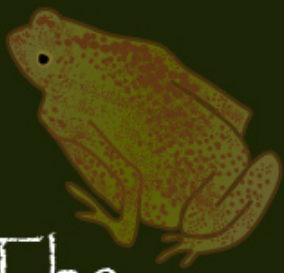
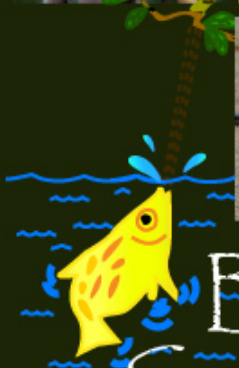
ISBN 978-983422764-7





Biodiversity Of The Sedili Kechil Wetlands

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Financially supported by:

Global Environment Facility

SGP The GEF Small Grants Programme

UNDP

Published by:

Wetlands International

First published November 2009

This publication shall be cited as:

Lee,S.S. Luesink, E. and George, F. 2009. Biodiversity of The Sedili Kechil Wetlands. Wetlands International – Malaysia, Malaysia. 48 pp.
ISBN 978-983-42276-4-7

design:
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Published by Wetlands International Malaysia

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1 Conservation Efforts in Sedili Kechil

With its distinct gradation of riverine vegetation and freshwater swamp forest, the wetlands of Sedili Kechil are one of the best remaining examples of wetlands in Malaysia. In a relatively small area, four wetlands types can be seen and experienced.


Aerial view of freshwater swamp forest

In 2005, Wetlands International Malaysia conducted a rapid ecological and socio-economic assessment of the wetlands in Sedili Kechil and Sedili Besar. Wetlands International recommended that these sites be considered for gazettement as a Ramsar site. Since then, Wetlands International Malaysia has been working with local communities on the wise use of these unique wetlands by developing community-based ecotourism and replanting degraded mangrove areas.


Mangrove forest

However, wetlands in Malaysia are under great threat. Mangroves are being degraded and destroyed; and freshwater swamp forests are being deforested at a faster rate than any other forest types for conversion to large areas for agriculture, plantations, and human settlements.

This guidebook provide readers with a glimpse of the rich and diverse biodiversity found in Sedili Kechil. It is hoped that a better understanding and knowledge of wetlands in this area will enhance the appreciation and protection of wetland ecosystems.

2 About Sedili Kechil

Sedili Kechil is a small quiet village situated on the east coast of Johor. Located at the river mouth of the Sedili Kechil river, Kota Tinggi about 50 km away is its closest sizeable town. From Kuala Lumpur, Sedili Kechil is a 5 hour drive.

Location Map of Sedili Kechil

Sedili Kechil is a traditional Malay fishing village. The local economy is diverse, but the main form of income is from fishing, operating small grocery shops and working in the nearby palm oil plantations. It has a thriving cottage industry of prawn farming, sand mining, vegetable farming, making handicrafts, salted fish production, and harvesting of horseshoe crabs (belangkas) and clams (lokan).

Entering Sedili Kechil village, one is transported into another time zone where the pace of life is slow and unhurried. Leaving the hustle and bustle of city life behind, the charm of the traditional village, wooden houses with gardens creates a peaceful and relaxing environment. The gardens can be described as an edible garden with fruit trees, herbal plants, vegetables, coconut trees and betel nut trees. In amongst all these are cows and chickens reared by families.

Fishing Jetty at Sedili Kechil

3 Introduction to the Sedili

The Sedili wetlands in southeast Johor represent a rare and unique wetland that is in danger of disappearing. A unique interlocking mosaic of wetland types forms this drainage basin where a substantial area still remains untouched and in need of conservation. From the sandy and rocky coastline, the landscape changes seamlessly and with distinct gradation to saltwater mangrove forest at the inter-tidal zone, nypa palm in brackish water swamps, pandanus vegetation in the riverine forest and freshwater swamp forest upstream.

The Sedili wetlands perform important functions which are often taken for granted. Wetlands prevent severe flood and drought by storing water during the wet season and releasing it during the dry season. The coastal mangrove forest protects the shorelines from damaging storms and floods. Mangroves also help prevent erosion by stabilising sediments in their tangled root systems. They maintain water quality and clarity, filter pollutants and trap sediments. The wetlands are also the nursery ground for aquatic life and rest areas for migratory birds.

The flooding of the Sedili Kechil floodplains by daily tidal flows and rainfall are important to the four forest ecosystems found in the area. The four forest types are the coastal forest, mangrove forest, brackish water riverine forest and freshwater swamp forest.

Ecosystem Diversity of Sedili Kech

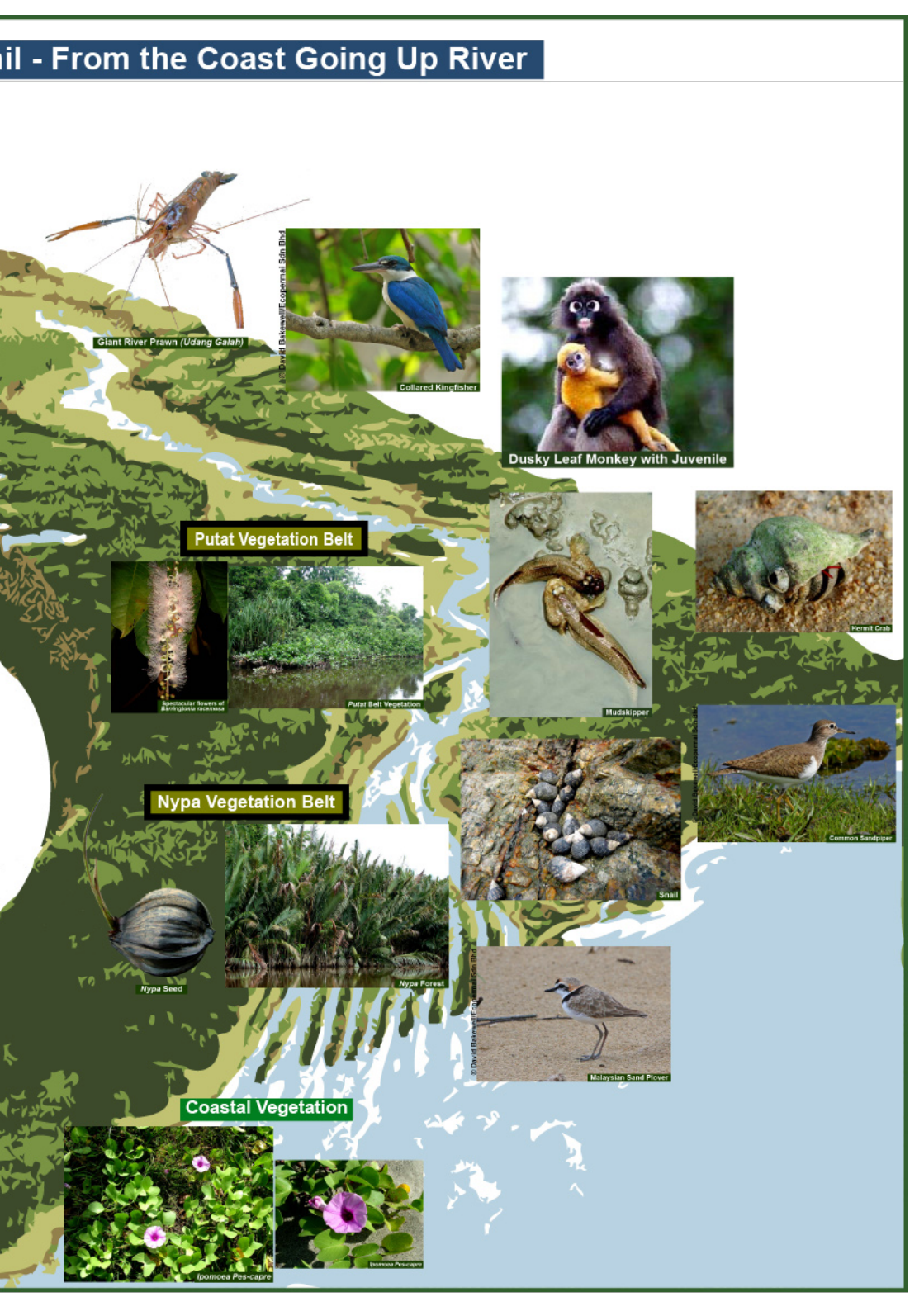
LEGEND:

- Freshwater Swamp Vegetation
- Nypa Vegetation Belt
- Putat Vegetation Belt
- Pandanus Vegetation Belt

  } Brackish Water Riverine Ecosystem

- Mangrove Vegetation
- Coastal Vegetation

nil - From the Coast Going Up River



5 The Coastal Ecosystem

Coast – Sandy Beach, Rocky Shore and Mudflat

Sedili Kechil is located on the coast between Teluk Mahkota, formerly known as Jason Bay, and Tanjung Sedili Kechil. The coastline is made up of mudflats, sandy and rocky beaches. In some areas along the beach, pioneer species such as *Ipomeao pes-caprae, Vitex ovata,* sapling like *Nypa fruticans, Cerbera odollam, Hibiscus tiliaceus* and *Terminalia cattapa* can be seen sprouting up.

Coastal Vegetation

On the ridge of the sandy beach at Teluk Mahkota, *Barringtonia* is found thriving. This vegetation type occurs behind an expanse of *Ipomoea pes caprae* or Morning glory and *Vitex ovata* (Verbenaceae). Other plants that colonise the beach area are trees, shrubs and tall herbs.

The type of trees found in this forest fringe are *Barringtonia asiatica or* Putat laut *(Lecythidaceae), Calophyllum inophyllum* or Bintangor laut *(Clusiaceae)* and *Casuarina equisetifolia or* Ru laut (Casuarinaceae). Among the small and medium-sized branched shrubs found there are *Ardisia elliptica* or Mata pelandok. Herbaceous plants found at the edges of the *Barringtonia* are *Tacca leontopetaloides (Taccaceae).*

Pandanus odoratissimus (Common Seashore Screw Pine)

This member of the screw pine tree family has very fragrant flowers. The trees are often found growing along seashores, banks of rivers, ponds and canals. Locally known as Mengkuang, this *Pandanus* species is commonly used by the local community for making sleeping-mats, baskets, hats, screens, and roofs of huts. The leaf-fibres are used to make ropes, nets and belts.

Casuarina equisetifolia (Ru Laut)

Commonly found along tropical seashore, the Horsetail or Whistling-pine is often planted as a windbreak. The tree is a great resource to the local communities. The wood of the tree is used for roofing shingles, fencing, and firewood. The root is used to treat ailments such as dysentery, diarrhoea and stomach ache. The twigs of the casuarinas are used for treating swellings, and the bark for treating pimples.

Casuarina equisetifolia planted as windbreak

Fruit of the *Casuarina equisetifolia*

Ipomoea pes-caprae (Sea Morning Glory)

The sea morning glory or Goat's foot is a common salt tolerant tropical creeping vine of the Convolvulaceae family. Found on flat broad stretches of sandy beaches, Goat's foot is often one of the first plants to colonise sandy areas to stabilise the area.

Ipomoea pes-caprae can be seen colonised the sand dune along Teluk Mahkota and they are good sand stabilizer

Barringtonia asiatica (Fish Poison Tree)

Locally known as Putat laut, it is commonly found in the mangroves and coastal areas of Sedili Kechil. These medium to large trees grow wild on sandy and rocky shores. The young leaves are bronze in colour with little pinkish veins, while matured leaves turn yellowish. The flowers are balls of white stamens with pink tips, which bloom at night and attract large moths and other nectar-feeding animals. Its lantern looking fruit has high buoyancy and is used as fishing floats. The tree contains the chemical saponin which is used as a poison to catch fish.

Barringtonia asiatica flower bloom atnight and drop the next morning

Lantern shape of *Barringtonia asiatica* fruits

Tacca leontopetaloides (Tahiti Arrowroot)

Originating from western Africa, the arrowroot is found throughout Southeast Asia. The bitter edible tuber contains starch, and is an important food source for many Pacific islands.

Tahiti arrowroot with flower

Tuber of arrowroot contains starch

Flowers and fruits of Tacca leontonpetaloides

Glochidion littorale (Monkey Apple)

Locally known as Jambu kera, the Monkey Apple is a shrub that grows up to three metres high. The shrub can be identified by its brown flaky bark. The leaves are short and have a leathery feel which turns orange when it matures. The fruit is red and smooth or sometimes partly covered with fine hairs and it has orange seeds. The young red leaves are edible and can be grounded to a paste to treat jelly fish stings.

Ardisia elliptica (Sea-shore Ardisia)

The Sea-shore Ardisia (Mata pelanduk) is a fast growing native understory shrub of Southeast Asia that can grow up to 5 metres tall. The flowers are small, pink and star shaped and hangs in a clusters. Its fruits are small, round and fleshy that turns from red to deep purple as it matures.

6 The Mangrove Ecosystem

The mangroves of Sedili Kechil extend from the tidal reaches of Sedili Kechil river to the southern end of Teluk Mahkota. Mangroves form when fine sediments, often with high organic content, collect in areas sheltered from waves. This is usually around the river mouths and sheltered coastal areas.

Mangroves provide a good habitat for marine life such as fishes, prawns, crabs and clams. The roots of trees found in mangroves trap micro-organisms that fish and prawns feed on. This in turn attracts other animals further up the food chain such as birds, monitor lizards, tortoise, and crabs.

Mangroves are also valuable resource to the local community. Fishing of commercially important species supplements the incomes of families, while timber from the mangroves is used to build jetties, small bridges, kampong houses, and firewood.

Pristine mangrove forest along Sedili Kechil river

Mangrove Vegetation

Rhizophora apiculata (Bakau Minyak)

Trees of the mangrove forest have unique features that allows them to thrive and survive in this unique tidal environment. Plants here have breathing roots, special reproduction and dispersal mechanism suited for this environment. One example is the *Rhizophora apiculata* and *Rhizophora mucronata* that have developed stilt roots to cope with the muddy and tidal conditions.

Rhizophora Apiculata **(Bakau minyak)**

Propagule of Bakau minyak

Flower of Bakau minyak

Rhizophora mucronata (Bakau Kurap)

Rhizophora tree is a useful resource for the community. It is used as firewood, charcoal, piling poles and furniture. When weighted with stones, its roots can anchor small boats. The bark contains tannin which is used for tanning leather, to strengthen and dye fishing lines, ropes and nets.

The mangroves of Sedili Kechil extend from the tidal reaches of Sg. Sedili Kechil to the southern end of Teluk Mahkota. It occupies both sides of the river banks and coastal area.

Xylocarpus granatum (Nyireh Bunga)

This mangrove tree can be identified by its large canon ball shaped fruits. Its buttress roots are shaped like planks towards the top, and ribbon shaped further down. The tree grows up to 10 metres tall and is ideal for woodcarving, building boats and furniture.

Sonneratia alba (Perepat)

A pioneering species in the mangrove habitat, it is frequently found on offshore islands, coastal and estuarine areas. Its fruit is edible, though sour, and its flower blooms at night to be pollinated by moths, birds and fruit-eating bats.

Bruguiera gymnorrhiza (Tumu Merah)

This is a small tree which grows up to 10 metres tall. The tree is unique because it has both buttress and knee roots. The seeds are green and shaped like cigars around 20 cm long and 1.5 cm in diameter. Attached to the seed is a solitary flower with red or pink calyx.

Lumnitzera littorea (Teruntum Merah)

This mangrove tree produces small bright red flowers and has shiny fleshy leaves. It is found on the landward fringes of many mangroves usually preferring sandy side.

7 The Brackish Water Riverine Ecosystem

The brackish water ecosystem is found around river estuaries, where the water in the river has higher salinity than freshwater, but not as much as seawater. This area of the river plays an important role in flood mitigation. The riverine forests trap and filter out sediments from surface run-off. Forested riparian zones improve the riverine ecosystem by shading at least part of the river, reducing heat stress on fishes and other aquatic organisms. The roots of the riparian vegetation anchor the riverbanks, preventing erosion. Woody debris, such as trunks, branches, and twigs provides structural complexity in the river, creating habitat for a wide range of invertebrates.

The different vegetation found in this area provides clear markers as to the salinity of the water. The presence of *Nypa fruticans, Hibiscus tiliaceus* and *Sonneratia caseolaris* along the riverbank indicates the start of the brackish water. Further upstream where the water is less salty, the Putat-belt is dominated by *Barringtonia conoidea* and *Barringtonia racemosa*. Where salinity of the river is minimal, you will find *Pandanus helicopus* thriving.

Intact riverine vegetation along Sedili Kechil

Nypa Belt Vegetation

Nypa fruticans (*Nipah* Palm)

The trunk of a *Nypa* palm actually grows below the surface of the water, leaving only the fronds and flower stalks growing above the water. Fruits of the nypa palm can be eaten and the sap from the flower stem is collected to drink or made into palm sugar. Young leaves are used for cigarette wrappers, while the old ones are used for thatching roofs. Nypa palms protect the riverbank against erosion.

Hibiscus tiliaceus (Sea Hibiscus or Baru-baru Laut)

The presence of sea hibiscus indicates the upper limit of sea water flow up river. It is a small tree with large heart-shaped leaves. The flowers are yellow in colour that blooms in the morning and changes to pinkish-brown before dropping off in the evening.

Sonneratia caseolaris (Berembang)

This species of tree can be found in less saline parts of the river, closer to the nypa zone. It has beautiful flower that blooms at night for bats and moths to pollinate. The fruits can be eaten in a salad or cooked. The berembang tree attracts fireflies which create a spectacular display at night with their flashing lights.

Matured fruit (left) and Matured tree with pneumatophores roots (right) of Berembang

Putat Belt Vegetation

The vegetation changes slightly when going further upstream past the Nypa belt. This zone is named after the *Barringtonia* or Putat trees which are commonly found here. The *Barringtonia* trees grow generally on submerged mud banks, standing in water at high tide.

Putat-belt vegetation with Nipah Palm still in the background

Recognisable by their large leaves and delicate flowers, there is more variety of vegetation and tree species growing in this zone. The nice mix of overhanging trees and smaller shrubs in this belt creates beautiful river scenery.

Barringtonia conoidea (Putat Ayer)

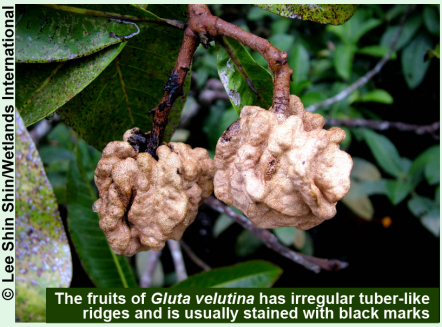
Barringtonia conoidea or Putat ayer are small shrubs or dwarf thickets found along the river banks. During low tide their stems and roots are exposed. They need very little salinity to grow.

Barringtonia racemosa (Putat Ayam)

This beautiful tree is easily recognized by its large leaves and beautiful fluffy white flowers and guava-like fruits. The flowers bloom at night and are pollinated by small bats and moths. In the morning, the flowers usually drop off. The seeds, bark, wood and roots contain poison which can be used to catch fish. Young leaves and fruits are used as food in salads.

Gluta velutina (Rengas)

This species grows between the Putat and Rassau belts. Its seedlings establish itself along the mud-banks and can grow up to 7 metres high. It flowers all year round. The clear sap from the trunk rapidly turns black and is known to cause blisters and blindness.



The fruits of *Gluta velutina* has irregular tuber-like ridges and is usually stained with black marks

The red young leaves and light pink flowers of *Gluta velutina*

Pandanus Belt Vegetation

Travelling upriver past the Putat-belt, the channel gets narrower and the currents stronger. The vegetation changes to species with pole-like stems and long leaves. This is the Pandanus or Rassau belt. *Mesua ferruginea* is found growing abundantly along the rassau belt. The Pianggu (*Horsfieldia irya)* growing behind the rassau-belt is the first forest type found on the stabilized mud-bank along the freshwater tidal region.

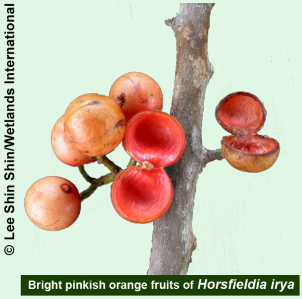
Pandanus Belt Vegetation

Pandanus Rassau

Pandanus helicopus is found at the freshwater tidal area of the river. The pole-like stems of the Rassau plant are crowned with long leaves which bend downwards. The sides of leaves have sharp thorns. The fruit of the pandanus plant is small and prickly and resembles a *Cempedak* fruit.

Horsfieldia irya (Pianggu)

Locally known as **Pianggu,** this tree was once common to this area. Monopodial with the slightly drooping branches in the upper part of the trunk. Its straight trunk has been felled for poles and masts. Fruits are round and contain an air chamber to float and help propagate. It is first ochre yellow, and then turns bright pinkish orange or reddish.



Teijsmanniodendron hollrungii

It grows up to 8 metres high, often more or less horizontal over the water's edge. The flower can be easily identified by a white corolla with light purple lip and the fruits are often covered with green powder.

Mesua ferruginea

The tree grows on freshwater tidal mud, around the edge of the rassau, in thickets up to 5 metres high. It stands in the water at high tide, spreading over the river. The young leaves are pale green and the old leaves appear silvery and they point almost vertically downwards.

8 The Freshwater Swamp Ecosystem

The unique ecosystem of freshwater swamps is one of the most endangered wetland types of Southeast Asia. Freshwater swamps are forests inundated with freshwater. The waterlogged state slows down the decomposition process of wood and other vegetations thus creating a layer of shallow peat.

There are signs that a freshwater swamp forest was located between areas of shallow peat, which may have supported peat swamp forest with a different floral composition.

Freshwater Swamp Vegetation

Water Trumpet *(Cryptocoryne)*

The English name “water trumpet” refers to their inflorescence, a spadix enclosed by a spathe, which resembles a trumpet. The typical habitats of *Cryptocoryne* are streams, ponds and rivers with slow flowing water. Its high sensitivity to the water quality is a good indicator of water quality in the area.

Cryptocoryne cordata

This species of water trumpet is uncommon and restricted to certain swamp areas. It is found in the upper reaches of Sedili Kechil river in oil palm plantations, growing together with *Cryptocoryne purpurea*.

Cryptocoryne purpurea Var Purpurea

The status of this species is uncommon and endangered. It has been previously recorded only at Tasek Bera, Pahang, and certain locations in Johor. The finding of this species in large quantities along the banks of Sedili Kechil river and fringes of the swamp forest is a new record.

9 Animal Life of the Sedili Kechil

Birds Of The Coastal Area And Mangrove

Sedili Kechil and its surrounding areas is a sanctuary for over 100 species of birds. The coastal area of Sedili is a resting area for migratory birds and wader species along the East Asian – Australasian Flyway. The mangrove forest and mudflats of Sedili Kechil are particularly important to more than 40 species of waterbirds, including egrets, herons, storks, rails, shorebirds, terns and gulls, as well as several threatened and near threatened birds, such as the Chinese Egret, Malaysian Plover and Asian Dowitcher.

The Great Egret and Little Egret are migrants to the Sedili mangroves, while the Pacific Reef Egret can be spotted the entire year. Other birds that are seen in the mangrove forests of Sedili are the Red Jungle fowl, Greater Coucal, Collared Kingfisher, Blue-throated Bee Eater, Dollarbird, different species of sandpipers and plovers. Sea Eagles and the Brahminy Kite are also often spotted near the mangrove forests.

Brahminy Kite

Chinese Egret *(Egretta eulophotes)*

This white egret with a yellow bill breeds in Russia, North Korea, South Korea and mainland China. They migrate south to their main wintering grounds at the Eastern Visayas, Philippines and Malaysia. The population that is found in Sedili has declined due to the loss of habitat.

Malaysian Sand Plover *(Charadrius peronni)*

This small sized bird has a greyish brown upper body faintly scaled, white under belly and yellow legs. It can be seen on the sandy shores of Sedili. The breeding male has a black hind neck collar and more extensive black breast band while the female has pale rufous crown, ear coverts and broken breast band.

Greater Sand Plover

The greater sand plover has a larger body than the Malaysian sand plover. It has a broad head, long and thick bill and yellow legs that is often stained with mud. It can be seen on the mudflat areas of Sedili.

Common Sandpiper *(Actitis hypoleucos)*

This small bird with straight dark bill has a dark olive brown crown and upper body, a white breast and belly with a white curve around the front of the wings. This species is a wintering bird and seen frequently along the river and on coastal beaches and estuarine sand flats and mudflats of Sedili.

Greater Crested Tern *(Sterna bergii)*

This species of tern is a common non-breeding visitor to the Sedili coast. It is a large bird with shaggy crest and a thick slightly down-curved yellow bill. Its mantle is dark grey, neck and entire underparts white, and its legs black. They are often spotted on the mudflats with other shorebirds.

Oriental Pied Hornbill *(Anthracoceros albirostris)*

This hornbill species can be easily identified by its large long ivory white bill, black upperparts and breast. white patch on its belly and below its eyes. Unlike nest of other birds, the female Oriental Pied Hornbill seals itself inside a hollow tree, leaving only a small hole through which the male brings insects and fruits. They can be found in primary and secondary lowland forests along the river banks.

Oriential Pied Hornbill

Collared Kingfisher *(Todiramphus chloris)*

This beautiful Kingfisher species is one of the more common birds of Sedili along the entire Sedili river system. They have blue-green upperparts with white collar, giving the birds their name, and white underparts. Their typical call is loud and is repeated a few times. They feed on small crabs, insects, worms, fish, frogs and small lizards.

Collared Kingfisher

Fish and Invertebrates Diversity

Crabs

Crabs are aquatic arthropods, which mean animals with jointed legs. Most crabs spend their lives in seawater, but some have evolved and adapted to brackish and fresh river water.

Some crabs stay slightly longer periods outside the water e.g. the soldier crabs which live on sandy beaches and fiddler crabs which live on the mudflats. These crabs dig deep burrows down to the water table where they kept themselves wet.

Fiddler Crab

In Sedili Kechil there are many different species of fiddler crabs in different sizes and colours. They are found in mangroves, salt marshes and on sandy or muddy beaches. Fiddler crabs are easily recognised by their distinctively asymmetric claws. It is the male which boasts an oversized claw which is used in courtship ritual or fighting for territory. The smaller pincer is used for feeding. In female crabs, both pincers are small.

Hermit Crab

Hermit crabs use an empty sea shell as a portable house to protect themselves. As the hermit crab grows in size, it has to find a larger shell. They are scavengers feeding on rotting flesh or plants. They have big pincers which they use for feeding. When threatened they retreat into their shells and block the entrance with their pincers to protect themselves.

Mangrove Horseshoe Crab *(Carcinoscorpius rotundicauda)*

Horseshoe crabs are also known as king crabs. Though they belong to the arthropoda family, along with crabs, insects, and other invertebrates with jointed legs, their closest living relatives are actually spiders and scorpions. They are ancient creatures and have lived for thousands of years. The horseshoe crab has a helmet shaped shell which protects its body, which measures around 25cm in diameter. Its shell is greyish and its tail is shaped like a spike which resembles a chopstick. It is often assumed that the tail is used to ward off enemies but it is actually used to right themselves when they are turned upside down. Horseshoe crab is a delicacy in Sedili Kechil. The egg is slightly chewy and is often prepared in a sambal dish.

Archer Fish

The archer fish gets its name from the way it hunts. It swims close to the water surface, searching for insects or small crabs resting on the roots or on overhanging leaves. When it spots its prey, it squirts water that knocks the unsuspecting prey into the water. It evens accounts for the refraction of the water when aiming for its prey! It has yellow and black broad strips on its body.

Mudskipper

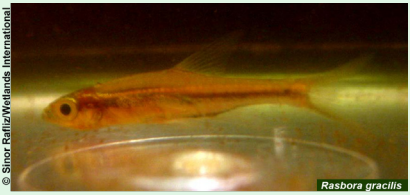
Locally known as belacak, mudskippers are one of the most fascinating animals of the intertidal life of mangroves and mudflat habitats. Best described as a cross between a fish and a frog, mudskippers are equipped with fins and gills which allows them to swim in water but also breathe and crawl out of water.

Mudskippers are agile and move over land and climb trees with the help of their pectoral and pelvic fins which look like small arms. When they move on land they appear to be skipping. With their periscope like eyes they can view their surroundings both above and below the water surface. At low tide mudskippers can be seen feeding and warding off competitors on the mud flats. When threatened they withdraw into their burrows.

Freshwater Fish

The forested riparian improves the riverine ecosystem by shading parts of the river, reducing heat stress on aquatic life. Wood debris, such as tree trunks, branches, and twigs, provides structural complexity in the river, creating a habitat for a wide range of invertebrates to feed, spawn and a safe nursery.

The type of fisheries operating in Sedili Kechil is limited to inshore fisheries. Fishermen only catch certain species of river fish like the Giant Snakehead or Toman and Giant River Prawns for commercial purposes. In the intact freshwater swamp forests are the commercially valuable ornamental fish species such as the *Rasbora, Betta* and *Parosphromenus*.



Giant Snakehead or Toman *(Channa Micropeltes)*

The Giant Snakehead fish is known to grow to over a metre in length. It is an aggressive predator and eats other fishes, amphibians and even small birds. As a fry, it is red in colour and develops black lateral stripes after about two months. As the giant snakeheads mature, they lose their stripes and develop a bluish black and white pattern on their upper bodies. In Malaysia, they are bred in fish ponds as game fish because they put up a strong fight when caught. In Sedili, the fishermen catch this fish by attaching shorter lines with bait off a longer fishing line to the branches of trees along the riverbank. They usually set these lines in the morning and check their catch later in the evening.

Fishing for Toman

Giant Snakehead or *Toman (Channa micropeltes)*

Giant River Prawn

Locally known as *Udang Galah*, it is easily recognized by the bluish tinge surrounding its body. The lifecycle of the giant river prawn actually begins in the open sea where the female prawn releases her eggs. When the larvae complete its development cycle, it makes its way back to fresh water.

The giant river prawn is sought after by seafood lovers. Now bred on a larger scale, they cost up to RM80 per kilo in the markets.

Giant River Prawn *(Udang Galah)*

Betta tomi

Betta tomi is listed in the IUCN Red List as a threatened species. This species was only identified in 1994 from specimens collected from the tributaries of Sedili river. They are believed to have since been affected by land development and water development and pollution.

Croaking Gourami *(Trichopsis vittata)*

This small fish species can be found in the freshwater swamp forest far upstream. Their mouth is relatively small and turned upwards. There are many colours of this fish, ranging from green to dark purple with black or red spots on the fins. Sometimes 2-4 black stripes or rows of spots are present on their sides. This species has a breathing organ known as the labyrinth organ, which enables it to live in water that lacks oxygen such as ditches, ponds, and canals. This species have some commercial value in the aquarium fish industry.

Mammals

Sedilli Kechil has a diverse mammal population. Species of mammals recorded in the area include the White-handed Gibbons (*Hylobates lar*), Pig-tailed macaques (*Macaca nemestrina*), Dusky leaf monkeys (*Trachypithecus obscurus*), Long-tailed macaques (*Macaca fascicularis*), Smooth-coated Otters (*Lutra perspicillata*), Plantain squirrels (Callosciurus notatus), Common palm civets (*Paradoxurus hermaphroditus*), Dog-faced fruit bats (*Cynopterus brachyotis*) and Wild Pigs (*Sus scrofa*).

White-handed Gibbon is totally protected animal in Peninsular Malaysia


Pig-tailed Macaque

Although not protected in Malaysia, the pig-tailed macaque is listed by IUCN as a globally vulnerable species. In Malaysia, captured pig tailed macaque are trained to climb trees to collect coconut fruits.

Dusky Leaf Monkey *(Presbythis obscurua)*

These monkeys are leaf-eating and have a sacculated stomach to digest their food. They live in forests and scrublands, but they are also spotted in the mangroves feeding on fruits and flowers. Males tend to be solitary while females remain in their birth groups and form strong social bonds. Infants can be identified by their orange fur.


Dusky Leaf Monkey with Juvenile

Long-Tailed Macaque *(Macaca fascicularis)*

They vary in colour from light brown or greyish to brown fur covering their backs. They have pinkish-brown faces and their fur on the head sweeps back over their faces. Up to 50 individuals live in a troop of monkeys. They have a varied diet consisting of fruit, leaves, insects, amphibians and crabs.

Long-tailed Macaque

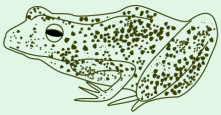
Smooth-Coated Otter *(Lutra perspicillata)*

Belonging to the Asian otter species, the smooth-coated otters can be found in the coast and mudflats of Sedili. They feed on fish, frogs, water rats, turtles and even aquatic birds. They hunt during the day in family groups. It is a totally protected species in Peninsular Malaysia and listed by IUCN as a vulnerable species. Its population has declined in many areas due to loss of wetland habitats.

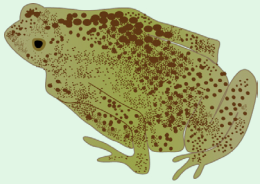
Smooth-Coated Otter

Reptiles and Amphibians Diversity

There is no detailed study on reptiles and amphibians in Sedili Kechil. Reptiles that have been recorded include Water Monitor Lizards (*Varanus salvator*) and the Malayan Box Turtles (*Cuora amboinensis*). Amphibians recorded in the area include Swamp Toads (*Bufo quadriporcatus*) and Rough-sided frogs (*Rana glandulosa*).



Rough Sided Frog *(Rana glandulosa)*



Swamp Toad *(Bufo quadriporcatus)*

Although the status of freshwater turtles, or terrapins, is of concern to conservationist globally, freshwater turtles are not protected by any legislation in Malaysia. The Malayan Box Turtle (*Cuora amboinensis*) found in Sedili is not protected but is listed as Vulnerable species in the IUCN Red List. Most of freshwater turtles or terrapins are riverine-dependent, hence it is importance to protect riparian forests and freshwater swamp forests in order to provide a sanctuary and survival of this species.

Malaysian Box Turtle *(Cuora amboinensis)*

Water Monitor Lizard *(Varanus salvator)*

Locally known as *biawak air*, monitor lizards grow up to 3 metres long and weigh up to 25kg. They have light to dark brown leathery skin and have powerful curved claws. Their long forked tongue helps them detect surrounding smells to find their prey. Water monitor lizards do not chew but swallow their food which consists of small creatures such as bird, fish, amphibians, rodents, insects and crabs and eggs which they steal from the nest of chickens, crocodiles and turtles.

Water Monitor Lizard basking in the sun on a fallen *Nypa* stem along the river

10 What Can You Do At Sedili Kechil

River Safari

Go on a cruise along the Sedili River for a fascinating adventure. A river cruise offers you a unique opportunity to get close to the diverse ecosystems and flora and fauna of the Sedili wetlands. You will learn about the different species living in these diverse ecosystems and the important roles they play.

Exploring The Sandy Beach

Explore the sandy beaches of Sedili. During the migratory season, you can spot waterbirds along the coast. In some areas there are tidal pools where you can find little fishes, snails and tiny sea creatures.

Local Cuisine

Sample the local cuisines like seafood prepared Malay-style or the local dishes like *lokan masak cili padi* (clam cooked with coconut milk and bird's eye chilli), *lempeng* (Malay pancake), *nibong* (young shoots of bamboo), fresh coconut juice or *keropok* (fish crackers) made in Sedili Kechil.

Handicraft

There is a handicraft centre operated by a group of local women just before the bridge to Bandar Penawar. These women have designed and created photo and mirror frames, necklaces, bracelets, wind chimes and small decorative shelf pieces from seashells.

Berkepah (Shellfish Harvesting)

Why observe when you can try your hand at shellfish harvesting. It is a great opportunity to meet and talk with the locals. Shellfish harvesting is normally carried out at low tide.

11 Where To Stay

There are four resorts in Sedili Kechil area. The four closest to the village and the coast are the Jason Bay Resort, Mutiara Motor Resort, Country Resort and Damai Resort.

The Country Resort is closest to the mouth of Sedili Kechil river.

These resorts have chalets except for Damai Resort, located near the Tanjung Sedili Kechil which is built in a dormitory style long house.

ACKNOWLEDGEMENT

We are very grateful to the following people and organization for their kind contributions in the preparation of this guidebook. This book would not have been made possible without their contribution and assistance.

Financial support
Global Environment Facility / Small Grants Programme

Technical assistance
Forest Research Institute Malaysia
Zoo Negara
Community of Kampung Sedili Kechil

Photos Contributed by
David Bakewell
Siti Munirah
Leong Siok Hui

Drawing and illustration
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Appendix 1

A List Of Common And Globally Threatened Birds Of Sedili Kechil

Item	Common Name	Scientific Name	Status
1	Red Junglefowl	*Gallus gallus*	
2	Lesser Adjutant	*Leptoptilos javanicus*	
3	Striated Heron	*Butorides striata*	
4	Pond-heron (unidentified)	*Ardeola sp.*	
5	Cattle Egret	*Bubulcus ibis*	
6	Grey Heron	*Ardea cinerea*	
7	Purple Heron	*Ardea purpurea*	
8	Great Egret	*Casmerodius albus*	
9	Pacific Reef Egret	*Egretta scara*	
10	Little Egret	*Egretta garzetta*	
11	Chinese Egret	*Egretta eulophotes*	VU
12	Osprey	*Pandion haliaetus*	
13	Black-winged Kite	*Elanus caeruleus*	
14	Brahminy Kite	*Haliastur indus*	
15	White-bellied Sea-eagle	*Haliaeetus leucogaster*	
16	Grey-headed Fish-eagle	*Ichthyophaga ichthyaetus*	NT
17	Japanese Sparrowhawk	*Accipiter gularis*	
18	Crested Serpent-eagle	*Spilornis cheela*	
19	Changeable Hawk-eagle	*Spizaetus cirrhatus*	
20	Slaty-breasted Rail	*Gallirallus striatus*	
21	White-breasted Waterhen	*Amaurornis phoenicurus*	
22	Red-wattled Lapwing	*Vanellus indicus*	
23	Grey Plover	*Pluvialis squatarola*	
24	Kentish Plover	*Charadrius alexandrinus*	
25	Malaysian Plover	*Charadrius peronii*	NT
26	Mongolian Plover	*Charadrius mongolus*	
27	Greater Sand Plover	*Charadrius leschenaultii*	
28	Whimbrel	*Numenius phaeopus*	
29	Eurasian Curlew	*Numenius arquata*	NT
30	Bar-tailed Godwit	*Limosa lapponica*	

Item	Common Name	Scientific Name	Status
31	Common Redshank	*Tringa totanus*	
32	Marsh Sandpiper	*Tringa stagnatilis*	
33	Common Greenshank	*Tringa nebularia*	
34	Terek Sandpiper	*Xenus cinereus*	
35	Common Sandpiper	*Actitis hypoleucos*	
36	Grey-tailed Tattler	*Heteroscelus brevipes*	
37	Asian Dowitcher	*Limnodromus semipalmatus*	NT
38	Rufous-necked Stint	*Calidris ruficollis*	
39	Curlew Sandpiper	*Calidris ferruginea*	
40	Sanderling	*Calidris alba*	
41	Broad-billed Sandpiper	*Limicola falcinellus*	
42	Oriental Pratincole	*Glareola maldivarum*	
43	Gull-billed Tern	*Gelochelidon nilotica*	
44	Common Tern	*Sterna hirundo*	
45	Lesser Crested Tern	*Sterna bengalensis*	
46	Great-crested Tern	*Sterna bergii*	
47	White-winged Tern	*Chlidonias leucopterus*	
48	Little Tern	*Sterna albifrons*	
49	Ruddy Turnstone	*Arenaria interpres*	
50	Great Knot	*Calidris tenuirostris*	
51	Spotted Dove	*Streptopelia chinensis*	
52	Zebra Dove	*Geopelia striata*	
53	Pink-necked Green-pigeon	*Treron vernans*	
54	Blue-crowned Hanging-parrot	*Loriculus galgulus*	
55	Long-tailed Parakeet	*Psittacula longicauda*	NT
56	Greater Coucal	*Centropus sinensis*	
57	Lesser Coucal	*Centropus bengalensis*	
58	Collared Scops-owl	*Otus bakkamoena*	
59	Buffy Fish-owl	*Ketupa ketupu*	
60	Spotted Wood-owl	*Strix seloputo*	
61	Large-tailed Nightjar	*Caprimulgus macrurus*	

Item	Common Name	Scientific Name	Status
62	Savanna Nightjar	*Caprimulgus affinis*	
63	Swiftlet (unidentified)	*Collocalia sp.*	
64	Grey-rumped Treeswift	*Hemiprocne longipennis*	
65	Asian Dollarbird	*Eurystomus orientalis*	
66	Stork-billed Kingfisher	*Pelargopsis capensis*	
67	White-throated Kingfisher	*Halcyon smyrnensis*	
68	Black-capped Kingfisher	*Halcyon pileata*	
69	Collared Kingfisher	*Todiramphus chloris*	
70	Blue-tailed Bee-eater	*Merops philippinus*	
71	Oriental Pied Hornbill	*Anthracoceros albirostris*	
72	Black Hornbill	*Anthracoceros malayanus*	NT
73	Brown Barbet	*Calorhamphus fuliginosus*	
74	Common Flameback	*Dinopium javanense*	
75	Black-and-red Broadbill	*Cymbirhynchus macrorhynchos*	
76	Common Iora	*Aegithina tiphia*	
77	Ashy Minivet	*Pericrocotus divaricatus*	
78	Golden-bellied Gerygone	*Gerygone sulphurea*	
79	Brown Shrike	*Lanius cristatus*	
80	Black-naped Oriole	*Oriolus chinensis*	
81	Greater Racket-tailed Drongo	*Dicrurus paradiseus*	
82	Pied Fantail	*Rhipidura javanica*	
83	Large-billed Crow	*Corvus macrorhynchos*	
84	Barn Swallow	*Hirundo rustica*	
85	Pacific Swallow	*Hirundo tahitica*	
86	Yellow-bellied Prinia	*Prinia flaviventris*	
87	Yellow-vented Bulbul	*Pycnonotus goiavier*	
88	Olive-winged Bulbul	*Pycnonotus plumosus*	
89	Dark-necked Tailorbird	*Orthotomus atrogularis*	
90	Rufous-tailed Tailorbird	*Orthotomus sericeus*	
91	Ashy Tailorbird	*Orthotomus ruficeps*	
92	Striped Tit-babbler	*Macronous gularis*	

Item	Common Name	Scientific Name	Status
93	Asian Glossy Starling	*Aplonis panayensis*	
94	Oriental Magpie-robin	*Copsychus saularis*	
95	Hill Myna	*Gracula religiosa*	
96	Common Myna	*Acridotheres tristis*	
97	Javan Myna	*Acridotheres javanicus*	
98	White-rumped Shama	*Copsychus malabaricus*	
99	Mangrove Blue-flycatcher	*Cyornis rufigastra*	
100	Yellow-vented Flowerpecker	*Dicaeum chrysorrheum*	
101	Orange-bellied Flowerpecker	*Dicaeum trigonostigma*	
102	Copper-throated Sunbird	*Nectarinia calcostetha*	
103	Paddyfield Pipit	*Anthus rufulus*	
104	Scaly-breasted Munia	*Lonchura punctulata*	
105	Yellow Wagtail	*Motacilla flava*	

Status: EN = Endangered, VU = Vulnerable, NT = Near Threatened (IUCN Redlist 2008)