# CHAPTER III

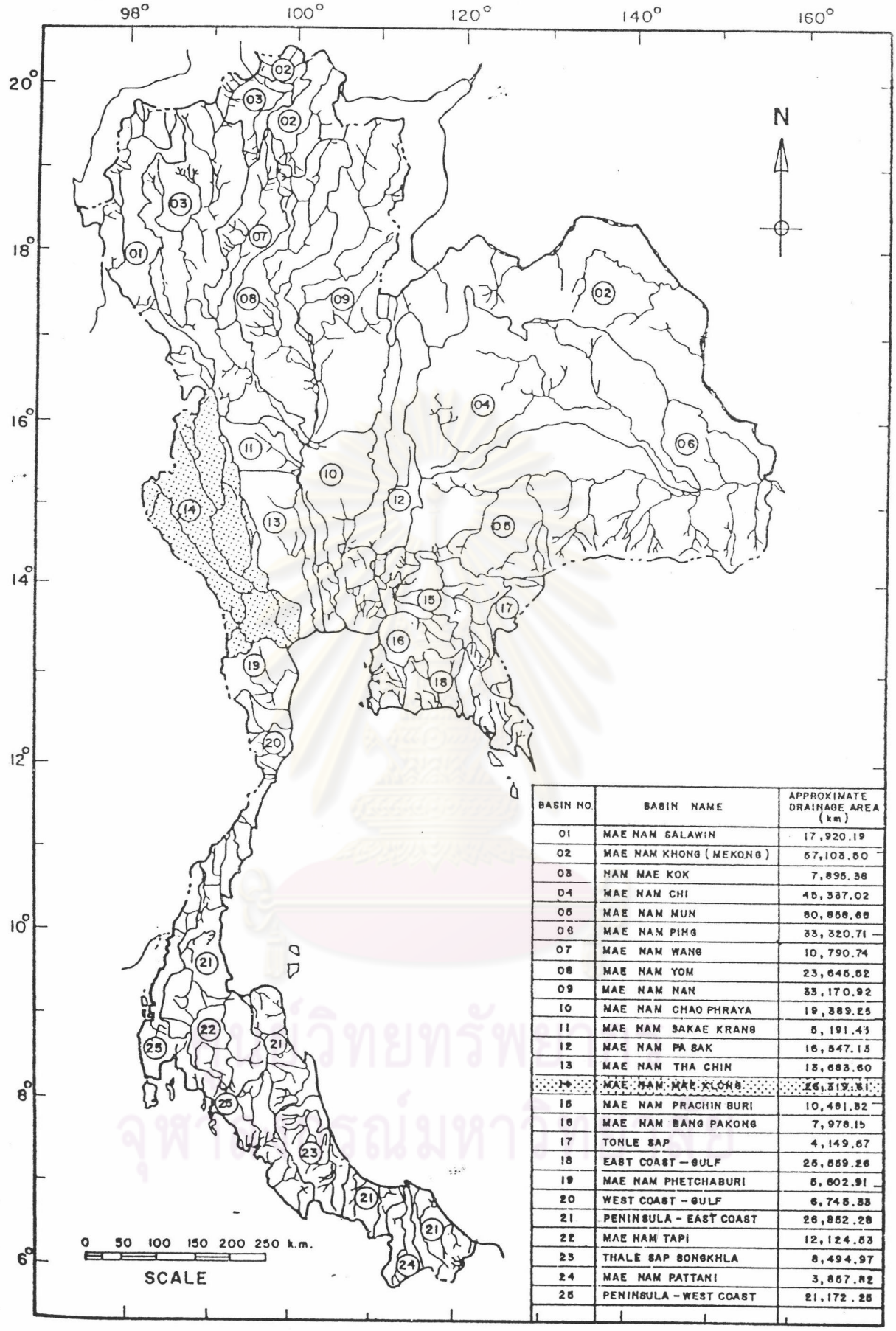
# MAE KLONG WATERSHED

## AREA OF STUDY

### Location

Mae Klong watershed area covers approximately 30,800 square kilometers in the western part of Thailand, including Kanchanaburi, Ratchaburi, Samutsongkhram, and some parts of Phetchaburi, Samutsakhon, Nakornprathom, and Suphanburi provinces. The northern part has a border with Tak province, the western with the Union of Myanmar, the eastern with parts of Uthaithani, Nakornpathum and Suphanburi province, and the southern with some parts of Phetchaburi province. Mae Klong watershed can be divided into 2 parts as upper and lower Mae Klong watershed (EGAT, 1992). The main rivers in this area are Mae Klong river, Kwai Yai river, and Kwai Noi river.

The area under study covers the lower Mae Klong watershed consisting of Kanchanaburi, Ratchaburi, and Samutsongkhram provinces. It is approximately 26,000 square kilometers from under Khao Laem and Srinakarin Dams to Mae Klong river delta. Figure 3.1 shows boundaries and areal distribution of the total 25 main watersheds in Thailand including Mae Klong watershed area. Figure 3.2 shows district/province boundaries in Mae Klong watershed area.




| BASIN NO. | BASIN NAME | APPROXIMATE DRAINAGE AREA (km) |
|---|---|---|
| 01 | MAE NAM SALAWIN | 17,920.19 |
| 02 | MAE NAM KHONG (MEKONG) | 67,103.50 |
| 03 | NAM MAE KOK | 7,895.36 |
| 04 | MAE NAM CHI | 45,337.02 |
| 05 | MAE NAM MUN | 80,858.68 |
| 06 | MAE NAM PING | 33,320.71 |
| 07 | MAE NAM WANG | 10,790.74 |
| 08 | MAE NAM YOM | 23,646.52 |
| 09 | MAE NAM NAN | 33,170.92 |
| 10 | MAE NAM CHAO PHRAYA | 19,389.25 |
| 11 | MAE NAM SAKAE KRANG | 5,191.43 |
| 12 | MAE NAM PA SAK | 16,547.15 |
| 13 | MAE NAM THA CHIN | 15,683.60 |
| 14 | MAE NAM MAE KLONG | 26,319.81 |
| 15 | MAE NAM PRACHIN BURI | 10,481.82 |
| 16 | MAE NAM BANG PAKONG | 7,976.15 |
| 17 | TONLE SAP | 4,149.67 |
| 18 | EAST COAST – GULF | 25,559.26 |
| 19 | MAE NAM PHETCHABURI | 5,602.91 |
| 20 | WEST COAST – GULF | 6,745.35 |
| 21 | PENINSULA – EAST COAST | 26,852.28 |
| 22 | MAE NAM TAPI | 12,124.53 |
| 23 | THALE SAP SONGKHLA | 8,494.97 |
| 24 | MAE NAM PATTANI | 3,857.82 |
| 25 | PENINSULA – WEST COAST | 21,172.25 |

Figure 3.1 Boundaries and area distribution of 25 main watershed of Thailand

Source : NESDB (1994)

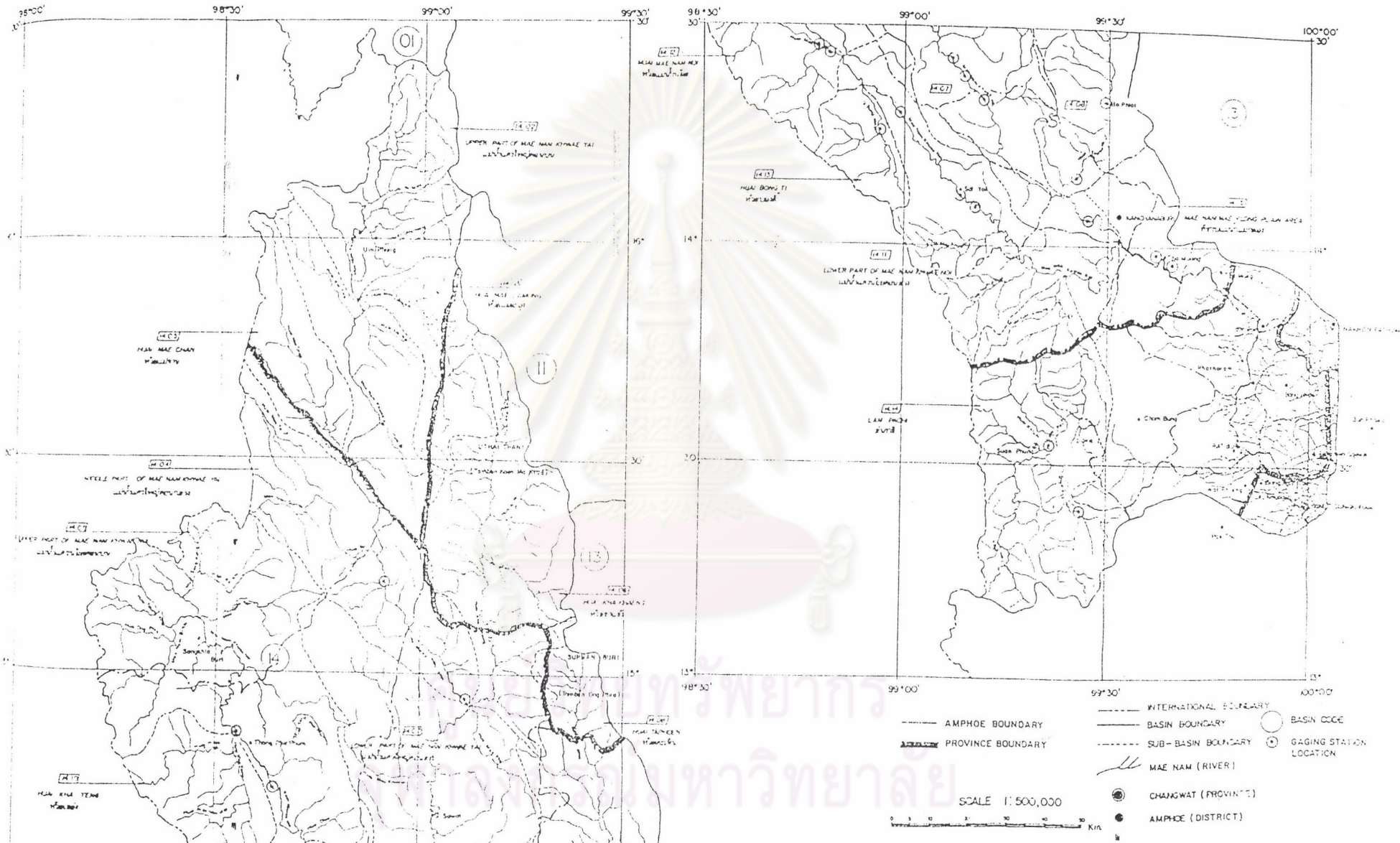



Figure 3.2 District and province boundaries in Mae Klong watershed area
Source : NESDB (1994)

**Accessibility**

The northernmost part of the study area is approximately 200 kilometres away from Bangkok. It can be accessed by using the highway No. 323 from Bangkok to Khao Laem Dam. Srinakarin Dam can be accessed by using the road No. 3199 which turn off the highway No. 323 at Kanchanaburi province. Ratchaburi, and Samutsongkhram provinces can be accessed by using the highway No. 4 or No. 35. Figure 3.3 shows accessibility to Mae Klong watershed area.

**River and Topographical Features**

Data from the Office of National Economic and Social Development Board (NESDB) in 1994 reveal that the Mae Klong river starts right at the spot where the Kwai Yai and the Kwai Noi rivers converge at Pakphrak, Kanchanaburi province. The two rivers which are also the major tributaries of the Mae Klong river, originate from the mountain range, forming the demarcation between Thailand and Myanmar. They meander through the hilly terrain covered with tropical evergreen, deciduous dipterocarp and mixed deciduous forests. The rivers have very steep slopes interspersed with rapids almost throughout their lengths.

The Kwai Yai river has its source at the Thanon Thong Chai mountain range in Umphang district, Tak province. It flows down south. The Kwai Yai river is 450 kilometers in length with a catchment area of 14,630 square kilometers.

The Kwai Noi rivers traverses through the province of Kanchanaburi for most of its length. The river is on the west of Tanon Thong Chai mountain range which forms the divide of the Kwai Yai river. The Kwai Noi river starts at Samsop confluence where the three rivers, Ranti, Song Kalia and Bi Khi, converge somewhere near Ban Tha Din Daeng a little above the seat of Sangkhla Buri district. The Kwai Noi river has a length of 320 kilometers with a catchment area of about 10,960 square kilometers.

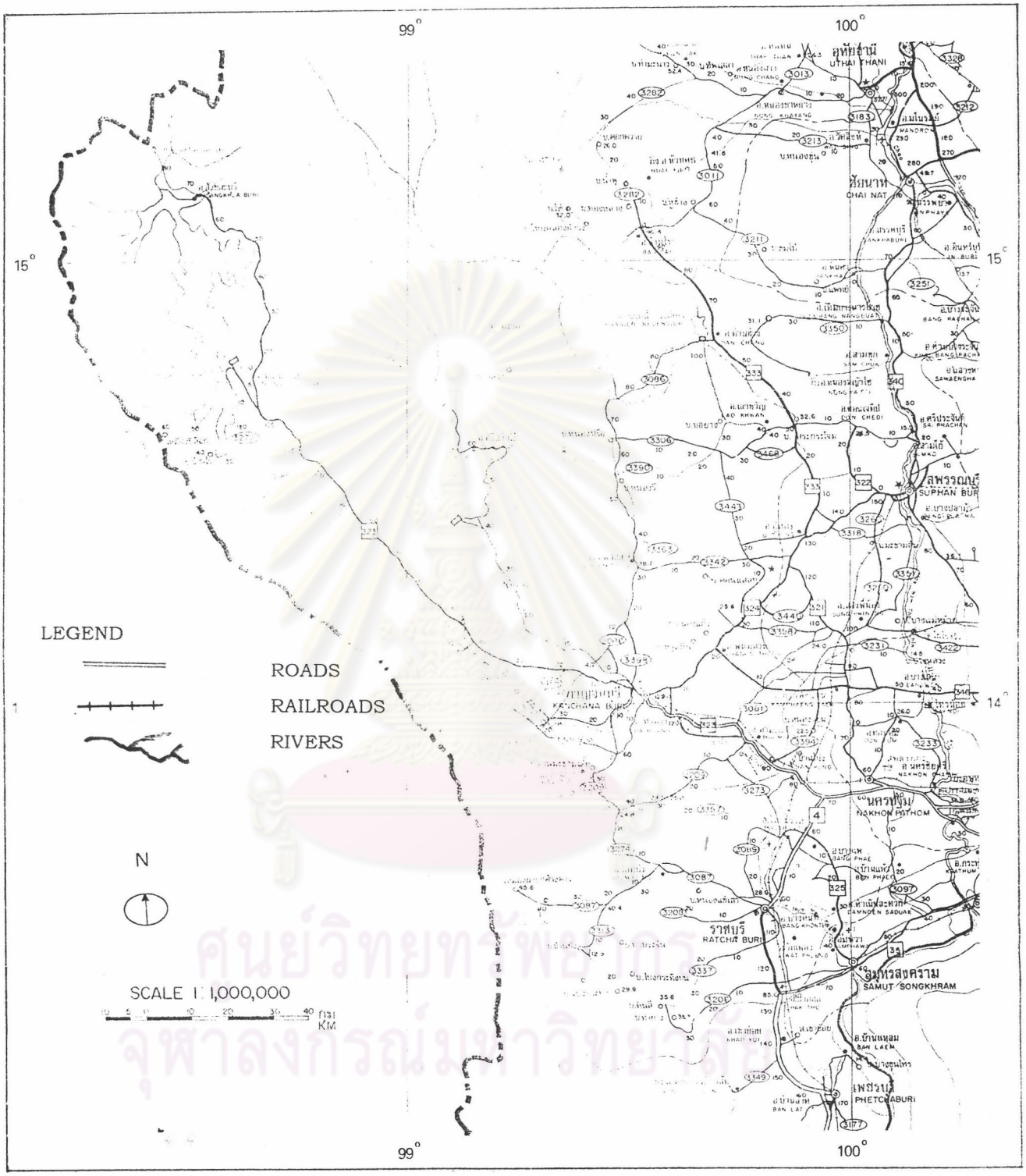



Figure 3.3 Transportation lines in Mae klong watershed area

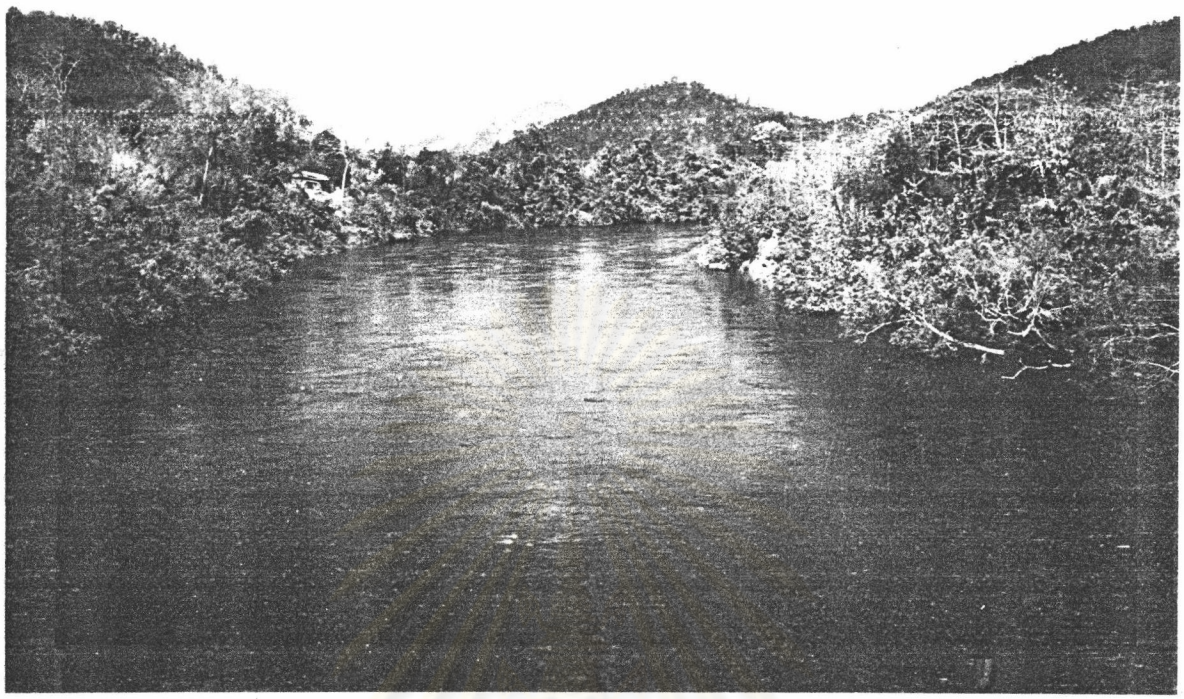


Figure 3.4 Topography of the Kwai Noi river in Sangkhlaburi district

Figure 3.5 Topography of the Mae Klong river in Photharam district

Figure 3.4 shows the topographical view of the Kwai Noi river in Sangkhla Buri district.

After the Kwai Noi and Kwai Yai rivers join up to form the main river, the Mae Klong river flows to the plain in the southeast through Tha Muang and Tha Maka districts. When passing Ban Pong district, Ratchaburi province, the river changes its course down south passing Photharam district as far as the seat of Ratchaburi province, from where it turns back to the southeast again into the areas of Samut Songkhram in Bang Konthi and Amphawa districts before emptying into the sea at Muang Samut Songkhram district. Figure 3.5 shows physiography of both sides of the Mae Klong rivers in Photharam district.

**Climate**

From the data of The Royal Thai Meteorological Department for western provinces in 1994, the Mae Klong basin which is closed to the Gulf of Thailand is subjected to the strong southwest monsoon from the Bay of Bengal and the Gulf of Thailand. The rain from the southwest monsoon and moist air from the Gulf of Thailand are distributed over the Mae Klong Basin as local showers and thunder showers in the afternoons and evenings.

The climate of the Mae Klong Basin may be divided into three seasons. Cold season, or the northeast-monsoon season begins at the end of October and ends in February. Summer begins in mid-February and ends in mid-May. Rainy or the southwest-monsoon season begins in mid-May and ends in late October.

The northeast monsoon begins later in the Mae Klong basin than in the northern and the northeastern parts of Thailand. The northeast wind commences at the end of October or about the beginning of November. Normally, the wind flows easterly. Due to the geographical location of the Mae Klong basin, being farther south and close to the sea, the temperature during cold season does not fall as low as that in the northern and northeastern parts of Thailand. However, an occasional surge of anticyclone

over Asiatic continent which extends southward over Indochina, lowers the temperature in the basin to some extent. The surge lasts only a few days and the weather resumes its normal condition with warm and sunny weather in day time, and with cool and clear sky in during the nigth time. Generally, there is no real cold season in the Mae Klong basin, although December and January are among the driest and coolest months of the year without rain.

In February, the northeast wind, which prevails over the Mae Klong basin from October to February, shifts easterly or more southeasterly direction and becomes the southeast winds. The southeast wind which has its source from the subtropical high over the Pacific ocean causes a rise in temperature in the Mae Klong basin and reaches its peak in April. It has been observed that during this period there is practically no rain.

The southeast wind shifts to south and southwest directions in May and becomes the southwest wind. This wind brings in moist air from the Gulf of Thailand and the Bay of Bengal to the Mae Klong basin. In the middle of May, rain accompanied with thunder activities begins and increases its frequency and intensity as the season advances and then disappears in late October.

Temperature in Mae Klong watershed area, due to its location in tropical latitudes, is uniform throughout the year with very little seasonal variation. Maximum temperatures during the summer generally range from 35° C to 38° C . Minimum temperatures occur during January when the mean varies between 12.2°C and 18.2°C (The Royal Thai Meteorological Department, 1994).

**General Geology**

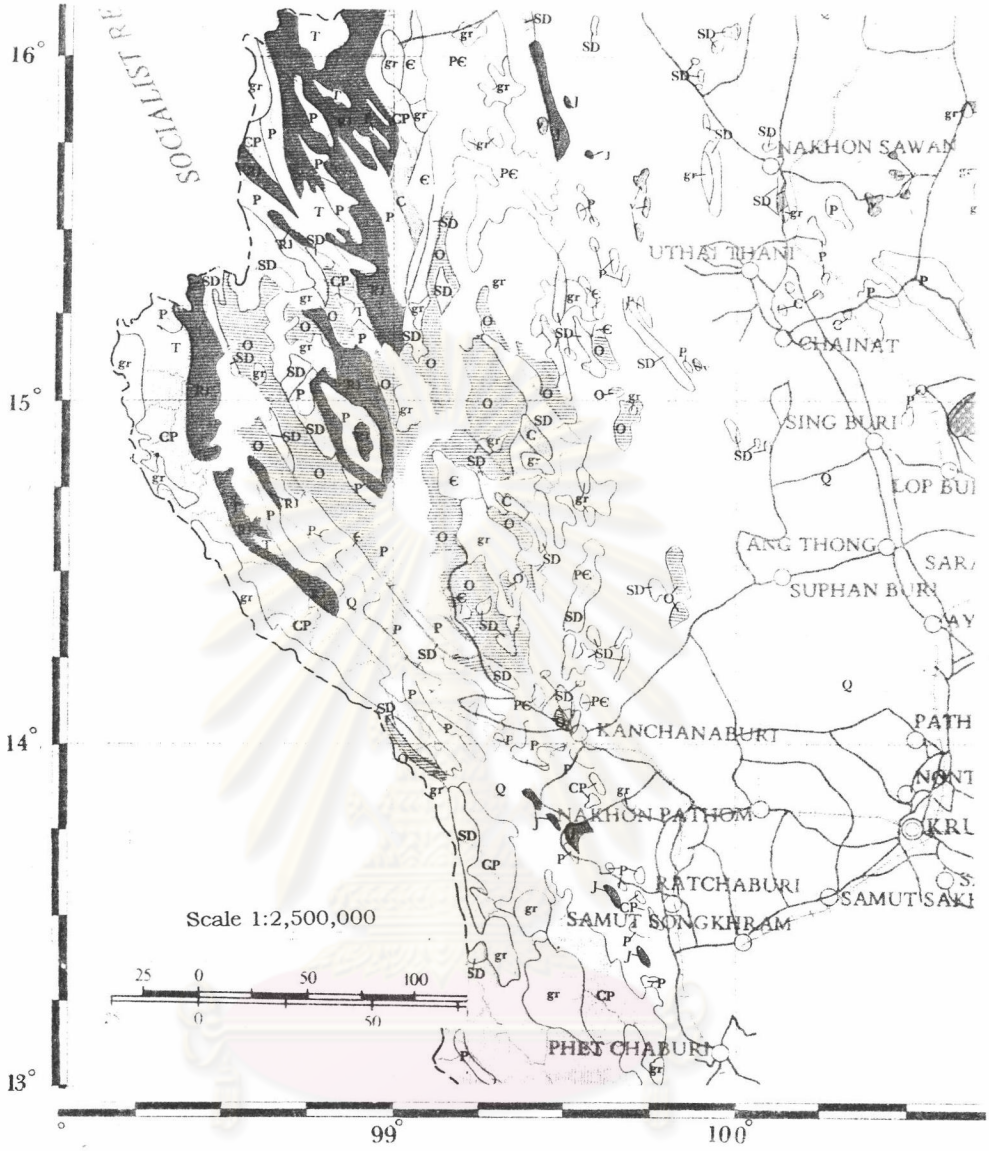
Geology setting of the region described in this chapter is mainly modified from the systematic work conducted by Geological Survey Division (1988 ), Department of Mineral Resources. The geological structure of Mae Klong watershed area is located as part of a large continental margin since

Early Paleozoic period (Charusiri, 1989) which ranges from Myanmar to Malaysia and the structure and morphology as well as topographical features are quite outstanding and continue southward to the Malaysian peninsula.

The geology of the Mae Klong watershed area repeats the major fold paralleling to the above mentioned enormous geological structure and is very complicated since rock strata are cut by several faults and further interrupted by granite intrusion. The basin of the Mae Klong river is composed of the hard base rocks belonging to Mesozoic to Paleozoic or Proterozoic era. The Tertiary soft sedimentary rocks, and unconsolidated deposits of the Quaternary cover those older rocks. The quite older base rocks occurred chiefly in northern part of the study area include those of the Paleozoic rocks of the Pre-Cambrian, Cambrian, and Ordovician.
The younger rocks include Permian and Carboniferous and Mesozoic (Triassic and Jurassic) rocks are more common in the south whereas intrusive rocks such as granite, granodiorite and diorite which are sparsely distributed throughout the entire area.

The rocks excluding the intrusives are distributed linearly from the northwest to the southeast almost corresponding to the regional topographic features. Tertiary sedimentary rocks are distributed and forming a comparatively flat topography along several tributaries of the Kwai Noi river and Kwai Yai river. Quaternary-Tertiary deposits constitute an enormous alluvial fan in the Mae Klong river basin downstream of Kanchanaburi.
The general geology of the Kwai Noi river and the Kwai Yai river is illustrated by geological map in Figure 3.6.

Rock types in western Thailand are divided into 3 major groups which include igneous , sedimentary, and metamorphic rocks. The igneous rocks in the study area regarded as volcanic rocks are distributed extensively on the top of mountain in the western parts of the area.
The other igneous rocks include Triassic granites and Cenozoic basalts.




Lithology

Alluvium and coastal plain; sand, silt, clay, tidal flat, swamps
Q — Marine clay, silt, peat (covered in lower Central Plain)
Low terraces; sand, silt, lateritic soil
High terraces; gravel, sand, silt, laterite

gr — Granite, granodiorite diorite

Sandstone, siltstone, shale, (continental)
Shale, limestone, sandstone, (marine)

P — Sandstone, shale, limestone
Limestone, sandstone, shale

CP — Volcanic conglomerate, sandstone, shale, limestone
Pebbly mudstone, shale, sandstone

SD — Limestone, shale, sandstone
Shale, limestone lens, chert, phyllite, quartzite, schist
Quartzite, phyllite, metatuff, chert, marble, schist

O — Limestone, shale, sandstone

€ — Sandstone, shale, quartzite, phyllite

PE — Gneiss, schist, calc-silicate, marble

Figure 3.6 Geological map of Mae Klong watershed area.
source : Geological Survey Division, Department of Mineral Resources, 1987

The granite rocks are found at Khao Chon Kai and more extensively upstream to the northwestern part of the area (Fig.3.6). Basaltic rock was mainly found in Bo Ploi district and its vicinity, Kanchanaburi province.

Sedimentary rocks in the study area consist mainly of limestone, shale, and sandstone which are distributed extensively in central, eastern, and southern parts of the area. Figure 3.7 shows distribution of the shale in Sri Sawat district, Kanchanaburi province. Especially Permian limestone and Carboniferous shale are much more common in Ratchaburi province. Figure 3.8 shows distribution of the limestone mountain in Ratchaburi province. Upper Paleozoic (Carboniferous) clastic rocks as sandstone and shale are found in parts of Kanchanaburi province, for example, Sai Yok and Thong Pha Phum district.

Metamorphic rocks in the study area include those of Precambrian high-grade rocks, such as quartz feldspathic gneiss, and Cambrian rocks as bonded quartzite, both of which are distributed in parts of Sri Sawat and Muang district, Kanchanaburi and those of lower-grade rocks comprising schist and phyllite.

Figure 3.7 The shale in Sri Sawat district, Kanchanaburi province

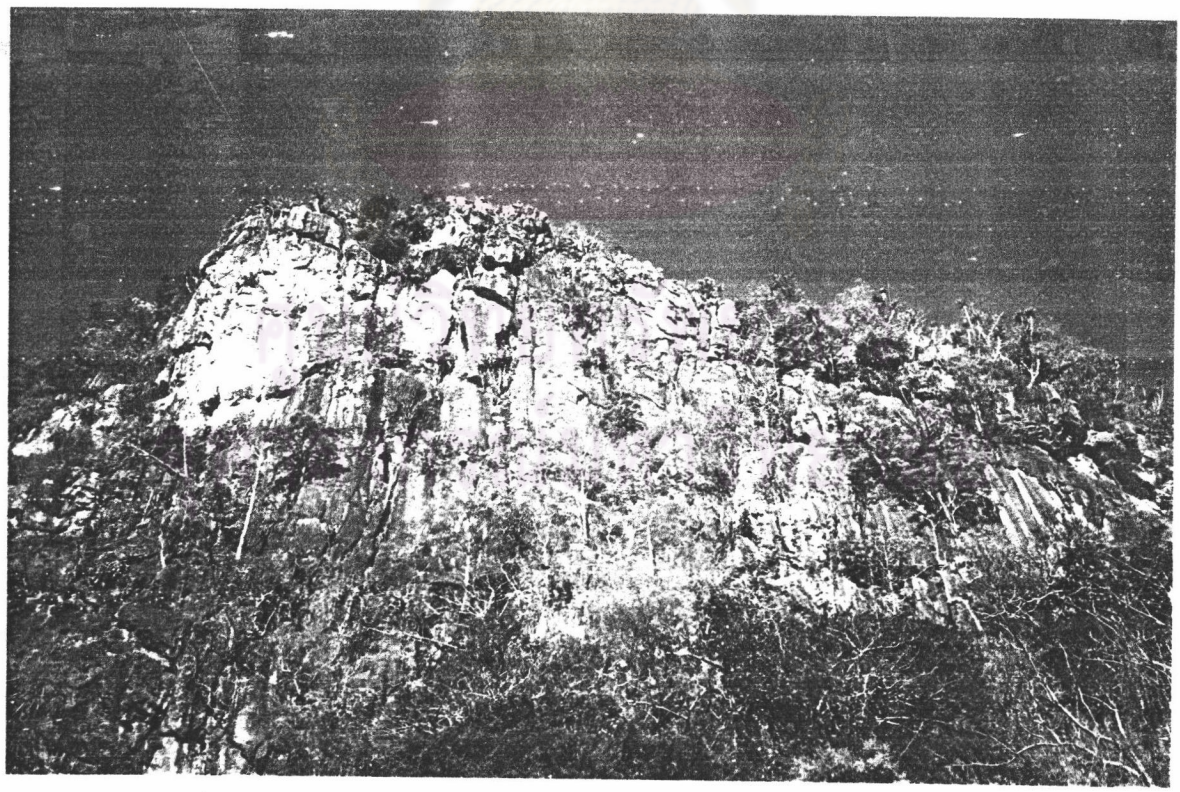


Figure 3.8 The limestone mountain in Ratchaburi province