

SUPPLEMENTARY MATERIALS

List S1: Keywords used for Preliminary Research – in English, Dutch and Malay

Asia	Mangrove Malay
Api-Api	Mangrove Malay Peninsula
Bakau	Mangrove Malaya
Boom	Mangrove Malaysia
Broek	Marsh
Dindings	Matang
Drasland	Melaka
Dutch East Indian Company	Modder
East-Indies	Modderpoel
Federated Malay States	Moeras
Federation on Malaya	Oost-Indie
Forest	Oost-Indische
Habitat Malay	Oost-Indischen Archipelago
Habitat Malaya	Paya
Habitat Malaysia	Paya Bakau
Hutan	Penang
Hutan Bakau	Perak
Johore	Pinwortels
Kedah	Province Wellesley
Kedah	Pulau Pinang
Kelantan	Pulo Penang
Land Cover Malay	Pulo Pinang
Land Cover Malay Peninsula	Salangore
Land Cover Malaya	Selangore
Land Cover Malaysia	Selat Melaka
Land Use	Singapore
Lumpur	Singapura
Malaca	Steltenboom
Malacca	Straits Of Malacca
Malacca Straits	Straits Settlements
Malaka	Southeast Asia
Malakka	South East Asia
Malay	Swamp
Malay Federation	Tanah Melayu
Malay Peninsula	Topography Malay Peninsula
Malay Peninsular	Topography Malaya
Malaya	Trengganu
Malayan	Unfederated Malay States
Malaysia	Vegetation Malay
Maleisie	Vegetation Malay Peninsula
Manggi	Vegetation Malaya
Manggi-Manggi	Vegetation Malaysia
Mangrove	Wortelboom

Table S1: List of Landsat Images Used Each Year for 1988, 1992, 2022, 2012 and 2018
(all products listed here are courtesy of the U.S. Geological Survey).

Year	Landsat Type	Images Used
1988	Landsat 5	LT05_L1GS_125058_19880403_20170209_01_T2 LT05_L1GS_129056_19881211_20170205_01_T2 LT05_L1TP_125059_19880318_20170209_01_T2 LT05_L1TP_126056_19880731_20170208_01_T1 LT05_L1TP_126057_19880731_20170208_01_T1 LT05_L1TP_126058_19880731_20170208_01_T1 LT05_L1TP_126059_19881222_20170205_01_T1 LT05_L1TP_127056_19880807_20170207_01_T1 LT05_L1TP_127057_19881127_20170205_01_T1 LT05_L1TP_127058_19880417_20170209_01_T1 LT05_L1TP_128055_19880220_20170209_01_T1 LT05_L1TP_128056_19880220_20170209_01_T1 LT05_L1TP_128057_19881204_20170205_01_T1 LT05_L1TP_129055_19880227_20170209_01_T1
1992	Landsat 5	LT05_L1TP_125058_19920921_20170122_01_T1 LT05_L1TP_125059_19920703_20170123_01_T1 LT05_L1TP_126056_19921030_20170121_01_T1 LT05_L1TP_126057_19920726_20170123_01_T1 LT05_L1TP_126058_19920421_20170123_01_T1 LT05_L1TP_126059_19920304_20170124_01_T1 LT05_L1TP_127056_19920802_20170122_01_T1 LT05_L1TP_127057_19920802_20170122_01_T1 LT05_L1TP_127058_19921224_20170120_01_T1 LT05_L1TP_128055_19920606_20170123_01_T1 LT05_L1TP_128056_19921231_20170121_01_T1 LT05_L1TP_128057_19920130_20170123_01_T1 LT05_L1TP_129055_19920410_20170123_01_T1 LT05_L1TP_129056_19930413_20170119_01_T1
2002	Landsat 7	LE07_L1TP_125058_20020723_20170128_01_T1 LE07_L1TP_125059_20020402_20170131_01_T1 LE07_L1TP_126056_20021018_20170128_01_T1 LE07_L1TP_126057_20021018_20170127_01_T1 LE07_L1TP_126058_20021002_20170129_01_T1 LE07_L1TP_126059_20020714_20170129_01_T1 LE07_L1TP_127056_20020907_20170129_01_T1 LE07_L1TP_127057_20021025_20170127_01_T1 LE07_L1TP_127058_20021110_20170129_01_T1 LE07_L1TP_128055_20020306_20170131_01_T1 LE07_L1TP_128056_20020306_20170131_01_T1 LE07_L1TP_128057_20021016_20170127_01_T1 LE07_L1TP_129055_20020719_20170130_01_T1 LE07_L1TP_129056_20020225_20170131_01_T1

Year	Landsat Type	Images Used
2012	Landsat 7	LE07_L1TP_125058_20120616_20161130_01_T1 LE07_L1TP_125059_20120413_20161202_01_T1 LE07_L1TP_126056_20120623_20161201_01_T1 LE07_L1TP_126057_20120623_20161201_01_T1 LE07_L1TP_126058_20120810_20161129_01_T1 LE07_L1TP_126059_20120623_20161130_01_T1 LE07_L1TP_127056_20120614_20161202_01_T1 LE07_L1TP_127057_20120614_20161130_01_T1 LE07_L1TP_127058_20120223_20161202_01_T1 LE07_L1TP_128055_20121027_20161127_01_T1 LE07_L1TP_128056_20121011_20161128_01_T1 LE07_L1TP_128057_20121011_20161128_01_T1 LE07_L1TP_129055_20120324_20161203_01_T1 LE07_L1TP_129056_20120324_20161202_01_T1
2018	Landsat 8	LC08_L1TP_125058_20180727_20180731_01_T1 LC08_L1TP_125059_20180524_20180605_01_T1 LC08_L1TP_126056_20181022_20181031_01_T1 LC08_L1TP_126057_20180803_20180814_01_T1 LC08_L1TP_126058_20180920_20180928_01_T1 LC08_L1TP_126059_20180413_20180417_01_T1 LC08_L1TP_127056_20180725_20180731_01_T1 LC08_L1TP_127057_20180319_20180403_01_T1 LC08_L1TP_127058_20180404_20180417_01_T1 LC08_L1TP_128055_20181223_20181227_01_T1 LC08_L1TP_128056_20181223_20181227_01_T1 LC08_L1TP_128057_20180630_20180716_01_T1 LC08_L1TP_129055_20180621_20180703_01_T1 LC08_L1TP_129056_20181027_20181115_01_T1

Table S2: Complete List of Primary Sources Obtained with Annotation or Delineated Mangrove Areas in Peninsular Malaysia

Record description	Information obtained	Accession number	Archive Information
Map of Prince of Wales' Island or Pulo Penang, and Province Wellesley, 1853 surveyed under the auspices of the Governor of Prince of Wales' Island. Singapore, and Malacca, including a careful survey of the South Channel made in 1853 by J. Moniot, Government Surveyor. 1 mile to 1 inch.	Mangrove annotation on mainland Penang.	CO 700/StraitsSettlements6	National Archives of United Kingdom
Hand-drawn map of Langat District, 1874 in Sir Frank Swettenham's Malayan journals, 1874 – 1876 / edited by P.L. Burns and C.D. Cowan.	Annotation of “mangrove swamps” on Klang Islands, Selangor.	959.5030924	Archive Library, National Archives of United Kingdom
Map of the Malay Peninsula, 1879. Met inzet van de stad Singapore.	Mangrove annotated as “Mangrove swamp” in Matang (Perak), and Sepang River (Selangor).	4.MIKO, inventarisnummer 1 131A	The National Archives of The Netherlands
A Map of the Malay Peninsula, 1898 compiled by and published for the Straits Branch of the Royal Asiatic Society, Singapore. 8 miles to 1 inch.	“Swampy islands covered with mangroves” denoted in Matang (Perak) and Manjung (previously known as Dindings) (Perak)	CO 700/StraitsSettlements31	National Archives of United Kingdom
Map of Perak, 1901. Alfred E. Young, Chief Surveyor, Perak. 8 miles to 1 inch.	Mangrove annotated in Matang (Perak).	CO 700/StraitsSettlements35	National Archives of United Kingdom
Map of the Malay Peninsula, 1911 compiled by and published for the Straits Branch of the Royal Asiatic Society Singapore. Inset: Singapore Town	Mangrove annotated in Matang (Perak) as “Swampy islands covered with mangroves”.	CO 1047/884	National Archives of United Kingdom
Penang Aerodome 1932	Mangrove annotated along	CO 1047/957	National Archives of United Kingdom

Record description	Information obtained	Accession number	Archive Information
	Nipah River on Penang Island.		
Aviation Map of Malaya 1935. FMS Surveys 138	Mangrove areas identified and annotated along west coast of Peninsular Malaysia.	CO 1047/957	National Archives of United Kingdom
Escape and Evasion map. 1944. Reverse: Sheet 44F. Geopolitical area: Siam, Malaya, Sumatra. Subject: International boundaries, roads, rail, drainage, contours	Mangrove areas identified and annotated along west coast of Peninsular Malaysia.	WO 418/70/3	National Archives of United Kingdom
Land Utilization Maps - Georgetown, Kota Bharu & Singapore, 1943 – 1944. Admiralty, Inter-service Topographical Department, and Ministry of Defence, joint Intelligence Bureau Library: Survey, Maps and Reports. Inter-Services Information Series. Malaya. Plans:1-30.	Delineated mangrove areas across Peninsular Malaysia.	WO 252/608	National Archives of United Kingdom Archives of UK
Forest Resources Map of Malaya, 1954	Delineated mangrove areas across Peninsular Malaysia.	hdl:1885/140842	Australian National University
Vegetation Map of Malaysia, 1958. Samengesteld door C.G.G.J. van Steenis. Uitgave van de Unesco Humid Tropics Research Project, Groningen. 1 blad. Behoort bij Commentary on the vegetation map of Malaysia door Van Steenis.	Mangrove areas identified across Peninsular Malaysia.	4.MIKO, inventarisnummer 6 064	The National Archives of The Netherlands

Table S3: List of Secondary Sources (Personal journal, books, reports, etc.) with Mentions of Mangroves in Peninsular Malaysia

Texts on mangrove	Source & Accession No.	Archive/Library
<p>The mangrove forests (or swamps) of the Malay Peninsula cover an area of about four hundred and thirty square miles, almost all on the west coast. On the west coast the mangrove belt is almost continuous from Kedah to Singapore.</p> <p>Mangrove swamps of the east coast are confined to the mouths of the rivers, the beaches being sandy and open, and generally free from gregarious tree growth other than casuarina.</p>	<p>"Mangrove forests of the Malay Peninsula" by James Gilbert Watson 1928</p> <p>634.9734209595 WAT MN</p>	National Library of Malaysia
<p>We are steaming over the incandescent sapphire sea among the mangrove-bordered islands which fringe the Selangor coast.</p> <p>At daylight we weighed anchor and steamed for many miles up the muddy, mangrove-fringed River Bernam, the mangrove occasionally varied by the nipah palm.</p> <p>We left Malacca at seven this morning in the small, unseaworthy, untrustworthy, unriggered steam launch Mosmee, and after crawling for some hours at a speed of about five miles an hour along brown and yellow shores with broad dark belt of palms above them, we left the waveless, burning sea behind, and after a few miles of torturous steaming through the mangrove swamps of the Linggi river, landed here to wait for sufficient water for the rest of our journey.</p> <p>This is a promontory covered with coco-palms, bananas, and small jungle growths. On either side are small rivers densely bordered by mangrove swamps. The first sight of a real mangrove swamp is an event. This mangi-mangi of the Malays (the Rhizophora mangil of botanists) has no beauty. All along this coast, within access of tidal waters, there is a belt of many miles in breadth, dense, impenetrable, from forty to fifty feet high, or as nearly level as may be, and of a dark, dull grey. At low water the mangroves are seen standing close packed along the shallow and muddy shores on cradles or erections of their own roots five or six feet high, but when these are covered at high tide they appear to be growing out of water. They send down roots from their branches, and all too quickly cover a large space.</p>	<p>"The leisure hour 1883: sketches in the Malay Peninsula" by Isabella L. Bird (Isabella Lucy) 1883</p> <p>305.89923 BIR KP</p>	National Library of Malaysia

Texts on mangrove	Source & Accession No.	Archive/Library
...The mangrove swamp is to me an evil mystery.		
...entered the mouth of River Klang, two hundred miles from Singapore. Although this is the largest river in Selangore, it is only a hundred and fifty yards wide at the mouth. The water is brown and thick with mud, and looks bilious. The banks are low and swampy, and covered with mangroves and nipa palm growing in the soft mud.	“The experiences of a hunter and naturalist in the Malay peninsula and Borneo” by William T. Hornaday (1854-1937) 1993 915.951 HOR M	National Library of Malaysia
On the west coast the rivers have deposited large mud-flats, or mangrove swamps, and the last tidal reached of the rivers, before arriving at the sea, have their course through these flats. On the east coast conditions are different. There are mangrove-swamps, for instance on the Kuantan river, but the coast is one long stretch of fine sandy beach, cooled by strong breezes...	“Handbook to British Malaya” by R.L. German 1935 915.951 GER MN	National Library of Malaysia
On the seaward fringe are the mangroves, also floristically richer than elsewhere in the tropics (Whitmore, 1984: 178). They are extensive along the west coast of the Peninsula and around the eastern, southern and western coasts of Borneo; most coasts facing the South China Sea are fringed with sand. These were the earliest forests to be used commercially, with silvicultural management, as important sources of both timber and charcoal. In recent years they have suffered most heavily from human impact, both for their wood and, by reclamation, for fish ponds and, on the inland sides, rice fields. Their value as breeding grounds for marine life has been greatly reduced by these incursions.	“In place of the forest: environmental and socio-economic transformation in Borneo and the eastern Malay Peninsula” by H. C Brookfield 1995 333.75137095983 BRO M	National Library of Malaysia
III. Coast from Sungei Bakau to Sungei Larut On this stretch of coast and for many miles south, there is almost continuous strip of mangrove forest, 7 miles wide in places.	Special report on selected areas of the west coast. 1943 WO 252/1326	National Archives of United Kingdom

Texts on mangrove	Source & Accession No.	Archive/Library
<p>Two small streams, the Cherating and the Balok, meander across the swamp from the line of hills which limits it to the west. About the mouths of each of these streams is an area of mangrove swamps stretching for about 1 1/4 miles upstream from the coast.</p> <p>Just over 3 miles from its mouth the Kuantan is joined from the south by the Belat River. There is a belt of mangrove swamp extending up the Kuantan River for about 7 miles from its mouth, and for about 5 miles up the Belat River.</p>	<p>Air photography and topographical surveys Federation of Malaya</p> <p>OD 6/776</p>	<p>National Archives of United Kingdom</p>
<p>An overgrown strip of bog three miles wide and 27 long in the Tanjong Karang area between the Bernam and Selangor Rivers on the west coast 50 miles north of Port Swettenham has been reclaimed by a highly successful irrigation scheme and today provides a healthy community life where desolation and disease reigned.</p>	<p>Malaya: 135 photographs compiled by the Central Office of Information depicting agriculture and food production.</p> <p>INF 10/206 PART 7</p>	<p>National Archives of United Kingdom</p>
<p>Mangrove Swamp Forest Mangrove and api are found all along the west coast of Malaya.</p> <p>Beach forests Where there are no mangroves, as along the east coast of Malaya, there is a narrow belt, rarely more than 20 to 100 yds. Wide, of beach forest. Note. There are small portions of the coastal area on which the nipah palm is found. These are usually muddy areas often associated with the landward side of mangrove swamp.</p> <p>Sub region: Perlis, NW Kedah and Langkawi Islands Natural vegetation and land utilization Mangrove swamp exists, with a few small breaks for the whole length of the coast. They reach inland in two small belts - on either side of the Perlis River for about 4 miles and on either side of the Jerlun River for about 2 miles.</p> <p>Langkawi Island About the tidal inlets on the east and north coast are expanses of mangrove.</p>	<p>General reports: topography, roads, towns and ports Aug 1943 - July 1945</p> <p>WO 252/606</p>	<p>National Archives of United Kingdom</p>

Texts on mangrove	Source & Accession No.	Archive/Library
<p>There is a belt of mangrove swamp for about 3 miles up the Kedah River from the sea, and a little along the shore.</p> <p>Sub region 3: The Muda Sub region and Penang Coastal mangrove swamps are limited to the river mouths here. There is an extensive area of mangroves stretching inland on either side of the Merbok River for about 8 miles from the coast and with an average width of 4 miles. There are two strips 400-500 yds. wide on either bank of the Muda River for 2 miles from the sea. A narrow strip of mangrove swamp intermittently borders the Prai River for about 9 miles from its mouth. The lower 3 miles of the Juru River is bordered on either side by a narrow belt of mangrove swamp.</p> <p>Penang Mangrove swamp line the coast on the west from Batu Puteh to S.P Betong, varying in width from 200 yds. to 900yds. And on the east from the mouth of the Nibong River to the south of the nipah river, and extending up to the Relau River.</p>		
<p>Parit Buntar to Taiping About 5 miles west of Taiping there lies the huge Matang mangrove Forest reserve, some 25 miles in length, and varying in width from 4 to 8 miles.</p> <p>Taiping to Batu Gajah The broad mangrove belt in this section extends south to Sungei Tinggi.</p> <p>KL to Seremban For a few miles south of Port Swettenham-KL road are large rubber estates and tin mines. South of these, there is mangrove on the coast and a large area of flat swamp and jungle... South of road running eastwards from Telok Datok is another large area of flat swamp and jungle, including some Forests Reserve, and a great deal of mangrove near Sepang.</p> <p>Ayer Hitam to Singapore</p>	<p>Coastal belt Alor Star to Singapore with particular reference to tank obstacles. 1943</p> <p>WO 252/1327</p>	<p>National Archives of United Kingdom</p>

Texts on mangrove	Source & Accession No.	Archive/Library
Along the coast of Batu Pahat to Kukup there is a belt of small holdings... It is mostly low-lying and intersected with oreaka and the coast itself is fringed with mangrove.		
Exploitation of material resources Forests: The shipbuilding a programme and the charcoal industry have led to indiscriminate felling of Malaya's forest reserves, the former policy was to work forests so as to ensure a sustained yield but the Japanese have paid no heed to the felling cycle. the charcoal industry was a purely domestic one, but is capable of great expansion, should the Japanese go in for indiscriminate felling. Formerly charcoal was made principally from mangrove wood, but to feed her iron furnaces it may be necessary for Japan to use inland wood as well, unless she ignores the risk of erosion to the low-lying west coast agricultural lands by indiscriminate felling of the mangrove belt.	Inlichtingenrapporten. 1942-1946 2.12.37 Inventarsari number 301	The National Archives of The Netherlands
In the Dindings about 1,200 acres of the Tanjong Burong Reserve were given up for Padi cultivation, the Mangrove Forest on the area being cut under licence in the ordinary way before cultivation takes place. To compensate for this a block of Mangrove Forest near Batu Undan was added, Teluk Senangin Reserve is shewn for the first time in the report.	Annual Report on Forest Administration in the Straits Settlements for the year 1903 doi.org/10.5962/bhl.title.137878	Biodiversity Heritage Library, Singapore (Online repository)
The only mangrove forest are in Singapore and the Dindings and these with those of Perak State (which alone are estimated to yield \$280,000 worth of fuel a year supply Railways, local Steamers, Smelting Works and other industries.	"Report on the Present System of Forest Conservancy in the Straits Settlements" by H. C. Hill 1900 doi.org/10.5962/bhl.title.137878	Biodiversity Heritage Library, Singapore (Online repository)