

1 INTRODUCTION

Shown in Fig. 1, Songkhla Lake Basin (SLB) lies in 3 provinces, i.e., all 11 districts of Phattalung Province, 12 (out of 16) districts of Songkhla Province and 2 (out of 23) districts of Nakhon Si Thammarat Province. The Basin covers approximately 8,729 sq.km. consisting of approx. 7,687 sq.km. of land area and approx. 1,042 sq.km. of the Lake area; the Basin spans approx. 150 km. from north to south, and approx. 65 km. from east to west. SLB is the only basin in Thailand where fresh water from precipitation, via streams and overland flow, draining into the Lake, is mixed with saline water from the sea, making Songkhla Lake a large lagoon system.

The Basin is bounded by two mountain ranges. To the west is Banthad mountain range which lies in north-south direction, and to the south is part of Sangala Kiri mountain range. The higher grounds of the two mountain ranges are covered with rainforests, constituting an upstream portion of the catchment area. Further down from the Banthad mountain range, from north to south of the Basin parallel to the mountain range, are undulating plains alternating with low hills. The area towards the east approaching the Lake is a large flat plain, most of which are paddy rice farms. North of Songkhla Lake is a large wetlands called “Phru Kuan Kreng” which covers approx. 137 sq.km. (incl. Thale Noi). The east of Songkhla Lake, which lies between the Lake and the sea, is a large flat plain.

Not only is Songkhla Lake the only natural lake (lagoon) in Thailand, it has a very unique characteristics. It is the *3-water ecosystem*. The mixing of fresh water runoff and overland flow, and saline water from the sea, causes salinity of Songkhla Lake water to vary spatially and temporally. Three distinct parts in Songkhla Lake are distinguished: fresh water, brackish water and saline water. Understandably, the rainy season sees larger extent of the fresh water while in the dry season more saline water intrudes further north into the Lake.

Physically, Songkhla Lake consists of 4 parts: Thale Noi in the northernmost of the Songkhla Lake system; Upper Songkhla Lake; Middle Songkhla Lake and Lower Songkhla Lake. The latter is connected to the Gulf of Thailand at Muang District, Songkhla Province. The characteristics of each part of Songkhla Lake are as follows:

- (1) **Thale Noi:** Covering approx. 27 sq.km., Thale Noi lies at the northernmost part of Songkhla Lake, in Phattalung Province. It is approx. 1.2 m. deep. It connects with the Upper Songkhla Lake by 3 waterways: Klong¹ Yuan, Klong Ban Klang and Klong Nang Riam. Thale Noi is fresh all year round.

¹ **Klong** is a Thai word for a stream or a waterway as well as a canal.

- (2) **Upper Songkhla Lake (Thale Luang):** Covering approx. 473 sq.km., Upper Songkhla Lake extends from the southern part of Thale Noi to Tambon Ko Yai, Krasaesin District, Songkhla Province; and Ban Laem Jong Thanon, Pak Payoon District, Phattalung Province. It is approx. 2 m. deep. Three main streams drain into Upper Songkhla Lake: Klong Tha Nae, Klong Nathom and Klong Tha Madue. It is fresh during most time of the year. In very dry years, saline water intrusion during dry season may cause salinity to rise as high as 10 psu².
- (3) **Middle Songkhla Lake (Thale Sab):** Covering approx. 360 sq.km., Middle Songkhla Lake extends from Tambon Ko Yai, Krasaesin District, Songkhla Province, to Tambon Pak Ro, Singha Nakhon District, Songkhla Province, It is approx. 2 m. deep. The Middle Songkhla Lake houses several islands, such as Ko Si-Ko Ha, Ko Mhak and Ko Nang Kam. Receiving water from 3 streams: Klong Phru Poh, Klong Pansai and Klong Pa Bon, the Middle Songkhla Lake connects with Lower Songkhla Lake by two large channels: Klong Luang and Ao Tong Baen. Salinity of water in the Middle Songkhla Lake varies seasonally in the 0-20 psu range.
- (4) **Lower Songkhla Lake (Thale Sab Songkhla):** Covering approx. 182 sq.km., Lower Songkhla Lake extends from Tambon Pak Ro, Singha Nakhon District, Songkhla Province, to the mouth of Songkhla Lake which connects to the Gulf of Thailand. Most parts of the Lower Songkhla Lake is approx. 1.5 m. deep, except the area around the mouth of the Lake which is about 12-14 m. deep. Salinity of water in the Lower Songkhla Lake varies seasonally in the 23-30 psu range.

The land area of the Basin (excluding 102 sq.km. on islets) is divided, by the Royal Irrigation Department, into 12 sub-basins (Shown in parentheses are sub-basin areas) (Fig. 2). They are:

- | | |
|------------------------------|----------------|
| 1) Klong Pa Payom Sub-basin | (808 sq.km.) |
| 2) Klong Thanae Sub-basin | (353 sq.km.) |
| 3) Klong Nathom Sub-basin | (757 sq.km.) |
| 4) Klong Tachiad Sub-basin | (769 sq.km.) |
| 5) Klong Pa Bon Sub-basin | (329 sq.km.) |
| 6) Klong Phru Poh Sub-basin | (507 sq.km.) |
| 7) Klong Rattaphum Sub-basin | (625 sq.km.) |
| 8) Klong U-Tapao Sub-basin | (2,357 sq.km.) |
| 9) East Coast Sub-basin 1 | (536 sq.km.) |
| 10) East Coast Sub-basin 2 | (202 sq.km.) |
| 11) East Coast Sub-basin 3 | (137 sq.km.) |
| 12) East Coast Sub-basin 4 | (205 sq.km.) |

² psu = Practical salinity unit = 1 g/l

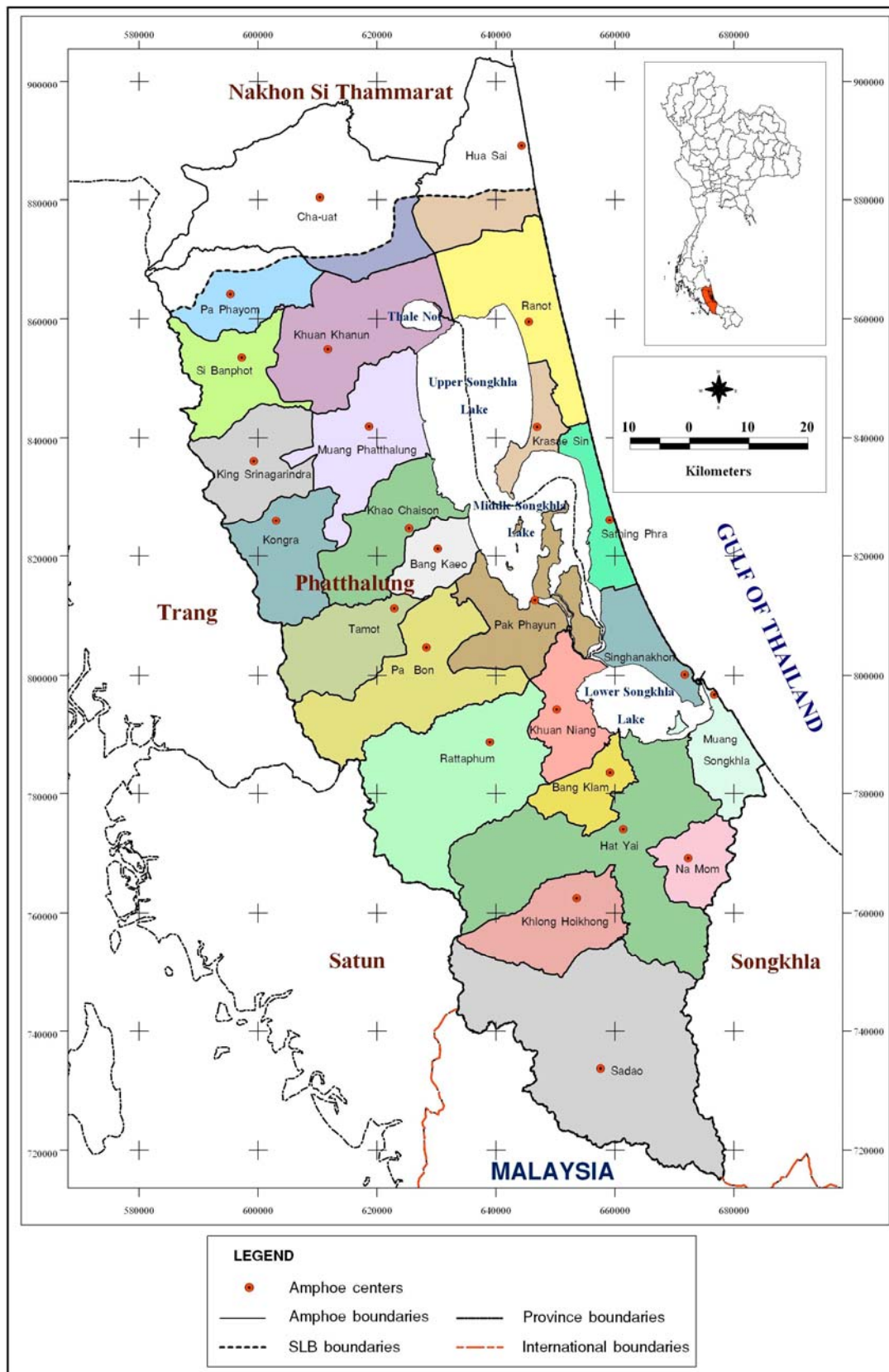


Figure 1 Songkhla Lake Basin

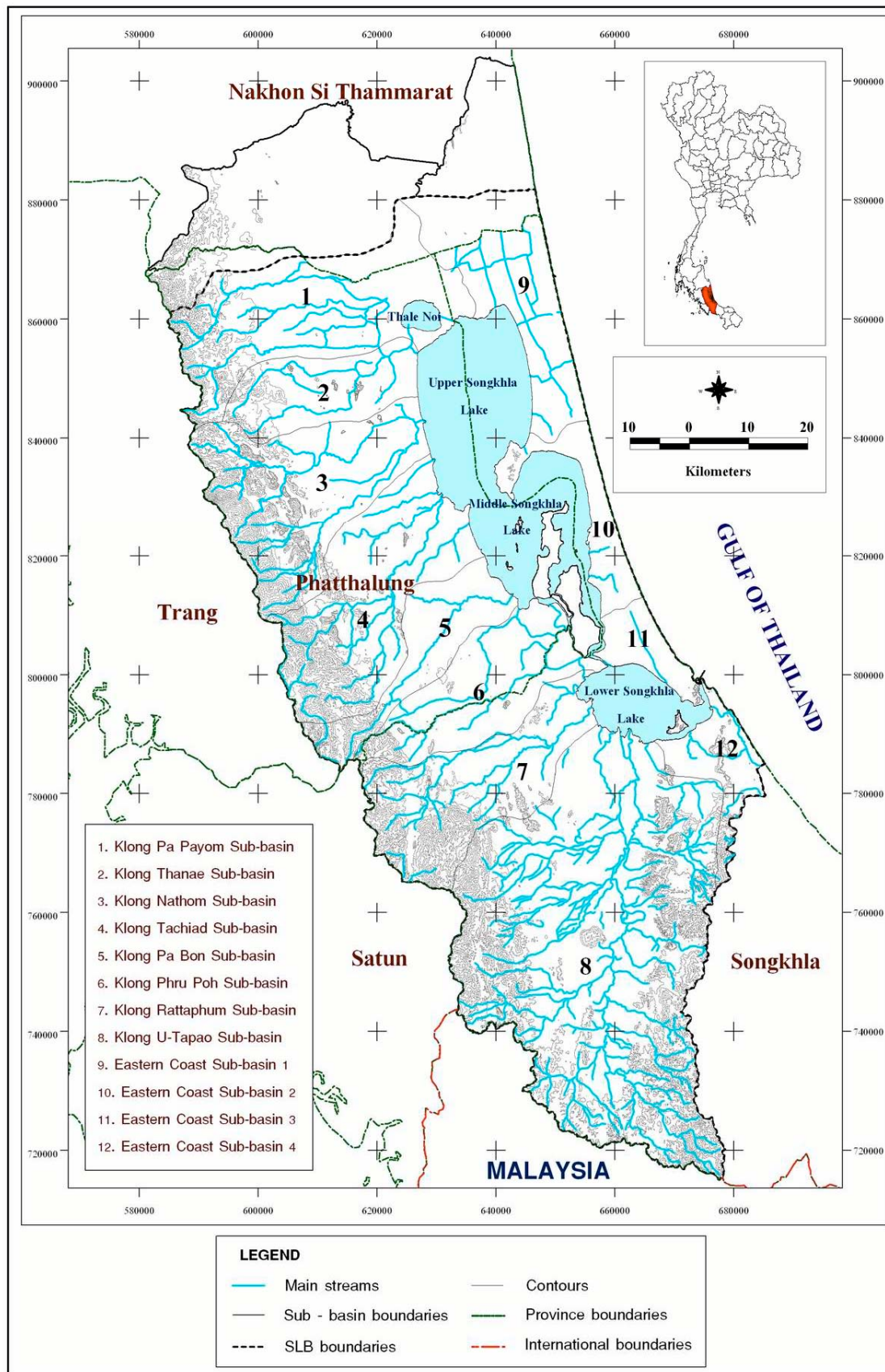


Figure 2 Sub-basins in Songkhla Lake Basin system

The complex ecosystem has made Songkhla Lake rich in biodiversity, encompassing a multitude of flora and fauna species. They form a life supporting system which have long accommodated living, as well as other economic activities for SLB inhabitants which currently (A.D. 2004) stands around 1.6 millions. Major economic activities at present include rubber plantation, paddy rice farming, fruit tree orchards, fishery, aquaculture and husbandry. SLB is also a source, a storage and a sink, of vast amount of fresh water supply which, if properly managed, can be used for agriculture, industrial and domestic purposes. Finally, SLB is a land with long records of arts and culture, rich historic and archeological remains, not to mention natural beauty; making SLB potentially viable for development as highly attractive tourism resources.

However, the past decades have evidenced overexploitation of the rich natural resources and environment in various economic activities, without reasonable effort to properly conserve and rehabilitate them. Valuable natural resource and environment have deteriorated at the rate never seen before in history, causing depletion of biodiversity, devastation of life supporting system, as witnessed by siltation of the Lake and streams, deterioration of water quality, depletion of fishery resource, shortage of fresh water in dry seasons, social conflicts in water and other resource uses. All these degenerate quality of life, reflecting that our development path was, has been and is unsustainable.

Given the above situation, the Government thus sees the necessity for maneuvering and guiding the SLB development to stay within sustainability framework, forming an efficient and effective life supporting system, and consequently lead to better quality of life for SLB inhabitants in a sustainable manner. The Government therefore assigned the Ministry of Natural Resources and Environment to develop a Master Plan for sustainable development of SLB. The terms of reference (TOR) of the study consisted of 3 major elements: firstly, it required the development of the master plan give emphasis on conserving and rehabilitating the SLB natural resource and environment, so that they are restored to the former state as far as practicable; secondly, it required that the development of the Master Plan sufficiently incorporate a public participation process, from the very outset of the study, during the study process, up to the conclusion stage of the study; thirdly, it required that the study be based on the most up-to-date scientific data and information from universities and other research bodies, as well as community-based socio-economic information.

The remaining portion of this *Executive Summary* is divided into 2 parts. Chapter 2 briefly discusses SLB environmental settings and issues. Chapter 3 proposes strategies, measures and priority project ideas for solving problems and rehabilitating the Basin, under this Master Plan.

The SLB environmental settings and issues discussed in Chapter 2 cover social and ecological settings of the Basin, especially the forest, wetlands (peat swamp and mangrove forests), aquatic animals and waterfowls, as well as situation on arts and culture and tourism. Finally, the report discussed the mechanism for administering and managing SLB, including the possible institutional reform. It is anticipated that, under the reformed institution, SLB problems and issues will be efficiently and effectively corrected, and that rehabilitation and restoration will be carried out within 10 years (AD 2005 – 2014) of this Master Plan.

Chapter 3 proposes the Master Plan for sustainable development of SLB, consisting of 5 strategies 26 measures, and 57 priority projects. The five strategies are:

- 1) Restoration of natural resources and biodiversity (5 measures)
- 2) Sustainable utilization of Basin resources (6 measures)
- 3) Pollution prevention and control (6 measures)
- 4) Conservation, rehabilitation and restoration of arts and culture, historic and archeological remains, local wisdom and tourism sites (4 measures)
- 5) Enhancement of SLB administration and management (5 measures)

The priority project ideas presented in Chapter 3 are meant only to serve as examples. These projects have been analyzed, formulated and scrutinized, in response to public demand. It is anticipated that these priority project ideas will serve as a starting point for implementing the Master Plan. It should be noted that these are by no means exhaustive. There can be a great number of additional projects, which comply with the framework defined by the vision, strategies and measures mentioned above. Besides, the proposed budgets should also be regarded as first approximation. The responsible organizations should make proper adjustment to suit the actual situation and expected outputs/outcomes, as more information becomes available.