

Abstract No: A-226

## MANGROVE PEAT OF BOTUM SAKOR IN CAMBODIA

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### SUMMARY

Peatland areas in Cambodia is relatively unknown until recently, therefore, it came as pleasant surprise that the first ever peatlands discovered in Cambodia would be located within a mangrove ecosystem. Mangrove peat was first discovered in 2012 and later confirmed in 2014 in the Koh Kong Province of Cambodia. Survey carried out in 2014 saw 4,976 hectares of mangrove peat being confirmed in Peam Krasop Wildlife Sanctuary. In 2015, another survey conducted in the same Province, but different location - at Botum Sakor National Park resulted in additional 4,768 hectares of mangrove peat are being confirmed. This survey focused on coastal area as well as riverine mangrove, moved further along the rivers.

Overall, peat located within this mangrove area is not very deep, with only one location recorded at 135cm. About half of the measurements were in the range of 50cm – 100cm. About 22 mangrove species are recorded during the survey. It should be noted that *Melalueca leucodendron* was also found here. The species is often located immediately behind the mangrove species, sometime, seen together with *Brugueira sexangula*. However, usually forming a pure stands of its' own.

**Keywords:** Peatlands, Mangrove peat, peat depth

### INTRODUCTION

Mangrove can be found in on tops of different substrates i.e. clay, sand or peat. Although peat can form in various geological setting all over the world, mangrove peat can only form in salt and brackish mangroves along tropical and subtropical coastlines and islands (Cameron and Palmer, 1995).

Peat forming mangrove are widely reported (Joosten, 2010). In fact mangrove peat is common in other part of the world; it has been extensively studied in Belize (Cameron and Palmer, 1995, Mckee & Faulkner, 2000, Macintyre *et al*, 2004, Middleton & McKee, 2010), Puerto Rico (Medina *et al.*, 2010), Honduras & Panama (McKee *et al.*, 2007) and Florida (Giesen *et al.*, 2006).

However, mangrove peat in not common in Southeast Asia; only two areas has been reported to have mangrove peat- one in Lariang-Lumu area in South Sulawesi (where Rhizophora- Brugueira thrived on 3m deep peat, and another one in Thousand Islands group, off Jakarta Bay (Giesen *et al.*, 2006, Rusila Noor *et al.*, 2006). That is why the recent discovery of mangrove peat in coastal area of Cambodia had generated much excitement within the peatlands circle as peatlands in Cambodia is relatively unknown prior to the discovery of mangrove peat in Peam Krasop Wildlife Sanctuary in Koh Kong Province.

### METHODOLOGY

The survey was carried out using the combining of remote sensing in the beginning to identified potential peatlands and later was confirmed by ground- thruthing. Where able possible, a few peat depth measurements were taken moving from the bank towards further inland in order to see where the deepest peat is located and where the peat end. The farthest from river bank is about 180m. Vegetation of the survey locations was also recorded.

### STUDY SITE

Botum Sakor National Park, with 183,408 hectares is located at the southwest border of Cambodia and covering three districts of Koh Kong, Kiri Sakor and Botum Sakor in the Koh Kong Province. The majority of Botum Sakor's area comprises gently sloping lowland and flood plains. This area consists of lowland evergreen forest, Melaleuca woodland, grassland, mangrove forest and swamp forest with patches of *Oncosperma* palm. The

climate is characterised by tropical monsoons and the area has two high tides per day, with a range of approximately 1.5 m. (Frontier Cambodia, 2010).



Map 2: Survey location in Koh Kong province

## RESULT AND DISCUSSION

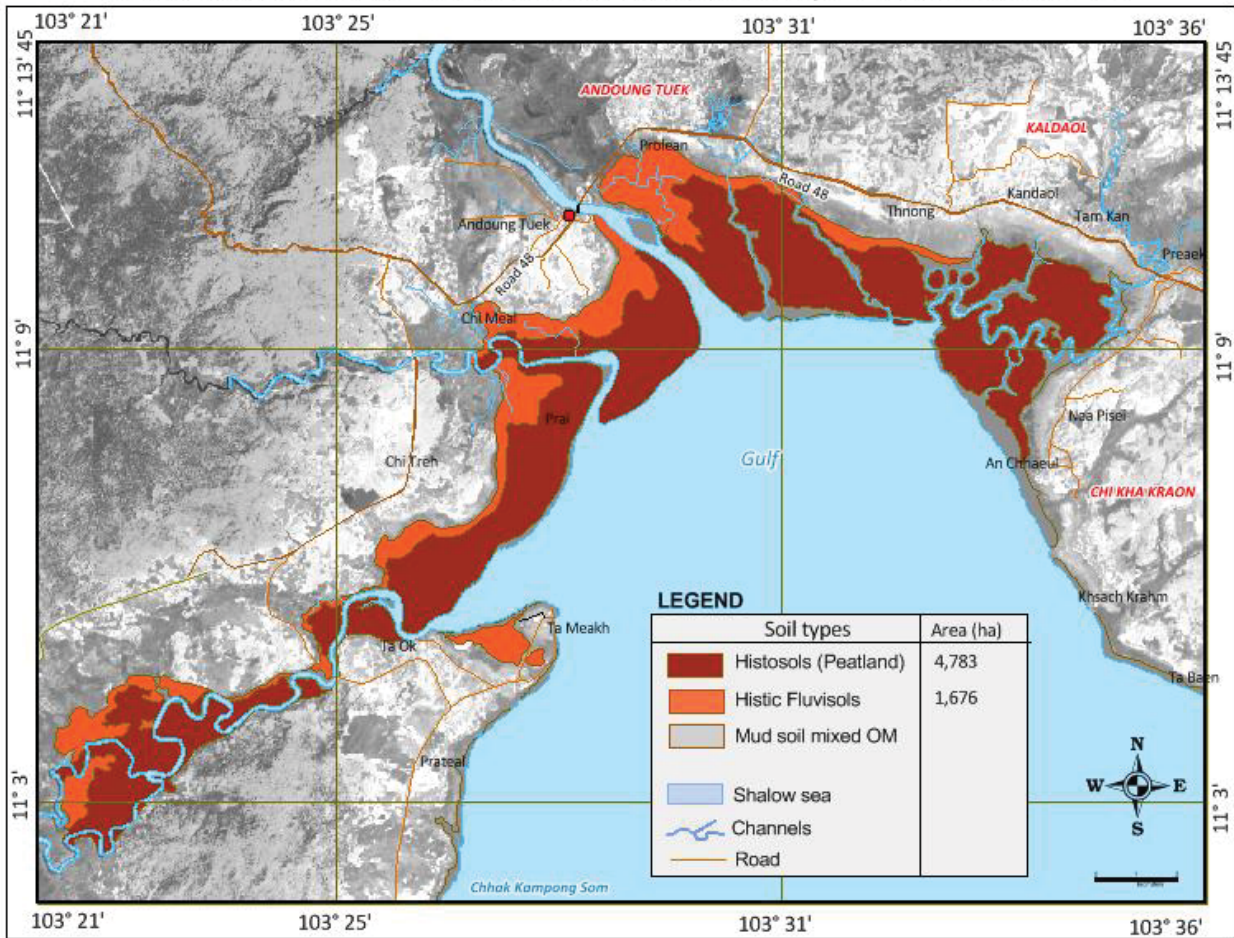
Based on the field survey and combining with remote sensing, it is estimated that 4,768 hectares of mangrove peat are being confirmed in Botum Sakor National Park. The confirmed location is mostly located in the western part – coastal and riverine mangrove area (see Map 2).

### PEAT DEPTH

Along 4 of the riverine mangrove, a total of 23 locations were surveyed with 49 peat depth measurements were carried out. Of the 49 measurements for peat depth, all areas recorded peat layer except 1 site, even though the peat depth recorded is not uniform and varied from location to locations. The range of peat layer recorded is from 20cm to 135cm, where low figure mostly found at the edge.

The peat depth recorded in Botum Sakor is comparable to peat depth (0.2-1.65m) recorded in Pelican Cays, Belize (McKee at Faulkner, 2000) and peat depth recorded (0.44- 2m) at Peam Krasop Wildlife Sanctuary (Lo *et al.*, 2016). This is however considered shallow if compared with 9m thick peat deposits at Twin Cays (Macintyre *et al.*, 2004).

**Peatland distribution in Botum Sakor, Koah Kong Province, Cambodia**



Map 3: Peatlands (mangrove peat) in Botum Sakor

**VEGETATION TYPES**

Generally, survey in Botum Sakor mangrove area shows both similar and different result compare to survey result from Peam Krasop Wildlife Sanctuary. For example, both site showed that vegetation near the edge is different from vegetation further inland. However, the outer layer in PKWS is almost entirely dominated by single species which is *Rhizophora apiculata*, whereas in Botum Sakor mangrove area, *Rhizophora apiculata* dominate in river bank with sedimentation/mudflats, while mixture species such as *Xylocarpus granatum*, *Bruguiera gymnorrhiza*, *Heritiera littoralis*, *Nypa fruticans* and *Pheonix paludosa*, dominate in river banks which faces erosion. Most common species are *Rhizophora apiculata*, *Bruguiera gymnorrhiza*, *Xylocarpus granatum* and *Bruguiera sexangula*.

In general, most of the vegetation encountered during this fieldtrip can be categorized as *Rhizophora* zone and *Lumnitzera-Xylocarpus-Brugueira* zone. However, other species zonation also noted; for example area where only *Rhizophora- Lumnitzera*, *Bruguiera-Melaleuca*, *Lumnitzera* only and also one single location where *Bruguiera* is mixing with normal lowland species i.e. *Syzygium sp.* Incidentally, this site registered the deepest peat measurement . In addition to that, other type of vegetation also been observed; *Melaleuca- Bruguiera* zone and *Melaleuca* stands. It should be noted that peat depth in *Melaleuca* stands is not very deep.

Species zonation is Botum Sakor mangrove area is not as cleared cut as shown in PKWS (Lo *et al.*, 2016), only 2 areas shown similar stunted species such as *Rhizophora apiculata* further inland. In a study on mangrove peat in Puerto Rico (Medina *et al.*, 2010), dwarf version of *Rhizophora mangle* was observed further inland, and the study concluded that the combination of phosphorus limitation and seasonal water stress most likely caused the stunted growth of *Rhizophora mangle*. The stunted *Rhizophora apiculata* may be due to the sharp rise in the land where it was mainly above flood water (FAO, 2007).

In term of flora biodiversity, flora in Botum Sakor mangrove area more diverse (24 species) compared to mangrove species in PKWS (15 species). The forest floors in Botum Sakor also over-grown with undergrowth such as ferns and *Acanthus sp.*, which make accessibility a problem. It should be noted that in PKWS, the areas survey is along the coastal with many waterways/ creeks, whereas in Botum Sakor, most of the area surveyed is along river estuary. This may explain the differences between these 2 areas.

## CONCLUSION

The occurrence mangrove peat in the coastal/ riverine mangrove of Cambodia indicate that it is more similar to the mangrove located in the Pacific islands i.e. Belize, Puerto Rico as compared to mangroves areas found along the coast of mainland or peninsular in Southeast Asia. It is believe that there could be more mangrove peat in other coastal area of Cambodia, and further assessment should be made to inventory these areas. It is hope that with the finding of mangrove peat in Cambodia, it importance and role in carbon sequestration should be highlighted in the future Cambodia national strategy and action plan.

## ACKNOWLEDGEMENT

Field surveys were financed by the Sustainable Management of Peatland Forests in Southeast Asia (SEApeat) project, funded by the European Union and implemented through Global Environment Centre. We thank the Cambodian Ministry of Environment for their full commitment to this effort especially the representatives Mr. Sun Visal, Mr. Hong Lork, Mr. Pech Moran, Mr. Sotha Tann and Mrs. Phon Nalin with the assistance of local officer: Mr. Eoung Vunny (Deputy director of Butom Sakor National Park), Mr. Eoung Vunny & Mr. Yourn Tra (Ranger of Butom Sakor National Park), Mr. Chun Sopheak (Ta Ouk Village chief), Mr. Chun Sopheak (Ta Ouk Community leader), Mr. Prav Peuk (Commune council), Mr. Sriv Senghy (Andoung Teuk Community leader) and Mr. Phong Sam-Ong (Andoung Teuk village chief). 2 students from Pahnasastra University of Cambodia- Eang Phallis and Taing PorChhay also joined the assessment.

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