai Subdistrict, Mueang Samut Prakan District, Samut Prakan Province (N 13°30'59", E 100°39'23"), established in 1947, is a notable remnant patch of the remaining mangrove and mudflat habitats in the Inner Gulf of Thailand, under the management of the Royal Thai Army (hereafter RTA). The 102 ha site is located 12 km east of the provincial capital, and 37 km from Bangkok (Figs. 1 and 2). The facility may be broadly segregated into three broad zones: (1) An access road running through the site to the 500-metre long Sukta Pier, which terminates in a restaurant; (2) a developed area (50 ha), containing minor roads and over 20 buildings, west of the access road and (3) a 52-ha area of abandoned shrimp ponds at differing levels of recovery to the east of the access road. The RTA utilizes the restaurant for commercial purposes, for formal occasions and celebrations (Fig. 2).

Bang Pu is a household name to the citizens of Bangkok many of whom visit the site, particularly in the cool season, to take the sea air and to feed the large and noticeable concentration of gulls that congregate there. The mudflats also constitutes one of the most accessible and highest profile localities of the designated Important Bird Area in the Inner Gulf of Thailand, which should also be recognized as a Ramsar site, as a wetland of international significance.

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Received 20 November 2010; accepted 10 October 2012

THE ESTABLISHMENT OF THE BANG PU NATURE EDUCATION CENTRE

Its accessibility, the relative intactness of the representative habitats and the diversity of birds, impart Bang Pu with high potential as a nature education centre. By invitation of WWF Thailand, representatives of the RTA visited a WWF-Hong Kong coastal wetland education centre at Mai Po Nature Reserve, Hong Kong, in March 2003. Mai Po bears strong similarities to the Bang Pu site, enabling the RTA representatives to see the potential of their own site.

Following this, in December 2002, the RTA and WWF Thailand agreed to establish the nation's first urban nature education centre at Bang Pu. An MOU was signed between the Commander-in-Chief, RTA and the WWF Thailand Country Representative on 20th August 2003. The RTA pledged to take responsibility for the infrastructure, while the conservation organization undertook to provide the educational services. The site was designated as a Royal Project, to celebrate the 72nd Anniversary of Her Majesty the Queen Sirikit.

Corporate sponsorship was subsequently sought to develop the site and on 27 April 2004, Thai Life Insurance Public Co., Ltd. approved funding of educational activities for US \$165,227 (6,543,000 *baht*) for three years. A reserve manager, four educational officers and an administration officer were appointed by WWF Thailand. Toyota Motor Thailand Co. Ltd also agreed to finance provision of infrastructure components on 5th January 2006 for US \$223,546 (9 million *baht*) covering a three-year period.

The main facilities of the nature education centre comprise a reception hall, a visitor centre, a small auditorium (with a capacity for 50 students), and office space for the reserve staff administration constructed at the reserve entrance (Fig. 2 and 3). Within the reserve, an eight-metre high canopy observation tower (Fig. 4A), four bird observation hides (Fig. 4B and C), six hundred metres of boardwalks (Fig. 5A) and 2.5 km of nature trails (Fig. 5B) were constructed at strategic locations. The Port Authority of Thailand funded a bird observation tower overlooking the mudflats for US \$44,248 (1.5 million *baht*) in August 2008 (Figs. 5C). In 2011, a 100-m long and 1 to 6 m high canopy observation walkway was built with support from Samut Prakarn Province (Fig. 5D).

WWF Thailand prepared training manuals for provision to the primary and secondary school teachers visiting the reserve, and a full range of leaflets and brochures on specific fauna and flora in the nature reserve. Binoculars and telescopes, bird guides and other education materials, were made available for use by students and members of the public, together with a range of other field guides on different nature topics. Other equipment (e.g. slide projector, overhead projector, musical instruments) were used to support activities undertaken in the lecture theatre.

HABITATS AND SPECIES DIVERSITY

The coastal mangrove belt in the Inner Gulf of Thailand has suffered gravely from industrialization and urbanization (ROUND, 2008). Virtually the entire seaboard of Samut Prakan Province (most of which lies to the east of the mouth of the Chao Phraya River) is now urbanised. Less than 1,600 ha of secondary mangrove still remain, mostly as a narrow fringe along the seaward margins (SCOTT, 1989). The 102 ha area of mangroves within the nature reserve at Bang Pu thus constitutes a notable remnant.

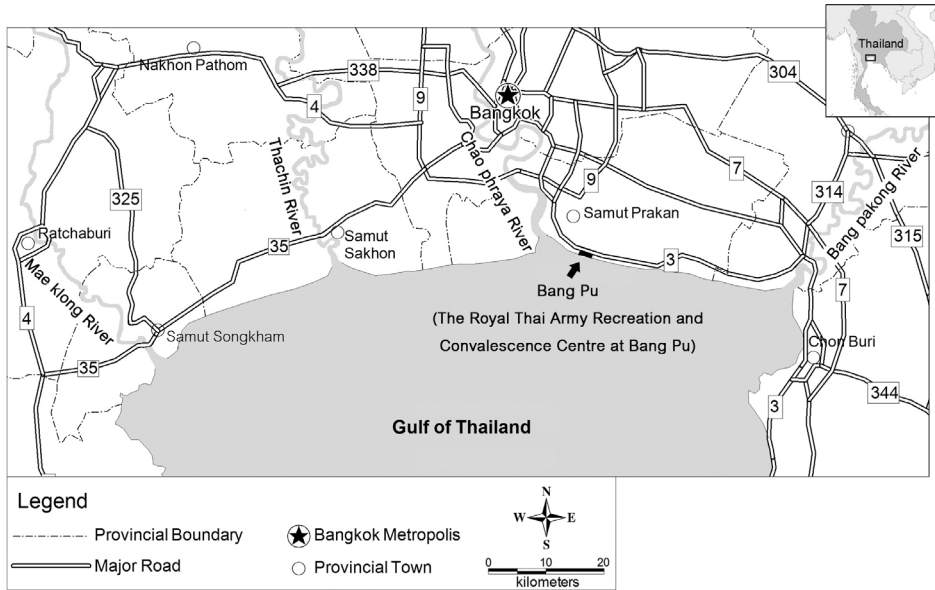


Figure 1. Map of the Inner Gulf of Thailand and surrounding coastal areas showing the location of “Bang Pu (the Recreation and Convalescence Centre at Bang Pu)”.

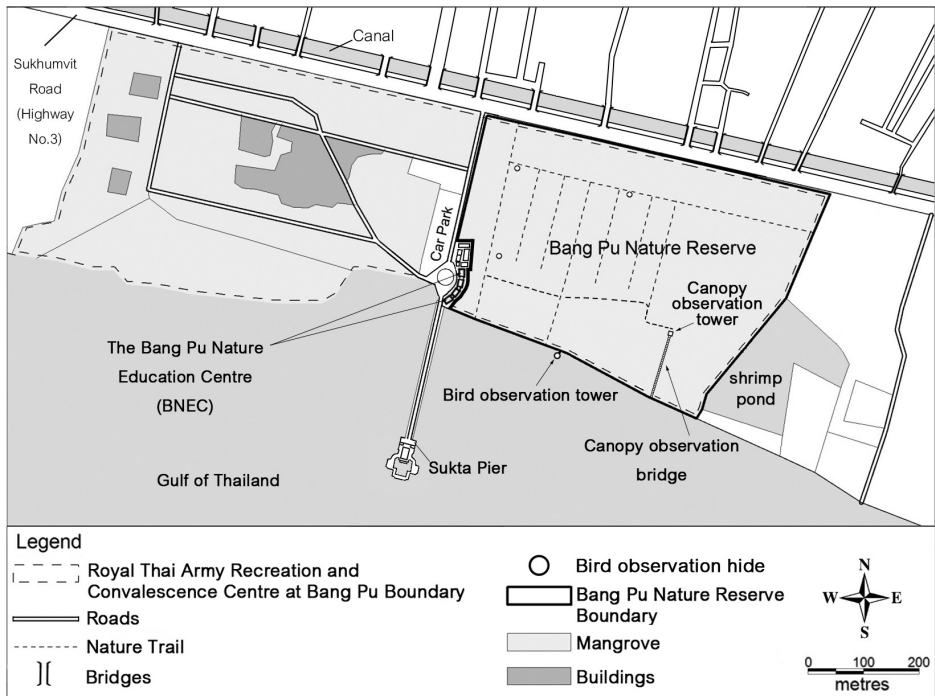


Figure 2. Map of “Bang Pu (the Recreation and Convalescence Centre at Bang Pu)” including the Bang Pu Nature Education Centre, the Bang Pu Nature Reserve and the surrounding environment.



Figure 3. Bang Pu Nature Education Centre.



Figure 4. Some facilities in Bang Pu Nature Reserve: A, canopy observation tower; B, bird observation hide; and, C, visitors watching birds from a bird blind.



Figure 5. Some infrastructures in Bang Pu Nature Reserve and surrounding mangrove environment: A, boardwalk; B, nature trail; C, bird observation tower; D, canopy observation bridge; E, exposed mudflats at low tide in front of the reserve, with Sukta pier behind; and F, Brown-headed Gulls resting on wood pilings on mudflats in front of the reserve.



Figure 6. Educational activities of BNEC conducted in the reserve and surrounding area: A, students observing structure of mangrove leaves during ecological course; B, students studying root systems of trees within the nature reserve from a board walk; C, students learning to identify species of gulls at Sukta Pier; and D, groups of students presenting their observation results in the nature reserve and sharing knowledge with other groups at BNEC.

Despite the massive land-use changes within recent decades, the Inner Gulf area remains of international importance as a staging post and wintering area for shorebirds. Some 150–300,000 migratory waterbirds use the site annually (BCST, 2004); of these, Bang Pu regularly supports concentrations of 10,000–20,000 shorebirds, terns and gulls. The Inner Gulf, comprising the Bang Pu site, has been identified as an Important Bird Area (BCST, 2004).

The Bang Pu Nature Reserve is dominated by mangrove and mudflat habitats (Fig. 2 and 5). So far, fifty-three plant species have been recorded within the site. The mangrove is predominantly *Avicennia marina* and *A. alba*. Enrichment planting has been promoted in recent years, with stands of *Rhizophora apiculata* and *R. mucronata*, as well as *Sonneratia caseolaris*, *Xylocarpus granatum*, *Ceriops* sp. and *Nypa fruticans*. Back mangrove species include *Thespesia populneoides*, and *Lumnitzera racemosa*, while *Sueda maritima* is found in open areas.

Some 200 bird species have been recorded from the reserve to date. The mangroves are utilized by breeding and roosting large waterbirds. A loose breeding colony of Little Cormorants *Phalacrocorax niger*, Cattle Egrets *Bubulcus ibis* and Black-crowned Night-Heron *Nycticorax nycticorax* is present from January to June each year. In response to the much improved security, their numbers have increased substantially. Asian Openbills *Anastomus oscitans* have also colonized the mangrove, with several hundred pairs breeding each year. Up to 30 Painted Storks *Mycteria leucocephala* and a small number of Grey Herons *Ardea cinerea* are regular visitors, while Purple Herons *A. purpurea* and Spot-billed Pelicans *Pelcanus philippensis* are regularly recorded. Among smaller waterbirds, Little Heron *Butorides striatus* and Black-winged Stilt *Himantopus himantopus* also breed in small numbers.

In August, migrant waders arrive from their Siberian or Central Asian breeding grounds, to join over-summering individuals. As many as 1,500 - 2,000 Black-tailed Godwit *Limosa limosa* use Bang Pu as a roosting site throughout the wintering months. Other passage and wintering shorebirds occurring within the reserve and on the inshore mudflats include Greater Sand Plover *Charadrius leschenaulti* and Lesser Sand Plover *C. mongolus*, Little Ringed Plover *C. dubius* and Kentish Plover *C. alexandrinus*, Grey Plover *Pluvialis squatarola* and Pacific Golden Plover *P. fulva*, Marsh Sandpiper *Tringa stagnatalis*, Common Redshank *T. totanus* and Common Greenshank *T. nebularia*, Ruddy Turnstone *Arenaria interpres*, Sandpipers and Stints *Calidris* spp.. Some 36 shorebird species in total have been recorded from the reserve although the numbers and diversity of the smaller shorebirds using the reserve have declined in recent decades, due to lack of appropriate habitat management, a matter of considerable concern.

Each winter, 6,000–8,000 Brown-headed Gulls *Larus brunnicephalus* feed and roost on the mudflats and the water's surface in immediate vicinity to the pier, attracted by the day visitors who feed them with hand-outs (Figs. 5F). Among them, small numbers of Black-headed Gulls *L. ridibundus* and the scarcer Black-tailed Gull *L. crassirostris*, Heuglin's Gull *L. heuglini*, Mongolian Gull *L. mongolus*, Pallas's Gull *L. ichthyæetus* and Slender-billed Gull *L. genei* are often found and attract many birdwatchers. Common Gull *L. canus*, Little Gull *L. minutus* and Black-legged Kittiwake *L. tridactyla* were new records that were first discovered at Bang Pu.

Birds aside, the site supports notable populations of mangrove fauna that sightseers, including water snakes and mudskippers (*Oxudercinae*) (WICKRAMSINGHE ET AL., 2009). *Periophthalmodon schlosseri* is the most abundant mudskipper, being tolerant to pollution impacts. *Boleophthalmus boddarti* prefers the less polluted parts of the reserve. *P. septemradiatus* occurs in association with the *Nypa* palms. The smaller species of mudskippers, *P. chrisospilos* and *P. septemradiatus*, (6 cm in length) are presumably more vulnerable to predation by birds and water snakes than the 25 cm long *B. boddarti* and *P. schlosseri*.

The mangrove and mudflats support a number of water snakes. Fifteen species of crab have been recorded from the site (WICKRAMSINGHE ET AL., 2009). The most abundant species include the grapsid crabs *Ilyogynis* sp., *Episesarma versicolora*, *Metopograpsus* sp. and *Uca annulipes*, an ocypodid. The mudflats also support substantial populations of shellfish, other crustaceans and approximately 70 recorded species of benthic fauna (WWF staff, personal communication).

EDUCATIONAL BENEFITS

Schools located in the catchment of the Bang Pu Nature Education Centre were contacted through Samut Prakan Provincial Educational Office Ministry of Education. Schools were invited to register with the centre and select a visiting date. In this manner, organized parties of 50–60 students each visited the nature education centre for several hour sessions. The school-children from secondary schools (levels 7–9) in Samut Prakan Province were particularly targeted, as age groups most liable to benefit from nature education (Fig. 5A–D).

Following an introductory session, the WWF nature educators divided the participants into four groups, with 12–13 students in each group, for undertaking educational walks around the reserve. Nature education curricula were preplanned according to the age, interest and duration of stay (3 hours, 6 hours or overnight stay) of each visiting party. Curricula related to the local curricula of the schools and the activities in each module were undertaken involving an environmental education process (including nature interpretation and nature games).

Educational courses (“Nature Education at Bang Pu Curricula”) relate to curricula of local schools for four different age classes: primary schools (levels 1–3 and levels 4–6); and secondary schools/and high schools (Levels 7–12). There is also a general curriculum for visiting members of the public.

A total of 20,599 students from 74 schools in Samut Prakan province attended WWF Thailand-run education programmes from May 2005 until February 2009 while a further 2,143 students from 32 other schools largely from the Bangkok area attended courses at the Centre. Some 63 groups, of 8,062 participants have visited the reserve to-date. Thus, some 30,804 individuals, from 169 groups, have passed through the Bang Pu Nature Education Centre’s doors since it opened.

DISCUSSION

Environmental Partnerships for Strengthened Conservation Outcomes

The Bang Pu Nature Education Centre represents a partnership between different stakeholders, with very different mandates. The Royal Thai Army was encouraged to utilise its development mandate, in construction and maintenance of wildlife observation hides, boardwalks and paths, and its powerful profile and connections to heighten public and media interest in the site. WWF–Thailand uses its strengths in environmental awareness promotion to provide quality nature education for schoolchildren. The organization also utilises its global WWF conservation network to link to other nature centres and wetland centres in the region, and keep pace with cutting-edge education agendas. Finally, the corporate sector finances the education programme, as part of their respective Social Corporate Responsibility (CSR) programmes. All three partners benefit from the overall package of a functioning nature education centre.

The centre has benefited WWF Thailand through providing this relatively new member of the WWF family (established in 1996) with an important marketing and communication showpiece for engaging key partners in Bangkok. This is important in a country (i) where international donor assistance is scant, due to its perceived relatively high level of development; (ii) whose capital, Bangkok, is a wealthy business centre; and (iii) where the government and

government agencies are reasonably funded and professionally competent, but who are not pursuing agendas that are relevant to urban nature conservation.

Secondary benefits include the provision of nature recreation opportunities to schoolchildren and the protection of a residual area of degraded coastal mangrove and associated inshore mudflats.

Improving Management of the Nature Reserve

The size of the nature reserve is small. Plant diversity is relatively low because of the highly disturbed nature of the remaining habitats and the highly saline water within the site. Moreover, the salinity regime favours the growth of extensive stands of *Avicennia*, which have gradually choked the four abandoned shrimp farms and prevent shorebirds roosting on the open waterbodies. The *Avicennia* stands require active control, with clear felling of trees that encroach into the shrimp-ponds designated for supporting roosting shorebirds. Furthermore, options for pumping freshwater from the adjacent canal into the southernmost shrimp-pond should be investigated, to facilitate the creation of freshwater habitat, where after species such as *Phragmites*, bulrushes and other flora could be introduced and encouraged to flourish.

Activities should be expanded beyond the nature reserve boundaries. This includes a proactive outreach programme along the Sukta pier, engaging with members of the visiting general public, particularly at weekends. Other activities (cycling, beach cleans, shorebird counting etc) could also be promoted in the industrial belt.

Bang Pu—A flagship for Conservation in the Inner Gulf

The high profile site at Bang Pu offers a unique opportunity to raise the profile of the outstanding conservation value of the Inner Gulf of Thailand, functioning as an outreach facility to the public to gain recognition of the Inner Gulf and its unique biodiversity. Annual national seminars could be organized on marine and coastal ecosystems, strengthening partnerships with concerned government agencies and the corporate sector located within the industrial estates of Samut Prakan.

Since Samut Prakan has been designated as an industrial zone the proliferation of factories in the coastal belt provides opportunities for further fund-raising through corporate engagement. It also provides an entry point for engagement with the industrial sector on pollution mitigation, a subject with usually negative financial implications in the context of weak and poorly applied environmental legislation.

The long term collaboration between the RTA and WWF–Thailand is dependent upon a shared vision on management, and an agreed division of responsibilities. The existing Bang Pu Nature Reserve Management Board provides an important forum for management dialogue and supervision. The two partners should review the membership and functioning of this Board, and bring in partners that strengthen the nature educational functioning of the site.

Promoting Urban ASEAN Heritage Sites

Among the ASEAN Heritage Parks, the 87 ha Sungei Buloh Wetland Reserve, Singapore, designated as a nature park in 1989, is unique. On 1 January 2002, 131 ha of Sungei Buloh was officially gazetted as a nature reserve and renamed as Sungei Buloh Wetland Reserve

to better reflect its status. In 2003, it was recognized as a site of international importance for migratory birds with Wetlands International presenting the reserve a certificate to mark its formal entry into the East Asian Australasian Shorebird Site Network, which include Australia's Kakadu National Park, China's Mai Po and Japan's Yatsu Tidal Flats. Sungei Buloh became Singapore's first ASEAN Heritage Park in 2003.

Nomination of the Bang Pu Nature Education Centre as an ASEAN Heritage Park should be considered, to provide momentum to the concept of urban nature education centres as an important network of conservation areas among ASEAN countries. The designation would have political, educational and environmental aspects. Firstly, the ASEAN Heritage Park declaration (2003) is poorly understood by the populace within ASEAN, and is poorly promoted at most of the designated national parks and wildlife sanctuaries. The designation of ASEAN Heritage Parks in an urban setting may raise the profile of ASEAN Heritage site values.

Networking with Wetlands Link International

In 1990, the Wildfowl & Wetlands Trust (WWT), a UK-based environmental charity dedicated to the conservation of wetlands and their biodiversity, created the Wetland Link International (WLI) programme. This programme was established to facilitate the exchange of information and expertise amongst those designing, developing and operating wetland education centres worldwide; to advocate for, and assist in, the development of new wetland education centres and associated programmes worldwide; to improve the operation of such centres through information/expertise exchange and training; to lobby for the greater inclusion of communications, education and public awareness (CEPA) programmes within wetlands and related conservation initiatives and instruments, and to develop frameworks for subsequent implementation at national, regional and global levels. The Bang Pu Nature Education Centre, which is a member of WLI, should strengthen its programme as an active Wetlands Link International registered site, to promote networking with other wetland education centres worldwide.

ACKNOWLEDGEMENTS

The authors wish to thank representatives from the Royal Thai Army in this pioneering initiative. Particular thanks are extended to General Krisdha Areerajakul, Director-General of Civil Affairs Department and Colonel Supol Chanpong for their strong collaboration in the establishment of the Bang Pu Nature Education Centre. Further thanks are extended to Colonel Kittichai Wongharn, former Director of the Recreation Centre, Colonel Chanin Bhopulsak, Director of the Bang Pu Recreation Centre, Colonel Narongrit Chantrakul, Sergeant Nivej Chooparn as well as their support staff for their strong collaboration in the development of the Bang Pu Nature Education Centre. We also thank ThaiLife Insurance Company Ltd, and Toyota Motor Thailand Company for their corporate support. Thanks are extended to Dr. Ariya Aruninta, Dr. Warren Brockelman, Dr. Robert Mather, Philip Round, Dr. Oleg Shipin and Dr. Robert Steinmetz for reviewing the draft text.

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