

OFFICIAL  
MAGAZINE OF  
NATURE SOCIETY  
(SINGAPORE)

# NATURE WATCH

VOLUME 31  
ISSUE 3  
JUL-SEP 2023  
S\$5.00

**Johor Wilderness  
Beckons (II)**

**To Protect Our Health,  
Protect Our Planet**

**Let's Blur the  
Boundaries Between  
Humans & Wildlife**

## Brilliant Birds of Hampstead Wetlands Park

ISSN 0218-6853



9 770218 685009 >



EST. 1954

**NATURE  
SOCIETY**  
SINGAPORE



**NATURE  
SOCIETY**  
S I N G A P O R E

- PATRON**  
**Professor Tommy Koh**
- PRESIDENT**  
**Dr Yeo Seng Beng**
- VICE PRESIDENT**  
**Dr Ngo Kang Min**
- IMMEDIATE PAST PRESIDENT**  
**Dr Shawn Lum**
- HONORARY SECRETARY**  
**Ms Natasha Raina**
- HONORARY ASSISTANT SECRETARY**  
**Ms Huang Ningxin**
- HONORARY TREASURER**  
**Mr Bhagyesh Chaubey**
- HONORARY ASSISTANT TREASURER**  
**Mr Peter Connell**
- EXECUTIVE COMMITTEE MEMBERS**  
**Mr Albert Liu, Mr Joel Leong, Mr Tan Gim Cheong**
- FINANCE ADVISORY GROUP MEMBERS**  
**Dr Lee Lay Tin, Ms Ng Bee Choo, Dr Shawn Lum**
- CO-OPTED COUNCIL MEMBERS**  
**Mr Goh Si Guim, Mr Tony O'Dempsey, Mr Kua Kay Yaw**
- ADVISORY COUNCIL MEMBERS**  
**Prof Ng Soon Chye, Mr Mason Tan, Dr Geh Min, Prof Lye Lin Heng**
- IUCN COORDINATOR**  
**Ms Ng Bee Choo**
- GREEN CORRIDOR COORDINATOR**  
**Dr Ngo Kang Min**
- COMMITTEE CHAIRS**  
**COMMUNICATIONS COMMITTEE**  
**Ms Natasha Raina, Ms Huang Ningxin**
- CONSERVATION COMMITTEE**  
**Mr Leong Kwok Peng**
- EDUCATION COMMITTEE**  
**Ms Tan Beng Chiak**
- HR & NOMINATION COMMITTEE**  
**Dr Shawn Lum, Ms Natasha Raina**
- FINANCE COMMITTEE**  
**Mr Bhagyesh Chaubey**
- FUNDRAISING COMMITTEE**  
**Ms Natasha Raina**
- PROGRAMMES AND OUTREACH COMMITTEE**  
**Dr Ngo Kang Min**
- STRATEGY COMMITTEE**  
**Dr Yeo Seng Beng**
- AUDIT COMMITTEE**  
**Mr Joel Leong**
- VOLUNTEER MANAGEMENT COMMITTEE**  
**Ms Huang Ningxin**
- SPECIAL INTEREST GROUP CHAIRS**
- BIRD GROUP**  
**Mr Tan Gim Cheong**
- BUTTERFLY & INSECT GROUP**  
**Mr Mohamed Jusri Bin Bangi**
- JALAN HIJAU GROUP**  
**Mr Tan Hang Chong**
- MARINE CONSERVATION GROUP**  
**Mr Lester Tan**
- PLANT GROUP**  
**Mr Bian Tan**
- VERTEBRATE STUDY GROUP**  
**Mr Yeo Suay Hwee**
- NSS SECRETARIAT**  
**ADMIN & ACCOUNTS OFFICER**  
**Mr Joseph Lim**
- MEMBERS & OUTREACH MANAGER**  
**Mr Kerry Pereira**
- REWILDING ASSISTANT MANAGER**  
**Ms Sylvia Tan**
- SENIOR PROJECT OFFICER FOR EVERY SINGAPOREAN A NATURALIST PROGRAMME**  
**Ms Sung Mei Yee**
- PROJECT OFFICER FOR EVERY SINGAPOREAN A NATURALIST PROGRAMME**  
**Ms Michelle Simon Hariff**
- NATURE RAMBLERS**  
**Mr Pandian Parthasarathy**

# NSS Exco's Message

I AM DELIGHTED to write this foreword to another colourful and interesting edition of *Nature Watch*. This quarter, we are particularly honoured to feature an op-ed piece by NSS's Patron Professor Tommy Koh. In recent issues, we have been expanding the Kaleidoscope section which aims to update members on what the Society is doing. We hope that you find it informative. Preparing a regular publication like this is demanding work for a largely voluntary organisation. All my Exco colleagues join in expressing appreciation to our Editor Gloria Seow and her production team, for what is a flagship component of NSS's engagement effort.

Another part of our outreach effort is the wide range of regular walks, talks and other events organised by our Special Interest Groups and Education Committee. Then there is our crown jewel – the 'Every Singaporean a Naturalist' (ESN) project currently focused on school children and their teachers. It aims to help the citizens of tomorrow enjoy, respect and value nature from a young age. There are plans to extend the project to our local communities.

Our ambition is to embed a love for nature as a core value for Singaporeans. You may remember the five Cs (cash, car, credit card, condominium and country club membership) that were much talked about in the 1980s and 1990s denoting the aspirations of people then. The five Cs have since evolved but whatever the variations, our fondest wish is to see a sixth C added to balance the mix: conservation (of nature).

Our new strategic plan gives us a clear direction of where we want NSS to be in five years' time. We have good ideas on how to get there but would like our work to be complemented by continual engagement with our members. During the NSS rebranding exercise earlier this year, we were glad to receive and incorporate very helpful member feedback on the proposed changes. In this spirit, please feel free to contact any member of the NSS Exco, Council, or staff to contribute your ideas and suggestions. For instance, ideas on how to attract new members and retain existing ones; innovative ways of engaging the public with nature; how to manage ourselves more effectively; whether we are advocating strongly enough for a better balance between economic development and nature conservation.

NSS has changed enormously over the last eight years, mostly for the better. We are mindful that too much change too quickly can cause an organisation to lose sight of its cultural compass. We in Exco greatly appreciate the continued support of our members as we keep pushing to expand and sustain our conservation activities.

Sincerely Yours,



**Peter Connell**  
Assistant Honorary Treasurer



Our ambition is to embed a love for nature as a core value for Singaporeans. You may remember the five Cs... our fondest wish is to see a sixth C added to balance the mix: conservation (of nature).



# CONTENTS

Volume 31 Issue 3 July–September 2023

## NATURE WATCH

Official Magazine of Nature Society (Singapore)

EDITOR

**Ms Gloria Seow**

ASSISTANT EDITOR

**Mr Peter Connell**

DESIGNER

**Mr S T Leng**

CONTRIBUTORS

**Prof Tommy Koh, Mr Wong Ting Sern,  
Ms Gloria Seow, Ms Kellie Lee,  
Mr Peter Connell, Dr See Toh Kwok Yee,  
Ms Nur Insyirah Aidil, Mr Kerry Pereira,  
Mr Tay Kae Fong, Dr Dan Khong**

### CONTRIBUTING TO NATURE WATCH

We welcome your articles, surveys, studies, observations, artworks and photo essays on biodiversity, natural history, conservation and related fields. Please email your story proposal to [contact@nss.org.sg](mailto:contact@nss.org.sg). Do include samples of your photographs (maximum 20 images per submission). We require high resolution JPEG images (ideally uncropped) in the largest size available, labelled with a descriptive file name.

### ADVERTISING IN NATURE WATCH

Please Contact:

Nature Society (Singapore)  
510 Geylang Road  
The Sunflower #02-05  
Singapore 389466  
Tel: (65) 6741 2036  
Fax: (65) 6741 0871  
E-mail: [contact@nss.org.sg](mailto:contact@nss.org.sg)  
Website: [www.nss.org.sg](http://www.nss.org.sg)

Advertising rates (full colour):

Full Page - \$2,000

2/3 Page - \$1,500

1/2 Page - \$ 1,000

1/3 Page - \$ 800

15% discount for 4 ads placed sequentially and committed upfront.

*Nature Watch* is printed on LumiArt paper from Stora Enso Europe with ISO 14001 Environmental Management Certification.

Mainly recycled paper is used, the rest is pulp from sustainable and controlled sources in Finland, Brazil and other European countries.

MCI (P) 048/06/2023

ISSN: 0218-6853

Printing by Mainland Press Pte Ltd

Copyright belongs to the authors. All rights reserved. No part of this publication may be reproduced in any form or any means without prior permission in writing from Nature Society (Singapore). The views and opinions expressed or implied in this publication are those of the authors and contributors only and do not necessarily reflect the official views of Nature Society (Singapore) or its members.

2



Brilliant Birds of Hampstead Wetlands Park

8



Johor Wilderness Beckons (II)

14



To Protect Our Health, Protect Our Planet



Let's Blur the Boundaries Between Humans & Wildlife

18 Looking Back One Year Ago...

18 Using Wolbachia to Combat Mosquito Breeding

19

Upcoming  
Activities



## KALEIDOSCOPE

- 20 Engaging the Public at the Festival of Biodiversity
- 21 Rebranding of NSS & Crafting of the New Strategic Plan
- 22 Nurturing Nature's Keepers: ESN Events Highlights
- 24 Snapshots of Past Events

ON THE COVER Buffy Fish Owl (*Ketupa ketupu*) parent feeding juvenile owl.

BIODIVERSITY



# Brilliant Birds

## OF HAMPSTEAD WETLANDS PARK

*Text & Photos by* **WONG TING SERN**

Located within Seletar Aerospace Park, Hampstead Wetlands is a compact green sanctuary. **Wong Ting Sern** shares why this is his favourite haunt.





This page: The Long-tailed Parakeet (*Psittacula longicauda*) is a forest bird that usually flies around in raucous flocks. It is also found in mangroves, forest edge, secondary growth, parks and gardens. Classified as a common resident, it consumes a variety of wild and cultivated fruits and seeds. Annual parrot counts have found that the local population size has been on the downtrend. It is possibly out-competed by the introduced Red-breasted Parakeet (*Psittacula alexandri*) whose numbers are burgeoning. Both birds vie for limited tree holes to nest in.

Facing page, from left:

The Banded Woodpecker (*Chrysophlegma miniaceum*) inhabits forests, mangroves, parks and gardens. Regarded as an uncommon resident, it forages singly or in pairs. The woodpecker systematically probes into crevices, mosses and epiphytes for invertebrates, particularly ants as well as their eggs and larvae. Although striking in colouration, it is unobtrusive and not that easy to spot. Given its loud screech, it is more often heard than seen.

The Collared Kingfisher (*Todiramphus chloris*) is frequently observed hanging out at neighbourhood canals while its distinctive call resonates loudly through housing estates. Hence it is not surprising that Hampstead attracts a number of these blue beauties. Photo shows a kingfisher diving after a fish. This common resident has a varied diet, also feeding on lizards, insects, crabs, earthworms, snails, frogs, and even small birds and mice. Indigestible items are regurgitated as pellets.

Hampstead Wetlands Park has a freshwater ecosystem that attracts an array of birds and other wildlife.

## HAMPSTEAD WETLANDS PARK IS SO TINY

that one can walk around the area in 15 minutes. Despite its diminutive size, it boasts a freshwater ecosystem that attracts an array of birds and other wildlife. Snags and habitat islands in its waterbody are key to the ecology of this wetland, providing shelter, nesting spots and resting grounds for wildlife. This is my favourite haunt for bird photography. I relish the mornings and evenings spent here observing the avian antics from the viewing decks and pathways. Over time, I have come to know the habits of Hampstead's birds, and am able to anticipate their actions to snap those split-second shots. Enjoy the photo essay of my amazing and amusing birdy pals. 🌿



**Above:** A Blue-tailed Bee-eater having an 'argument' with a Yellow-vented Bulbul (*Pycnonotus goiavier*). Interspecies interactions are interesting to watch. In the end, the bulbul flew off and left the bee-eater in peace. This bulbul is a frequently encountered resident found throughout Singapore, in open habitats such as scrublands, mangroves, secondary growth, gardens and parks. It has a mixed diet of small fruits, nectar, shoots, and insects.

**Right:** As the largest of Singapore's kingfishers, the handsome Stork-billed Kingfisher (*Pelargopsis capensis*) is a crowd pleaser whenever it appears. This resident bird lives in or near waterbodies situated in forests, parks, gardens, woodlands and mangroves. It hunts fish, frogs, crabs, rodents and young birds. At Hampstead, I often observe it plunging into the water to look for food. Most of the time, it can be found perched on a branch across the pond.





The Oriental Pied Hornbill (*Anthracoceros albirostris*) needs no introduction. Its population across Singapore has flourished over the years. Some live in the Hampstead area. Often announcing itself with its unmistakable yapping call, the species is loud and social. It typically forages in small flocks. I watched in amusement as this individual walked rather unsteadily across a branch. It had likely indulged in over-ripe fruits that were already fermented and mildly alcoholic. Local birders have recorded the Javan Myna (*Acridotheres javanicus*) becoming drunk and even passing out after feasting on fermented fruits.

The Coppersmith Barbet (*Psilopogon haemacephalus*) is a colourful common resident. It is so named as its incessant 'kuk-kuk-kuk' call sounds like a coppersmith banging on copper sheets. Inhabiting gardens, parks, mangroves and open woodlands, the barbet feeds on figs, fruits and insects caught on the wing. It roosts and nests in tree cavities. Photo shows the barbet carrying away baby poop from its nest.





Above: The Oriental Dollarbird (*Eurystomus orientalis*) is a bulky bird in the roller family. It receives its name from the white coin-shaped patch that can be seen on each underwing during flight. At Hampstead, it usually parks itself on a high branch. Photo shows the Dollarbird sallying after an insect. It eats it on the wing and returns to the same perch after a few seconds. This bird is a common resident and winter visitor, found across mangroves, parks, gardens and forests.



Left: Blue-tailed Bee-eaters (*Merops philippinus*) are winter migrants to Singapore, typically appearing around November. By April, most of them return north to breed. They predominantly hunt flying insects such as bees, wasps, hornets and dragonflies. At Hampstead, the bee-eater looks out for prey from a vantage point such as a bare branch. Upon spotting a target, it swoops down, snatches the insect and returns to its perch. The prey is beaten against a branch to kill it and break its exoskeleton. Some are branch-swiped to remove the stinger before consumption.



Right: The Buffy Fish Owl (*Ketupa ketupu*) is an uncommon resident that inhabits places in close proximity to inland and coastal waterways. It hunts large fishes mostly at dawn and dusk. Photo shows mummy owl feeding junior. The little one made the news in March 2021 when it fell out of its nest and crashed to the ground. It tried to fly off but was caught in a mesh and had to be rescued by ACRES. Thankfully, it was assessed to be uninjured. ACRES staff then used a telescopic pole to place the fledgling onto a high branch and reunite it with its parents.



Left: The Scaly-breasted Munia (*Lonchura punctulata*) is gregarious and forages in small twittering flocks, sometimes mixed with other munia species. The bird sports a massive beak that allows it to feed on grass seeds. It also takes small berries and insects. This munia is regularly encountered in grasslands, scrub, secondary growth, cultivated lands and even urban areas. We have two subspecies in Singapore: *fretensis* (resident) and *topela* (introduced from the bird trade).



Wong Ting Sern has been a nature photographer since the 1970s. He started taking pictures of birds in the late 1990s, first using film cameras before migrating to digital. As an avid traveller, he has been as far north as Ellesmere Island in Canada and as far south as Antarctica.



The Oriental Honey Buzzard (*Pernis ptilorhynchus*) is amongst the most readily seen migrant raptors in Singapore. It makes a living by raiding bee and hornet hives for larvae and honey. Although its plumage is variable, it can be identified by its small pigeon-like head when perched and in flight, as well as by its longer tail compared to the similar-looking Changeable Hawk-eagle (*Nisaetus cirrhatus*). The honey buzzard can turn up anywhere in Singapore during migration, even in built-up areas. Photo shows the raptor soaring on rising thermals.



## Johor Wilderness Beckons (II)

**Gloria Seow** and **Timothy Pwee** seek out the untamed side of Kukup and its environs, enjoying especially the fabulous encounters with its winsome wildlife. This is the second half of their post-pandemic driving tour of Johor, following the first report published in *Nature Watch* Q4/2022.

By **GLORIA SEOW** & **TIMOTHY PWEE** Photos by **GLORIA SEOW**

**F**resh off the Tioman Island ferry, our plan was to catch a coach to Johor and drive a rental car to the coastal town of Kukup for the second leg of our trip.

But we missed our ride and had to arrange for another. By the time we hit Kukup, it was already nightfall but still in time for a seafood dinner and some grocery shopping. Walking back to our hotel, we were alarmed to discover that certain streets were quickly flooding even though it had not rained a drop.

### Otterly Surprising Sighting in Kukup

We realised that the sea was surging in, courtesy of a super spring tide. Moving fast, we shifted the rental car to higher ground. By then the rapidly rising waters had cut off access to our hotel and we were forced to retreat to drier parts to wait out the high tide. Walking the empty streets, we noticed two smallish otters ahead of us. At first glance, they appeared to be juvenile Smooth-coated Otters (*Lutrogale perspicillata*), a highly familiar species to us. One animal waded into the tidal waters behind a parked car. When it saw us, it bolted to join its partner inside a dark school com-

pound and disappeared behind a building. Whipping out our handphones, we managed to film the encounter.

Back on our own, it struck us that these creatures could be the nocturnal Asian Small-clawed Otter (*Aonyx cinereus*), given the late hour and their diminutive size. The small-clawed otter is the tiniest of 13 otter species worldwide. We sent our video to otter experts in Singapore who confirmed our identification. It was a magnificent mega lifer for us both.

During their foraging trips, small-clawed otters wander further from water than other Asiatic species. They hunt

The vast expanse of mudflat at Tanjong Piai National Park teems with mudskippers and crabs.



A lone Whimbrel was out and about, hauling teensy crabs from their holes.



In the darkened streets of Kukup, we encountered a pair of Asian Small-clawed Otters initially misidentified as juvenile Smooth-coated Otters.



An Asian Small-clawed Otter wading into the tidal waters flooding the street.



Our second encounter with likely the same pair of Asian Small-clawed Otters later in the night, this time with a pup in tow.

It struck us that these creatures could be the nocturnal Asian Small-clawed Otter, given the late hour and their diminutive size. The small-clawed otter is the tiniest of 13 otter species worldwide.

crabs, snails, molluscs, insects and small fish. Moving in groups up to 20 strong, rice farmers regard them as allies because crabs are seen as pests in paddy fields.

Stuck outdoors and waiting for the tide to turn, we were hopeful of seeing the otters again. Our luck could not have been better. Just an hour and a half later, there were squeals coming from trees at the far end of a row of deserted food stalls. Three small-clawed otters scampered out of the shadows and sprinted towards us. The fastest runner turned out to be a juvenile, being significantly smaller than the two adults. It stopped abruptly when it saw

Gloria, then approached to within 30 cm of her shoes before backing away. We knew that the trio had gone for a swim as the fur was wet. They trotted off and paused when they spied a dog. Strangely, the canid did not give chase but slunk away instead. This made us wonder if it had a prior bad experience with the otters. The otter family then headed in the direction of the sea and vanished for good.

Our two thrilling brushes with the Asian Small-clawed Otters occurred on 13 July 2022 at 9.53 pm and 11.25 pm with the rising tide peaking at 3.7 m. Both encounters were likely with the same



Over 70 fish farms are within spitting distance of Pulau Kukup, the world's largest mangrove island. Pulau Kukup is visible in the background.

otter pair and their pup. We only returned to our hotel room after midnight when the waters finally abated. Our coach hiccup and the tidal forces conspired to produce these sightings, a true blessing in disguise. Videos of the two encounters are at: <https://www.facebook.com/gloriaseow/videos/1450556698737221> and <https://www.facebook.com/gloriaseow/videos/1565423303852627>.

#### Kukup Boat Tour & Village Maze

The purpose of basing ourselves in Kukup was to visit Pulau Kukup and Tanjung Piai, two nature sites managed by Johor National Parks. The morning after our otter encounter, we popped into the park office in Kukup and toured its small but informative exhibit on local mangrove ecology. While chatting with a friendly staffer, she mentioned that high spring tides flooding the streets are commonplace. Locals are used to the drill of moving their cars away from the jetty area each time it happens. Thankfully, our night grocery run had saved us from the hassle of a soaked car and untold engine troubles.

But we were disappointed to find out that Pulau Kukup, the world's largest mangrove island, was closed for maintenance. Its crumbling boardwalk had kept the island from being reopened after the prolonged Covid-19 shutdown. We settled for a boat tour of the Kukup area instead. The jetty for these tours is next to Kukup Ferry Terminal, which runs regular ferries to Indonesia, namely Tanjung Balai in Karimun and Selat Panjang in Sumatra.

The boat tour took us past numerous fish farms and tantalisingly close to Pulau Kukup to see that the island still boasts healthy mangroves. Our friend Dr Sng Bee Bee had an insider peek at one of these farms to learn its modus operandi and how it supplies the seafood trade in Singapore (see box story). Tidal currents clean the fish cages three to four times a day, making Kukup an ideal locale for rais-

Most memorable for us was exploring two Chinese villages suspended over the sea. Concrete and wooden pathways link up a jumble of houses, shops, eateries, Chinese temples, guest houses, and even a games arcade and school. These structures are built entirely on concrete stilts and platforms along the muddy coastline.



Kukup boasts entire villages suspended over the sea on concrete stilts and platforms.



Sheets of minuscule shrimp spread out to dry next to the narrow village street.

ing fry. However, with over 70 operational fish farms in the area, we worry about the impact of pollution from fish waste on the mangrove ecosystem just metres away.

Most memorable for us was exploring two Chinese villages suspended over the sea. Concrete and wooden pathways link up a jumble of houses, shops, eateries, Chinese temples, guest houses, and even a games arcade and school. These structures are built entirely on concrete stilts and platforms along the muddy coastline. Here, the villagers live and make a living. Surprisingly, many of these buildings are modern. Some are monstrosities rising several storeys. In the mud below, one can spy mudskippers managing to coexist with the tidal swirl of trash.

We spent many intriguing hours wandering the maze of village streets. Although the suspended streets are not wide enough to fit a car, we still had to watch for traffic, mostly motorbikes, carts, bicycles and the odd tourist e-bike. There are hardly any kerbs or railings to protect the careless. Strolling along, we came across charming sights like sheets of minuscule shrimp spread out to dry. They would likely be sold as dried shrimp or processed into *belacan*. In the late morning, we saw a fishing boat pulling up alongside the street to unload its wild catch at high tide. Both villages we explored were reminiscent of other seaside towns we had visited in the region (e.g. Senggarang village in Bintan, Indonesia).

### Tanjong Piai National Park

Located just 12 km from Kukup, Tanjong Piai National Park spans 926 hectares. Of this, 526 hectares are intact mangroves while 400 hectares are mudflats. It is nearly three times the size of Singapore's expanded Sungei Buloh Wetland Reserve (332 hectares). Tanjong Piai, translated as

## Fish Farming in Kukup

By DR SNG BEE BEE

I joined a tour group for a foray into Kukup's fishy food trail that leads back to Jurong Fishery Port in Singapore. The fishing industry provides a vital livelihood for Kukup's residents. We visited a farm to witness how fish and shrimps are reared in wooden compartments floating in the sea. These fishes start off as hatchlings, taking at least a year to grow to adult size before being sold to wholesalers. They are eventually trucked to Singapore and even flown to Hong Kong. The top five table fish farmed here are grouper, sea bass (also known as barramundi), snapper, pomfret and pufferfish.

Fish feed comes in bags of pellets. The farm owner threw some pellets to attract his fishes to the surface. He then scooped one up to show off its size with great pride. One thing he mentioned was climate change being a real threat to his business as it raises the water temperature and affects fish growth. Another thing he revealed was that he once lost a lot of money when his fishes died due to water pollution.

I was concerned about the impact of fish farming on the biodiversity of Pulau Kukup's mangroves located next door. Digging around the internet, I found a few papers. One study revealed an unfavourable shift that led to deforestation on Pulau Kukup from 2013 to 2016. But between 2019 and 2021, its mangrove forest recovered with improved vegetation growth. There are interventions to mitigate the risks of tourism and the fishing industry on the mangroves. They require the use of 'defensive water edge architecture' to safeguard the sensitive mangrove ecology with erosion control structures. Knowing that mangroves are nurseries for young fishes amongst other ecosystem services, I am glad that steps are being taken to protect the biggest mangrove island in the world.

Our group next visited Jurong Fishery Port in Singapore. We met up a second time with the Malaysian man who handles the seafood transport from Kukup to Jurong, and deals with the wholesalers at the port. Work for him begins in the evening and lasts throughout the night as he and others prepare the seafood for sale to retailers. We had a close look at the astounding variety and volume of fresh fish and other seafood being traded. The tour helped us appreciate the hard work needed to bring the precious seafood to our plates.



**Fish and shrimps are reared in wooden compartments floating in the sea. Pulau Kukup can be seen in the background.**

Photo: Dr Sng Bee Bee



**The fishing industry provides a vital livelihood for Kukup's residents.**



We encountered a fantastic array of crabs at Tanjong Piai's mangroves and mudflats.

'Cape of the Golden Leather Fern', is a lot richer in wildlife. Only 325 hectares of this national park is open to guests.

Our visit provided a completely different experience to Singapore's mangroves, and was the high point of our trip. Beginning at the network of boardwalks criss-crossing the dense mangrove forest, we encountered a fair number of skinks and crabs clambering over the exposed mangrove roots, mud lobster mounds and muddy substrate.

Quite a few were Mangrove Skinks (*Emoia atrocostata*). It was a joy to watch them scuttling around and hunting invertebrates. There was also the shed skin of a mystery snake, evidence that the skinks themselves are hunted. Peering closely, we spotted an almost submerged Dog-faced Water Snake (*Cerberus schneiderii*), with its nose positioned above water for breathing. Pawprints etched clearly in the mud suggested Smooth-coated Otter or Asian Small-clawed Otter prowling about.



Mangrove boardwalk at Tanjong Piai National Park.

This elevated path extended seawards, across a vast expanse of mudflat (see opening photo). The walk out onto this mostly treeless stretch, fanned by a gentle breeze and bathed by the evening sun was a surreal experience. The superb tidal flat was teeming with thousands of colourful crabs of various species, frolicking mudskippers and molluscs inching along. Untroubled by human cares, their attention was on each other instead. We amused ourselves watching several territorial



According to [ecologyasia.com](http://ecologyasia.com), the Mangrove Skink inhabits mangroves, back-beach vegetation and rocky shorelines. It ventures into the intertidal zone at low tide to feed on insects and other invertebrates.

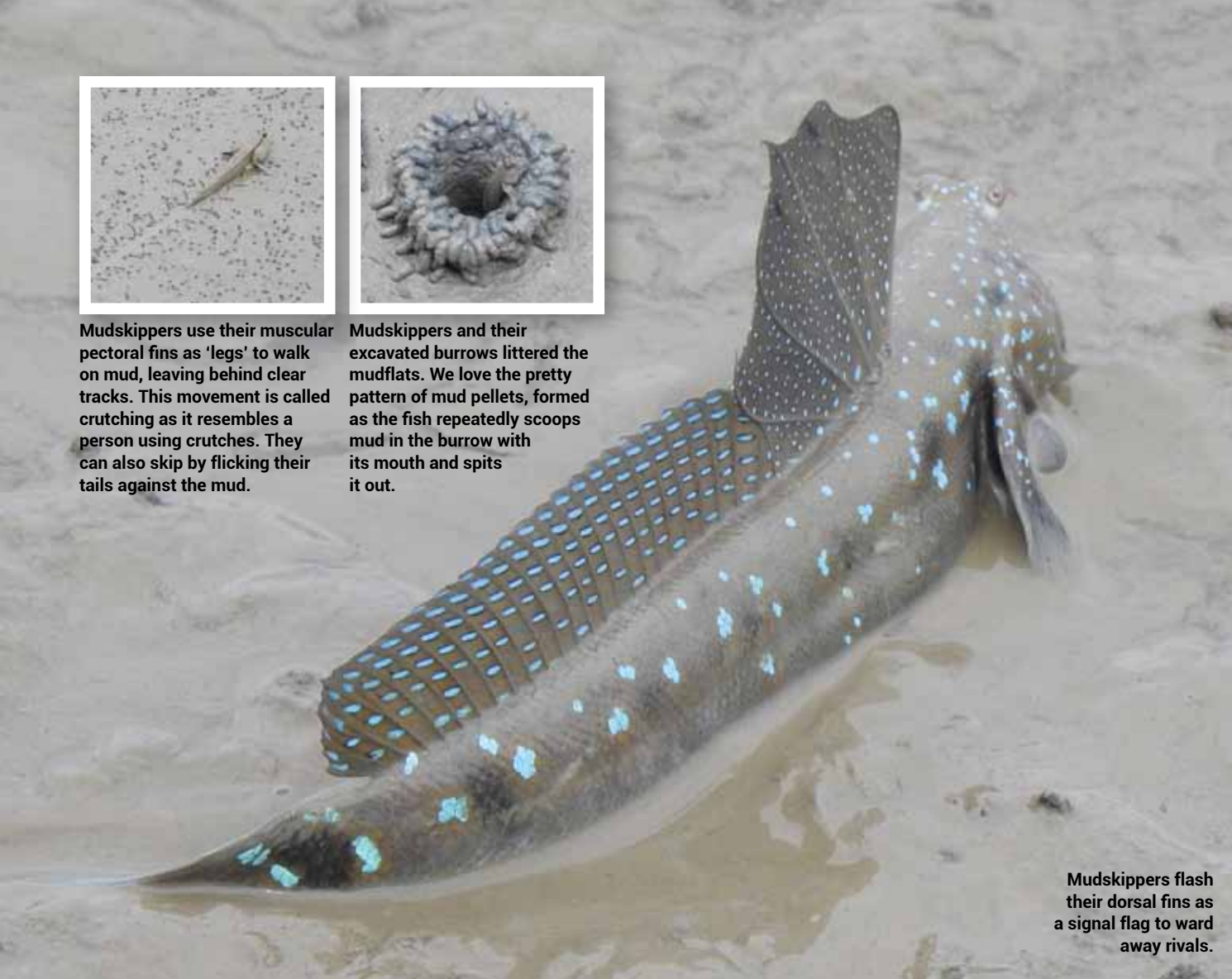


An almost submerged Dog-faced Water Snake hiding amongst air-breathing pencil roots. This nocturnal snake has a diet of fish and invertebrates.



Mudskippers use their muscular pectoral fins as 'legs' to walk on mud, leaving behind clear tracks. This movement is called crutching as it resembles a person using crutches. They can also skip by flicking their tails against the mud.

Mudskippers and their excavated burrows littered the mudflats. We love the pretty pattern of mud pellets, formed as the fish repeatedly scoops mud in the burrow with its mouth and spits it out.



Mudskippers flash their dorsal fins as a signal flag to ward away rivals.

## The superb tidal flat was teeming with thousands of colourful crabs of various species, frolicking mudskippers and molluscs inching along. Untroubled by human cares, their attention was on each other instead.

fighters. Some mudskippers were flashing their dorsal fins as a signal flag to warn off rivals, while others were aggressively chasing each other. Ten species of mudskippers can be found here. Crabs became crabby when establishing and defending territories. A lone Whimbrel (*Numenius phaeopus*) was out and about, hauling teensy crabs from their holes.

In the distance, large vessels and tankers plied the seas on their way in and out of the Straits of Malacca, one of the busiest shipping lanes in the world. The passing ships generate strong waves, threatening the mangrove forest with erosion as well as the occasional oil spill and illegal dumping of ballast water. The situation has been mitigated with the installation of offshore breakwaters (which helps with the build-up of the mudflats) and the intensive replanting of mangrove saplings.

We were taken aback at the crab

diversity on the mudflats and in the mangroves. Many species were new to us. They were imbued with stunning colours, especially the fiddler crabs. And they were tiny, but nothing that our binoculars and zoom lens could not handle. Most visitors were oblivious to their presence, which was a great pity.

We did touristy things too, posing for photos at the 'Southernmost Tip of Mainland Asia' which was marked by a globe monument and plaque. Tanjong Piai provided simultaneous views of two neighbouring countries – Singapore and Indonesia in the distance. The place was recognised as a Ramsar site (wetlands of international importance) in 2003, being a key stopover and feeding ground for migratory shorebirds.

Indeed, the wilderness of Johor is ripe for exploration, and we cannot wait to visit Tanjong Piai and other spots again. 🌿



**Gloria Seow** is a professional copywriter, editor, and nature guide. She has 15 years of nature education experience leading walks and workshops for

schools, corporates and private groups, see <https://lorisowl.wordpress.com/>. She chaired the NSS Education Committee from 2008 to 2016, and is its current Vice Chair. She is also the Editor for *Nature Watch*.



**Timothy Pwee** has been a NSS member since the 1990s. He is perpetually curious about how things, especially nature, relate to each other. Over the years, he has been

involved in various NSS subgroups including the old Publication Committee, Education Committee and Vertebrate Study Group.

# To Protect Our Health, Protect Our Planet

By PROFESSOR TOMMY KOH, Patron of NSS

**O**ur well-being is inextricably bound with the natural world, of which we are a part. But we have been poor stewards of the earth and its resources. April 22 is celebrated around the world as Earth Day. As a tribute to Mother Earth, I would like to focus attention on the link between our health and the health of our planet; specifically, the inextricable connections between humankind and our impact on the earth's land, biodiversity, oceans and atmosphere.

My starting point is that we, human beings, are not separate from the natural world in which we live. Kofi Annan, the former secretary-general of the United Nations, explained the link in these words: "Human health depends, to a larger extent than we might imagine, on the health of other species and on the healthy functioning of natural ecosystems... We cannot do without the countless services provided by biodiversity: pollinating our crops, fertilising our soils, providing millions of people with livelihoods, medicine and much else."

Sadly, we, the beneficiaries, have been very poor stewards of the earth and its resources. Consider the damage we have done in the last 50 years. As a result of human actions, the earth has lost one-third of its forests, 90% of its large commercial fisheries, one-fifth of the land suitable for agriculture, one-fifth of its topsoil, half the coral reefs and 80% of its wetlands.

## Human Health & Biodiversity

There is a price to be paid for our poor stewardship. The bill includes our health, as there is a link between human health and the earth's biodiversity. At the 1992 Earth Summit, which I had the privilege of chairing, two environmental treaties were opened for signature. The first was the Convention on Biological Diversity (CBD). The second was the UN Framework Convention on Climate Change (UNFCCC).

The CBD came into force in 1995. The period 1995 to 2022 was disastrous for the earth's biodiversity. We are losing biodi-

versity at such an alarming rate that some biologists have called this the Sixth Great Extinction.

The Fifth Great Extinction took place 65 million years ago, when the earth was struck by a massive asteroid. The impact resulted in the death of the dinosaurs and many other species of flora and fauna.

Today the threat we face comes not from outer space but ourselves. As a result of deforestation across the world, wildlife is losing its habitat. As wildlife comes into closer contact with humans, this can accelerate the spread of zoonotic diseases, such as Sars and Covid-19. A zoonotic disease is one which originates in an animal. The disease is transmitted from the animal to a human or through an intermediary animal. For example, the Nipah virus was transmitted from a bat to a pig and from the pig to a human.

Apart from the risk of zoonotic diseases, is there any other reason for worrying about the loss of biodiversity? Prof



The most ambitious goal is to conserve at least 30% of land, inland waterways, coastal areas and oceans. Another ambitious goal is to reduce, by 10 times, the rate of extinction of all species by 2030.  
Photo: Gloria Seow.

Edward O Wilson, the Harvard biologist often

described as the

'father of biodiversity', explained why we should worry. In 2008, he wrote: "The mismanagement and destruction of species and ecosystems around the world... lower the quality of the planet's natural resources, destabilise the physical environment, and we hasten the spread of human infectious diseases and the spread of invasive enemies of crops and forests, on which our lives depend.

A renowned entomologist as well, Prof Wilson also wrote: "If the beneficial insects did not flourish, most of our land ecosystems would collapse and a good part of humanity would perish with them."

One of the beneficial insects Prof Wilson referred to is the bee, which is responsible for not only producing honey, but also the pollination of an estimated one-third of all plants or plant products eaten by humans. In 2019, the UN's Food and Agriculture Organisation warned that



Besides being a source of medicine, nature supports human health in other ways. Doctors have found that walking among trees in forests – the Japanese call it ‘forest bathing’ – can lead to improved mental and cardiovascular health.

Photo: Gloria Seow.



One of the beneficial insects Prof Wilson referred to is the bee, which is responsible for not only producing honey, but also the pollination of an estimated one-third of all plants or plant products eaten by humans. Photo: Mohamed Jusri Bin Bangi.

Consider the damage we have done in the last 50 years. As a result of human actions, the earth has lost one-third of its forests, 90% of its large commercial fisheries, one-fifth of the land suitable for agriculture, one-fifth of its topsoil, half the coral reefs and 80% of its wetlands.

declining bee populations pose a threat to global food security.

Is the situation hopeless? It is desperate, but not hopeless. In December 2022, the countries which are parties to the CBD met in Montreal, Canada. At the end of their meeting, they adopted the Kunming-Montreal Global Biodiversity Framework Agreement. Under this agreement, the governments agreed to work towards achieving a set of 23 goals and targets by 2030. The most ambitious goal is to conserve at least 30% of land, inland waterways, coastal areas and oceans. Another ambitious goal is to reduce, by 10 times, the rate of extinction of all species by 2030.

Will these goals and targets be achieved? A sceptic will say that none of the previous environmental goals and targets had been achieved. So why should we believe that these will be met? I have no answer to the sceptic except to hope that a tipping point has been reached, and the governments will summon the political will to do the right thing.

### Atmosphere & the Oceans

In assessing the impact of climate change, one must look at the effects on both the atmosphere and the oceans, as the two are linked. It is an established fact that the earth's atmosphere is warming due largely to the burning of fossil fuels.

The oceans have become warmer too. By absorbing rising quantities of

carbon dioxide from the atmosphere, the oceans have also become more acidic.

One result is that many coral reefs have been damaged by bleaching. The Great Barrier Reef of Australia is a good example. According to a 2022 survey, 91% of the reefs were found to have been affected by bleaching. This is worrying because coral reefs provide food and shelter and act as nurseries for fish. When corals die, the ecosystem is disrupted and fish stocks are depleted, to the detriment of humans ultimately.

Human health is threatened, too, in a more direct way, if global temperatures rise unchecked. A growing body of scientific evidence points to an increase in heat-related deaths as temperatures climb. Experts believe that the battle to keep global warming under the critical threshold of 1.5°C will be won or lost by 2030. The bad news is that global emissions of CO<sub>2</sub> are still rising. The situation is so bad that the UN Secretary-General, Antonio Guterres has described the situation as ‘Code Red’.

### Nature & Medicine

A final point about nature and healing. About half of prescribed medicine comes, directly or indirectly, from natural sources – plants, animals and microbes. Traditional Chinese medicine relies on plants and animals even more than Western medicine. Some examples of medicines derived from plants: aspirin from willow bark, mor-

phine and codeine from poppy, the anti-malarial drugs quinine and artemisinin, and oncorine and vinblastine used in cancer treatment.

Insulin, vital in the management of diabetes, was largely produced from the pancreas of pigs and cattle before biosynthetic versions came along in the 1980s, while heparin, a blood thinner, is derived from bovine and porcine tissue. Is there any medicine derived from microbes? The answer is penicillin.

Besides being a source of medicine, nature supports human health in other ways. Doctors have found that walking among trees in forests – the Japanese call it ‘forest bathing’ – can lead to improved mental and cardiovascular health. In Singapore, Prof Kua Ee Heok is a champion of this belief and practice. His study on ‘Rainforest, Health and Happiness’ was selected for presentation at the 2022 World Congress of Psychiatry.

I will conclude by quoting from two professors at Harvard Medical School, Prof Eric Chivian and Prof Aaron Bernstein. In 2008, they edited a seminal book *Sustaining Life: How Human Health Depends on Biodiversity*. This is how they summed up their wisdom in the book: “Human beings are an integral part of nature, and... our health depends ultimately on the health of its species and the natural functioning of its ecosystems.”

It is a timely message for Earth Day and a guide for all our actions beyond that. 🌱



Prof Tommy Koh (in red) is the Patron of Nature Society (Singapore). In 2006, he received the Singapore President's inaugural Award for the Environment, and the Champion of the Earth Award.

This essay first appeared in *The Straits Times* on Earth Day, 22 April 2023. It has been reprinted in *Nature Watch* with permission.

# Let's Blur the Boundaries Between Humans & Wildlife

By **KELLIE LEE** Photos by **GLORIA SEOW**

Singapore's greening thrust has brought back vegetative diversity and its attendant wildlife. What are the limits of where and how wildlife exists? In theory, boundaries on maps and in policy are well defined. But in practice, humans and wildlife do not always respect them, which can result in conflict. How can we blur the real and perceived boundaries and coexist better with wildlife? **Kellie Lee** examines these questions and more.

**R**oads, buildings, and manmade structures are designated for human use. Parks, forests and nature reserves are the domain of flora and fauna.

These infrastructural boundaries are clearly demarcated on maps. Sharp lines are drawn between areas, with colour-coded spaces for human or wildlife use. Greens and blues indicate tree-dense patches and waterbodies where wildlife can thrive. Colours like whites, pinks and greys represent areas of human activity. The map of Singapore is drawn on the same principle.

## Are Wildlife Overstepping their Boundaries?

Despite such zonings, in reality there is never a clear divide between wild and domesticated ecology. Animals hardly conform to the boundaries set by us. They will wander out of parks and green zones, and transgress into areas designated for human habitation.

Over time, wildlife in Singapore have become habituated to the city's infrastructure. Macaques know that rubbish bins are a source of food and are frequently seen rummaging through trash. Smooth-coated Otters climb ladders to get in and out of concrete canals and waterways. Reticulated Pythons traverse our drains to get from place to place. Animals have even moved in with us. The House Gecko is found in most buildings, while the Common Palm Civet is known to den in the tight spaces between ceiling and roof of some landed homes.

Traditionally, urban areas are sites of human monopoly. As wildlife become increasingly adapted to the built environment, they will encroach further into the city. When this happens, physical boundaries between humans and wildlife are blurred.

## Valuing Wildlife Differently

From the colonial past to the modern contemporary, the Singapore government has always put the welfare of its people above that of wildlife. We wiped out all wild

Malayan Tigers to prevent tiger-related deaths. Culling has been used to keep the populations of macaques, pigeons, and wild boars under control. Likewise, fumigation in neighbourhoods reduces the risk of zoonoses linked to the five pests defined by the National Environment Agency (NEA): mosquitoes, rat fleas, rats, cockroaches, and flies.

Laws enacted respect the value of human property above wildlife. The abuse and killing of wild animals are not allowed by the Wildlife Act, except in defence of property. Furthermore, the Wildlife Act has an exclusion list of four mammals, four birds, five reptiles and all invertebrates, leaving these species unprotected. Where is the line drawn deeming some lives less valuable than others? Among Singapore's wildlife, there is a political hierarchy that values species differently. The following are three examples:

- **Native species / Non-native species** – When trapped, native wildlife stand a chance of being released back into the



As wildlife become increasingly adapted to the built environment, they will encroach further into the city. When this happens, physical boundaries between humans and wildlife are blurred. Photo shows Smooth-coated Otters at Gardens by the Bay.

wild. In contrast, non-native wildlife are kept in captivity, lest they threaten the survival of indigenous animals if released. In short, native species are more valued in the local context. Non-native wildlife may be repatriated and released back into their homeland ecosystems should funding and paperwork be in order.

• **Managed species / Unmanaged species**

– Among native animals, populations of ‘managed species’ such as macaques and wild boars are closely monitored. ‘Unmanaged species’ are allowed to feed and breed freely, at least until they pose a problem.

• **Endangered species / Non-threatened species**

– Conservation projects like rehabilitation and reintroduction are targeted at threatened/endangered species. Their conservation status is derived using a mathematical formula devised by NParks.

**Animals in Our Midst: Yay or Nay?**

To achieve a convivial coexistence between urbanites and wildlife, it is necessary to understand the thinking that drives our attitudes and behaviours towards animals sharing our space. We can explore the overlapping parameters used to categorise and rank such animals.

• **Pets / Wildlife** – Even though pets and wildlife are both nonhumans, they are received dissimilarly. Pets are cared for and treated like humans. They are given names, talked to, caressed, and mourned for upon their death. Companion animals often recognise their human caregivers and reciprocate the affection. Wild animals are accorded no such affinity. They are thought to inhabit spheres outside of humanity, and receive considerably less respect.

• **Good wildlife / Bad wildlife** –

A simplified method of cataloguing urban wildlife is to define them as either ‘good’ or ‘bad.’ ‘Good’ ones refer to species that city dwellers tolerate or even enjoy encountering. ‘Bad’ wildlife represents those that bring about all sorts of inconvenience, from petty annoyances like noise and smell, to life-threatening factors (e.g. zoonoses or injury) and everything else in between. The reasons for displeasure or disgust towards ‘bad’ wildlife extend beyond self-interest. It can also arise when animals that people care about, especially pets, are threatened.

What constitutes ‘good’ or ‘bad’ wildlife is subjective. As the definition of ‘bad’ wildlife is varied – it may

be an animal that arouses a slight displeasure or one that is deadly – so too are their characterisations. Ideas of what is regarded as ‘bad’ wildlife include movement patterns, texture, noise produced, the possibility of being attacked, foreignness, and even the stress induced by their mere presence. ‘Bad’ wildlife is generally unwelcomed in human spaces like homes, roads, buildings and adjacent areas.

The dislike and fear of insects, especially flying ones, is common. A friend

of mine wishes to get rid of the crickets in her neighbourhood as they make a racket at night which affects her sleep. Insects found at home such as ants, houseflies, and mosquitoes are deemed ‘dirty’.

Most people recognise though, the impossibility of exterminating commensal insects from their homes and surrounding areas. As a concession, house geckos that feed on roaches and flies are tolerated. But if insect pests are absent indoors, friends whom I have spoken with will largely be against having geckos around



‘Good’ wildlife refers to species that city dwellers tolerate or even enjoy encountering. ‘Bad’ wildlife represents those that bring all sorts of inconvenience, from petty annoyances like noise and smell, to life-threatening factors (e.g. zoonoses or injury) and everything else in between. Photo shows a colony of Common Fruit Bats roosting under a roof.



Even though pets and wildlife are both nonhumans, they are received dissimilarly. Pets are cared for and are treated like humans. They are given names, talked to, caressed, and mourned for upon their death. Wild animals are accorded no such affinity and receive considerably less respect. Photo shows a baby Wild Boar.

as they produce smelly and hard-to-clean droppings. As such, the gecko straddles a thin line between being 'good' or 'bad'.

- **Cute wildlife / Ugly wildlife** – The appeal of an animal has much to do with its 'cuteness.' Despite consuming pet fish, otters are generally loved, with words like 'otter therapy' used to describe them. In contrast, a video of two hornbills 'mercilessly' devouring a pet bird triggered an outcry against them.

Similarly, for obscure native wildlife such as the Malayan Tapir and Slow Loris, their appearance is used to judge them. Ignorant of the fact that the Tapir is less dangerous compared to the venomous bite of the Slow Loris, one friend unfamiliar with both animals commented that the Tapir looked scary like a wild boar and should remain in the forest, whereas the Slow Loris was cute and fluffy and she would be happy to see them in parks.

### Changing Boundaries, Changing Behaviours

Singapore's branding as a 'City in Nature' should not presume a peaceful coexistence between people and wildlife. As humans, we have the means to choose the animals that stay or leave, and we exercise this privilege all the time.

I believe that we have a natural disposition for valuing nonhuman lifeforms. My friends support fumigation to rid their neighbourhoods of mosquitoes, and are indifferent to the culling of pigeons due to overpopulation. Like the majority of Singaporeans, they have little understanding of the ill effects of such animal control measures. Fumigation kills not just mosquitoes but all other insects including butterflies and beneficial garden bugs. Poisonous bird feed deployed to cull pigeons kill non-target birds as well. After learning of these repercussions, my friends are now hesitant about harming innocent animals.

With a better understanding of how physical, political and psychological boundaries are drawn between humans and wildlife, and between different types of wildlife, we can begin to forge an amicable coexistence with them and to value all lifeforms more equitably. In the same vein, there is an urgent need to include nature education in the national curriculum to pave the way for us to truly embrace our destiny of being a 'City in Nature.' 🌿



**Kellie Lee** is a wildlife anthropologist and environmental sociologist. She has worked with the private, public and academic sectors to research pertinent issues

and find new ways of peaceful coexistence between persons, institutions and nature.

## Using *Wolbachia* to Combat Mosquito Breeding

By PETER CONNELL

IN JUNE 2023, Singapore's National Environment Agency (NEA) invited a delegation from NSS to visit its *Wolbachia* mosquito breeding factory in Ang Mo Kio. For background, only female mosquitoes bite us as they need the protein in a blood meal to produce eggs. Males feed on nectar. Biting mosquitoes represent a significant mortal threat in Singapore. Our primary concern is the dengue virus that is transmitted by the two *Aedes* mosquitoes, *Aedes aegypti* and *Aedes albopictus*. Singapore has recorded an average of 13,000 dengue cases annually over the past decade.

In our tour, we discovered how NEA first extracts eggs from female mosquitoes and injects them with *Wolbachia*, a naturally occurring bacterium. The eggs hatch to produce a population of *Wolbachia*-infected larvae and later pupae. NEA then segregates the pupae by sex. Only *Wolbachia*-infected male mosquitoes are released into the target environment. When they mate with wild females, the resulting eggs will fail to hatch.

NEA is capable of breeding five million *Wolbachia*-infected male mosquitoes for release every week. It is currently achieving 30% coverage of HDB estates and 9% coverage of landed properties. Results are highly encouraging. There has been a 98% suppression of *Aedes aegypti* population at current release sites, and up to 88% reduction of dengue cases at sites with at least one year of regular releases. In 2022, the mapping of dengue outbreaks showed very low case rates within and adjacent to release sites.

We congratulate NEA on this success story. This is a much better option than indiscriminate mosquito fogging that kills beneficial insects too.



The NSS delegation joined a tour to learn how NEA uses *Wolbachia*-infected mosquitoes to reduce dengue transmission. Photo: NEA.



From left: The *Wolbachia* mosquito factory is highly automated. This is a machine for separating male and female pupae. Photo: Huang Ning Xin; Eggs of *Wolbachia*-infected mosquitoes. Photo: Dr Ngo Kang Min.

## Looking Back One Year Ago...

By GLORIA SEOW

The late wildlife consultant, nature guide, and well-known conservationist **Subaraj Rajathurai** was conferred the **Public Service Medal (Posthumous)** in the National Day Awards in August 2022. His wife, NSS member **Shamla Subaraj** (photo at right, centre) was honoured to accept the award on his behalf. In a heartfelt video, Subaraj's son **Saker** (left) thanked Minister for National Development **Desmond Lee** (right) and NParks for recognising the decades of hard work his father had put in. Subaraj was passionate about wildlife and nature education, and was a tireless voice for the animals. He was also a celebrated pioneer in ecotourism. Sadly, he passed away on 22 October 2019 at the age of 56. He will always be remembered for being one of the staunchest advocates of nature in Singapore.



# UPCOMING ACTIVITIES

Compiled by DR SEE TOH KWOK YEE



## Applicable for all NSS Events



Participants have to be well on the day of the event, and must wear a mask if you are coughing or sneezing. NSS reserves the right to turn away participants who are unwell.

12 August 2023, Saturday

### Fun with Heritage Trees

Members Only, Registration Needed



Embark on an immersive journey to offbeat locations to view some of Singapore's heritage trees. Hop on our curated bus tour where we will share stories linking these majestic sentinels to Singapore's vibrant history and national development. The Education Committee is delighted to collaborate with the Plant Group on this fun trip to celebrate our nation's birthday. Time: 8.30 am to 11 am. Fee: \$10 per person. Maximum: 30 participants. Please register at: <https://tinyurl.com/NSSPlantOuting> by 2 August. Contact Kerry at [kerry@nss.org.sg](mailto:kerry@nss.org.sg) for enquiries.

19 August 2023, Saturday

### Butterfly Walk at Bukit Gombak Park

Members Only, Registration Needed



Join Steven Choong and Om Prakash for a colourful butterfly walk at Bukit Gombak Park which boasts an impressive 70 species. Encounter residents like the Silver Forget-me-not, Orange Emigrant, and a recent new comer the Julia Heliconia. If luck is on our side, the Dark Cerulean, Apefly and Common Birdwing could appear. Time: 9.30 am to 12 pm. Maximum: 25 participants. Please register at: <https://tinyurl.com/nssbutterflywalk3> by 11 August. Contact Kerry at [kerry@nss.org.sg](mailto:kerry@nss.org.sg) for enquiries.

26 August 2023, Saturday

### Birdwatching for Beginners at Bishan-Ang Mo Kio Park

Members Only, Registration Needed



Even though it is surrounded by residential estates, Bishan-Ang Mo Kio Park is a sanctuary to many bird species including sunbirds, orioles, munias, kingfishers and herons. The open layout makes it easy for novice birdwatchers to spot birds. Wear appropriate outdoor clothes and bring along your binoculars. Trip leader: Lee Ee Ling. Time: 7.30 am to 10.30 am. Maximum: 15 participants. Please register at: [www.tinyurl.com/NSSBGbirdwatching2](http://www.tinyurl.com/NSSBGbirdwatching2) by 18 August. Contact Ee Ling at [ellee1584@gmail.com](mailto:ellee1584@gmail.com) or HP: 9693-5870 for enquiries.

7 September 2023

### Talk: Bird Conservation in a Challenging Context – Lessons from the Middle East and the Caucasus

Open to the Public, Registration Needed



The Middle East and the Caucasus sit at the crossroads of two of the world's great migratory flyways, used by millions of raptors, bustards and passerines to travel

between Asia and Africa. However, the region is riddled with complex political issues and threats to biodiversity, making bird conservation a challenge. Speaker Tomas Haraldsson will share his experiences working to raise the profile of migratory bird conservation in this region and the initiatives to get young people into birdwatching and conservation. Time: 7.30 pm to 8.30 pm. Maximum: 40 participants. Venue: NSS Office. Please register at: <https://tinyurl.com/talknss> by 1 September. Contact Kerry at [kerry@nss.org.sg](mailto:kerry@nss.org.sg) for enquiries.

16 September 2023, Saturday

### Butterfly Walk at Windsor Nature Park

Members Only, Registration Needed



Join Mohammad Jusri on a butterfly walk at Windsor Nature Park. This beautiful area is home to a great variety of forest butterflies. We will watch and video them. Possible sightings include the Common Birdwing, Common Mormon and Branded Imperial. Do wear walking shoes and bring along water, insect repellent, rain gear, hat and binoculars. Time: 9 am to 11 am. Maximum: 15 participants. Please register at: <https://tinyurl.com/nssbutterflywalk2> by 8 September. Contact Jusri at [nss.org.sg](mailto:nss.org.sg) for enquiries.

23 September 2023, Saturday

### Birdwatching for Beginners at Bishan-Ang Mo Kio Park

Members Only, Registration Needed



Even though it is surrounded by residential estates, Bishan-Ang Mo Kio Park is a sanctuary to many bird species including sunbirds, orioles, munias, kingfishers and herons. The open layout makes it easy for novice birdwatchers to spot birds. Wear appropriate outdoor clothes and bring along your binoculars. Trip leader: Lee Ee Ling. Time: 7.30 am to 10.30 am. Maximum: 15 participants. Please register at: [www.tinyurl.com/NSSBGbirdwatching](http://www.tinyurl.com/NSSBGbirdwatching) by 15 September. Contact Ee Ling at [ellee1584@gmail.com](mailto:ellee1584@gmail.com) or HP: 9693-5870 for enquiries.

30 September 2023, Saturday

### Birdwatching at Satay by the Bay & Marina Barrage

Members Only, Registration Needed



Many bird species can be seen at the water features and rich greenery of Gardens by the Bay. Join Veronica Foo to look for the Lesser Whistling Duck, Red-legged Crane, Stork-billed Kingfisher, various sunbirds and migrant species like the Common Kingfisher, terns and waders. The walk will start from Kingfisher Wetland at Satay by the Bay and end at Marina Barrage. Bring along your binoculars. Time: 7.30 am to 10.30 am. Maximum: 15 participants. Please register at: [www.tinyurl.com/NSSBGbirdwatching3](http://www.tinyurl.com/NSSBGbirdwatching3) by 20 September. Contact Ee Ling at [ellee1584@gmail.com](mailto:ellee1584@gmail.com) or HP: 9693-5870 for enquiries.

30 September 2023, Saturday

### Online Talk: Restoring Singapore's Coral Reefs

Open to the Public, Registration Needed



Singapore's coral reefs have been impacted by coastal urbanisation for over five decades, necessitating the formulation of various measures to assist in their recovery. Join marine biologist Dr Lionel Ng in this talk, where he will share about Singapore's approach to reef restoration, including ongoing research targeting future environmental challenges. Hosted on Zoom by Gloria Seow and Dr Yong Ding Li. Time: 3 pm to 4 pm. Please register at: <https://tinyurl.com/eventnss> by 25 September. Zoom link will be emailed after the closing date. If you do not receive it in your Inbox, kindly check your spam mail. Contact Gloria at [gloria\\_seow@yahoo.com](mailto:gloria_seow@yahoo.com) for enquiries.

7 October 2023, Saturday

### Ramble at Rifle Range Nature Park

Members Only, Registration Needed



Join Pandian for a morning ramble to explore Rifle Range Nature Park. Terrain ranges from medium to difficult. Participants must be medically fit. The walk is not suitable for children below 14 years old. Time: 7.30 am to 2.30 pm. Maximum: 20 participants. Please register at <https://tinyurl.com/nssramble> by 29 September.

14 October 2023, Saturday

### NSS Rewilding Project

Open to the Public, Registration Needed



Join the NSS Rewilding Project to make the Rail Corridor a greener place. Get involved every step of the way, from the manual processing of grass to weed clearance and the planting of native trees. We aim to restore continuous canopy cover to the Rail Corridor for it to be a better conduit for plants and wildlife. Participants need to be physically fit, including being able to lift at least 10 kg of weight and withstand the hot sun. Time: 9 am to 12 pm. Venue: Rail Corridor opposite Jalan Bumbong. Please register at: <https://forms.gle/KRqDWSnCDrsBCb1YA> for any of the dates offered. Contact Sylvia at HP: 9190 4849 for enquiries.

21 October 2023, Saturday

### Butterfly Walk at Bukit Brown

Members Only, Registration Needed



Bukit Brown is a cemetery that once held 100,000 tombs within 86 hectares of secondary forest and semi-open landscape. Join Dr Ngo Kang Min to explore this historical landmark and seek out the butterflies that feed on grasses and herbs. They include the Blue Pansy, Striped Albatross and Common Grass Yellow. Also found there are forest-dependent butterflies such as the Banded Line Blue, Common Palmfly, Common Rose, Commander and Horsfield's Baron. Time: 9 am to 12 pm. Maximum: 20 participants. Please register at: <https://tinyurl.com/nssbutterflywalk> by 13 October. Contact Kerry at [kerry@nss.org.sg](mailto:kerry@nss.org.sg) for enquiries.





# Engaging the Public at the Festival of Biodiversity

By **KERRY PEREIRA**, *Members & Outreach Manager*

Nature Society (Singapore) had a strong presence at the Festival of Biodiversity organised by NParks on 27 and 28 May 2023 held at Heartbeat@Bedok. This annual festival creates awareness and fosters a deeper sense of appreciation for our natural heritage. An estimated 24,000 members of the public attended the event.

Over 20 organisations had exhibition booths including NSS, ACRES, Mandai Nature, Herpetological Society of Singapore, and Singapore Wildcat Action Group. At the launch, guest of honour Deputy Prime Minister Heng Swee Keat and Minister Desmond Lee dropped by the NSS booth. DPM Heng showed keen interest in the conservation concerns presented by Bird Group representative Lim Kim Chuah. They discussed the plight of the critically endangered Straw-headed Bulbul (*Pycnonotus zeylanicus*) and how Singapore, as a stronghold for the species with good numbers present here, plays an important role in its continued survival. Kim Chuah also shared how the Straw-headed Bulbul Working Group, co-chaired



Volunteers engaged visitors with show-and-tell specimens, videos, publications and games at the NSS booth. Photo: Kerry Pereira.



Many biodiversity and green groups were active in public outreach at the well-attended festival which attracted 24,000 visitors. Photo: Kerry Pereira.

by NSS and NParks, is working towards a more comprehensive conservation strategy.

Over the weekend, volunteers from NSS's Bird Group, Butterfly and Insect Group, Marine Conservation Group and Plant Group engaged visitors with show-and-tell specimens, videos, publications and games at our booth. Volunteer guides led nature walks at the nearby Garden Hill Park which gave visitors a first-hand experience of our local biodiversity.

Volunteers from NSS's Bird Group, Butterfly and Insect Group, Marine Conservation Group and Plant Group engaged visitors with show-and-tell specimens, videos, publications and games at our booth. Volunteer guides led nature walks at the nearby Garden Hill Park.



**Making and playing with origami winged fruits of dipterocarps to learn about seed dispersal.** Photo: Tan Beng Chiak.

The Education Committee held a children's workshop 'I Think I Can Fly' where participants were taught how to fold paper origami that imitated the winged helicopter seeds of dipterocarp trees found in our primary forests. Through the hands-on activity, participants learnt the various mechanisms plants use to disperse their seeds. "Many adults and children wore big smiles and were excited to toss their flying fruits to see how they glided," said ESN (Every Singaporean a Naturalist) student volunteer Johnny Tan. "The children were particularly happy to bring home their new toys."

There were also talks held in conjunction with the festival. Joseph Koh, co-author of the recently published tome *A Photographic Guide to Singapore Spiders*, delivered an enlightening presentation on the remarkable diversity of local spiders. Marine biologist at the Tropical Marine Science Institute Sam Shu Qin spoke on the importance of coral reefs and her work in reef restoration. Both talks can be viewed on NParks' YouTube Channel under its Spotlight Series.

ESN student volunteer Johnny Tan shared his reflections, "I enjoyed interacting with experienced NSS volunteers and learning about nature conservation. My conversations with them helped ignite my interest in knowing more about the biodiversity of Singapore as well as the need to conserve our wildlife and help them in the face of development."

# Rebranding of NSS & Crafting of the New Strategic Plan

By TAY KAE FONG

At the beginning of 2023, NSS embarked on a strategic planning initiative to identify key priority areas for the next five years. The planning period lasted four months and was financially supported by the National Council of Social Service (NCSS). As the founder of Binomial Consulting, my team and I felt honoured to have been selected to facilitate the process of fostering NSS's long-term growth through innovation, strategic planning, and branding.

We adopted a design thinking approach to engage all stakeholders in a collaborative and inclusive manner. This led to a series of three workshops and two membership surveys. We had around 30 workshop participants comprising mainly NSS Executive Committee (Exco) and Council members whom we fondly nicknamed 'G30'.

The first workshop was exploratory and saw us discussing a wide variety of issues facing biodiversity and habitats in Singapore and the region. From the discussions, we identified the key areas shaping NSS's strategy as follows:

- 1 Geographical Coverage** – The decision was to focus on Singapore and contribute to Southeast Asia by working through partners.
- 2 Focus Areas** – G30 was mindful of the ongoing attention on climate change and ESG (environmental, social and governance) issues. They felt that staying focused on habitats and biodiversity conservation were still key to addressing these challenges.
- 3 Approach** – G30 decided that it was important to adopt an evidence-based approach in all NSS work.

Subsequently, we surveyed the Society's membership base in February and June 2023 for their feedback and inputs. Based on the considerations, we crafted a new vision and mission statement for NSS. This was shared at the Society's May 2023 Annual General Meeting and in *Nature Watch* Apr-Jun 2023 issue.

With NSS's direction clarified, we worked with G30 to identify key initiatives to pursue in subsequent workshops. Ten initiatives were shortlisted, with five of them slated for implementation in 2023 and 2024. The first five initiatives involve enhancing conservation efforts, strengthening community engagement, boosting advocacy, streamlining organisational processes, and developing talent.

In line with the new strategic plan, NSS's branding was reviewed. A modernised logo based on the existing one was chosen after many rounds of input from G30 and the general membership. This signalled the Society's drive to continue building on existing foundations. We updated the font type to be more legible and made refinements to the roots and propagules of the mangrove tree in the logo. In addition, a new tagline 'Planet | People | Partners' was selected. Work is currently underway to finalise the communication templates to reflect the new brand identity.

The transformation journey for NSS has been inspiring, and we at Binomial Consulting are excited to have played a role in it. As a new NSS member myself, I look forward to seeing the impact of the Society's renewed focus and commitment to biodiversity and habitats.



## NSS vision

To be Singapore's leading advocate of biodiversity and habitats

## Mission

With our evidence-based approach and partnerships with agencies, peers, and corporates, we lead habitat and biodiversity conservation in Singapore and with partners in the region.

Through engagement, education, advocacy, and research, we inspire and enable people to take action towards a sustainable and biodiverse planet.



## ESN EVENTS HIGHLIGHTS

KALEIDOSCOPE

# Nurturing Nature's Keepers

By **NUR INSYIRAH AIDIL**, *NSS Intern*

**L** launched in 2018, Every Singaporean a Naturalist (ESN) is NSS's flagship citizen science and nature education project. ESN aims to empower and equip participating schools with nature and scientific knowledge. To supplement ESN's ongoing Urban Biodiversity Monitoring initiative, NSS staff and volunteers organised a string of activities in the first half of 2023. These included an online speaker series, a nature journalling workshop for teachers, a bird walk for students, and a biodiversity race. We aim to nurture a new generation of passionate and informed individuals to champion the preservation of our natural heritage.

### Naturalist Chatter 2023

This is the fourth year of us rolling out the NSS ESN Naturalist Chatter, an online speaker series designed to broaden and deepen ESN student participants' understanding of nature and conservation in Singapore. This year's sessions featured experts discussing



Three speakers covered a variety of interesting topics under the NSS ESN Naturalist Chatter 2023 banner.

thought-provoking topics centred on habitat fragmentation and loss. It sparked many meaningful conversations on the importance of conservation and sustainable practices among our participants.

### Nature Journalling Workshop for Teachers

ESN project officers help develop the capacity and competency of the teachers helping the ESN programme in their schools. On 15 March 2023, 16 teachers from 10 schools attended a nature journalling workshop held at Sungei Buloh Wetland Reserve. Nature journalling deepens one's observation and critical thinking skills, whilst nurturing appreciation of our natural heritage. The workshop was facilitated by Education Committee Chair Tan Beng Chiak, two ESN teachers Norlinda Ishnin and Siti Nur Nadirah Asmadi, as well as NSS member Azmi Mohammed.

Our ESN educators went on a nature walk at Sungei Buloh, taking in the sights and sounds of its fauna and flora. They then reflected on their wild encounters in their nature journals, followed by a sharing session of their journal entries. To round it off, the teachers exchanged experiences and learnt how to integrate nature journalling into their school curriculum to further engage their students.



ESN teachers first enjoyed a nature walk at Sungei Buloh Wetland Reserve. After the walk, they get busy with nature journalling on site.

### Bird Walk for Schools

ESN staff frequently collaborate with NSS Special Interest Groups to create mutually beneficial learning opportunities for participating schools. On 20 May 2023, a group of 12 student and teacher attendees from two schools went on a guided walk at Jurong Lake Gardens. Led by three talented youth birders Kaeden Sim, Lim Qian Xun and Thongthornpatch Chamadol under the mentorship of Bird Group veteran Lim Kim Chuah, participants had a good time learning from their trip leaders and peers in preparation for the NSS ESN 2<sup>nd</sup> Biodiversity Race 2023.



Trip leaders from the Bird Group pointing out the avian wonders of Jurong Lake Gardens to ESN students and teachers.

NEWS AND HAPPENINGS AT NATURE SOCIETY (SINGAPORE)



## NSS ESN 2<sup>nd</sup> Biodiversity Race 2023

The highly-anticipated NSS ESN 2<sup>nd</sup> Biodiversity Race 2023 took place on 31 May 2023. It attracted an impressive turnout of 38 teams hailing from 15 schools, double the number in 2022. This friendly inter-school competition tested the observation skills and nature knowledge of participants. They explored a park of their choice to record any fauna from five taxonomic groups, namely amphibians, birds, butterflies and moths, mammals, and reptiles. Teams had fun identifying, photographing and uploading their sightings onto the race's iNaturalist platform within the given time of 3.5 hours.



The biodiversity race had 38 teams from 15 schools competing. Race sightings were uploaded onto the iNaturalist platform.

In all, participants recorded 815 observations from 113 species in nine race locations. Of these, 716 observations from 100 species were of research grade and were shared to the Global Biodiversity Information Database (GBIF) to aid in conservation work and research.

The exhilarating race ended at Mapletree Business City with a delectable lunch. Participants received various keepsakes including an educational postcard featuring the Common Rose butterfly. At the Closing and Prize-giving Ceremony, representatives from the 15 schools reflected on their race experience and learnings. Many participants were amazed at their chance encounters. They relayed that this experience has increased their awareness and appreciation of Singapore's wildlife.

Guest-of-Honour Dr Andie Ang delivered the closing speech. Dr Ang is the Head of Primate Conservation and Singapore Programmes at Mandai Nature. She spoke on Mandai Nature's unwavering commitment and support for conservation and presented



Students from Northoaks Primary School reflecting on their race highlights.



First place winner of the 'Best Photographed Observation' award in the Primary School Category went to Teck Whye Primary School for this photo of the Changeable Hawk Eagle being chased by a Drongo.



First place winner of the 'Best Photographed Observation' award in the Secondary School Category went to Yishun Town Secondary School for this photo of the Yellow Bittern.

prizes to all race winners. Award categories included the Highest Number of Species with Research-grade Observation(s), Most Unique Observation, and Best Photographed Observation.

Tokens of appreciation were presented to race sponsors by NSS Vice President Dr Ngo Kang Min. The race would not have been possible without the support of Mandai Nature, NSS Exco and NSS ESN Working Group, as well as the tireless service of race verifiers and volunteers. We extend a heartfelt thanks to Canon Singapore for their camera training session and for loaning 13 cameras to our race participants.

We are also deeply appreciative of Mapletree for providing us with a wonderful after-race venue. Finally, a big shout out to all 38 school teams for racing passionately even amidst the sweltering heat.



Massive turnout of participants at the NSS ESN 2<sup>nd</sup> Biodiversity Race 2023.



# Snapshots of Past Events

By DR DAN KHONG

See Page 19 for Upcoming Activities



KALEIDOSCOPE

NEWS AND HAPPENINGS AT NATURE SOCIETY (SINGAPORE)



**1 Rewilding Project**, 20 May 2023. Twenty-five young trees went into terra firma in the first of a series of rewilding sessions held at the Rail Corridor. Led by Sylvia Tan and Lee Kwang Boon, 15 participants sweated it out while clearing the grass and planting the saplings to the encouraging tunes of a Straw-headed Bulbul (*Pycnonotus zeylanicus*). Two more Saturday sessions happened on 10 and 24 June 2023. Photo: Sylvia Tan.

**2 Plant Walk at Bukit Batok Nature Park**, 20 May 2023. Guided by Tony O'Dempsey and assisted by Sng Bee Bee and Sia Sin Wei, 17 participants learnt about the trees and shrubs thriving in the secondary forest and parkland of this wildlife-rich nature park. The cool cloudy weather and new friends made added to the enjoyment. Photo: Tony O'Dempsey.

**3 Green Mortician Day**, 21 May 2023. It would be nice to have a plot to bury a pet that has died, but most pets are flame cremated. Led by Tan Hang Chong, eight participants visited Toh Guan Centre to learn about the novel method of aqua cremation (aquamation). This is an eco-friendly alternative using water-based reductive dissolution.

**4 Birdwatching at Pasir Ris Park**, 21 May 2023. Wet drizzly weather is never an issue with birdwatchers. They simply take shelter and talk about birds. When the skies cleared, Lee Ee Ling led the group around the mangroves and park and saw birds like the Blue-throated Bee-eater (*Merops viridis*), Common Flameback (*Dinopium javanense*), and Collared Kingfisher (*Todiramphus chloris*), as well as a bonus Mangrove Pit Viper (*Cryptelytrops purpureomaculatus*). Photo: Lee Ee Ling.

**5 Fun at Night at Pasir Ris Mangroves**, 3 June 2023. Guides Spencer Yau and Lena Chow sighted 11 wildlife species with 18 participants in this night romp. Highlights included the Mangrove Snake-eel (*Ophichthidae* family), Chrisangi Leaf Insect (*Phyllium chrisangi*), Mangrove Pit Viper, and a UV-fluorescent millipede. Despite the mangrove streams being turbid after the rains, they also found the Dog-faced Water Snake (*Cerberus rynchops*). Photo: Spencer Yau.

**6 Ramble at Pulau Ubin**, 10 June 2023. This ramble attracted 21 hiking enthusiasts who journeyed through 4.5 hours of overland adventure and encountered a variety of wildlife along the way. They were led by Pandian, Soh Lay Bee, and Yeo Piak Joo. Photo: Pandian Parthasarathy.

**7 Pesta Ubin: Birdwatching at Pulau Ubin**, 10 June 2023. The rare Straw-headed Bulbul is more often heard than seen. Even with guides Yap Wee Jin and Lee Ee Ling, this coveted species eluded the 15 participants. Nevertheless, they had plenty of birds to make up for the dip, including the Blue-eared Kingfisher (*Alcedo meninting*), White-rumped Shama (*Copsychus malabaricus*), and Changeable Hawk-Eagle (*Nisaetus cirrhatus*). The walk doubled up as a bird survey for NParks. Photo: Yap Wee Jin

**8 Plant Walk at Kent Ridge Road**, 10 June 2023. Dr Yap Von Bing and Dr Amy Choong brought 11 participants on an interesting botanical stroll. They encountered 27 species including the Sparrow's Mango (*Buchanania arborescens*), Slender Pitcher Plant (*Nepenthes gracilis*) and Silver Back Tree (*Rhodamnia cinerea*). Participants also learnt how Acacia is made into paper and discovered that Koster's Curse (*Miconia crenata*) tastes like blueberry. Photo: Yap Von Bing.

**9 Pesta Ubin: Enjoy Butterflies at Pulau Ubin**, 16 June 2023. With sunny weather as their ally, guides Amy Tsang, Simon Chan and Mohamed Jusri Bangi were in their element leading 14 participants to seek out the butterflies. In all, they found and photographed 51 species including *Papilionidae*s, *Pieridae*s, *Nymphalidae*s, *Riodinidae*s and *Hesperiidae*s. Photo: Amy Tsang.

**10 Pesta Ubin: Birdwatching at Pulau Ubin**, 17 June 2023. Birding enthusiasts Yap Wee Jin and Lee Ee Ling led 15 participants to find 36 bird species in this fruitful morning walk. Highlights included the Blue-eared Kingfisher, Oriental Darter (*Anhinga melanogaster*), and Blue-winged Pitta (*Pitta moluccensis*). At the same time, they conducted a survey of the Red Junglefowl (*Gallus gallus*), White-rumped Shama and Straw-headed Bulbul as part of NParks' conservation efforts. Photo: Yap Wee Jin.

**11 Talk: An Incredible Photographic Odyssey**, 16 July 2023. Award-winning wildlife photographer and author Bjorn Olesen shared with a full house of 50 persons the story behind his newly-launched 320-page book *Asia's Greatest Wildlife Sanctuaries*. Published in support of Birdlife International, the book documents his incredible photographic odyssey through 27 wildlife sanctuaries across 14 Asian countries over a period of 20 years, and includes numerous conservation success stories. Photo after gorgeous photo, Bjorn told many riveting tales of his wildlife encounters. In the Q&A session moderated by Gloria Seow, the book's editor Dr Yong Ding Li joined Bjorn to answer a slew of questions. Bjorn has generously donated the proceeds from books sold by NSS to the Society. The book can be bought from NSS and leading bookstores. Photo: Timothy Pwee.

# NATURE SOCIETY (SINGAPORE)

Planet | People | Partners



**VISION** To be Singapore's leading advocate of biodiversity and habitats.

**MISSION** With our evidence-based approach and partnerships with agencies, peers, and corporates, we lead habitat and biodiversity conservation in Singapore and with partners in the region. Through engagement, education, advocacy, and research, we inspire and enable people to take action towards a sustainable and biodiverse planet.

## Why Join NSS?

Nature Society (Singapore) or NSS is dedicated to the study, conservation and enjoyment of the biodiversity and natural heritage of Singapore, our neighbouring countries and the wider world. The Society is a non-profit, non-government organisation. Our members work with commitment and altruism to conserve Singapore's remaining nature areas such as forests, mangroves, wetlands and reefs.

NSS was formerly known as the Singapore Branch of the Malayan Nature Society (MNS), formed in 1954. In 1991, we became independent as Nature Society (Singapore). Both NSS and MNS continue to maintain strong links with each other.

NSS organises guided nature walks, horseshoe crab rescues, nature surveys, clean-ups, talks, exhibitions, and overseas nature trips. Going on an NSS outing allows you to meet people from all walks of life with a common passion!

## Join NSS Today & Receive *Nature Watch* for Free!

The values that NSS upholds are a bulwark against the excesses of an ultra-materialistic society. If you too feel that protecting our biodiversity and natural heritage are important, join NSS today and support the Society in our work. Members will receive four issues of *Nature Watch* (NSS quarterly magazine) and a regular e-newsletter for free. Members also get to participate in fascinating nature-based activities and events which enable one to forge friendships with fellow nature lovers.

## Follow us at:

- [www.facebook.com/naturesocietysingapore/](http://www.facebook.com/naturesocietysingapore/)
- [www.instagram.com/naturesocietysingapore](http://www.instagram.com/naturesocietysingapore)
- [www.youtube.com/@naturesocietysingapore3888](http://www.youtube.com/@naturesocietysingapore3888)
- [www.linkedin.com/company/nature-society-singapore/](http://www.linkedin.com/company/nature-society-singapore/)
- [www.nss.org.sg/](http://www.nss.org.sg/)

## Nature Society (Singapore) Membership Categories

### ANNUAL SUBSCRIPTION

- S\$40 **Ordinary Member**  
Age 18 and above
- S\$75 **Family Member**  
Husband, Wife & Children under Age 18
- S\$18 **Junior & Student Members**  
Age 12-18 & Full-time Students Age 18-35 enrolled in a Singapore-based institution
- S\$1,000 **Life Member**  
Applicable to Ordinary Members who have joined for 10 years or more
- S\$200 **Affiliate Member**  
Non-Profit Organisations & Schools
- S\$4,000 **Corporate Member**  
Nominal Fee of S\$200 + Annual Tax-Exempt Donation of S\$3,800

## How to Join NSS

To join as a NSS member, please fill in this form <http://tinyurl.com/NSSmembershipform>. It allows you to settle the membership fees within the link. Once your membership is approved by the Executive Committee, you will receive *Nature Watch* and the e-newsletter for free, as well as be able to attend all member-only events.

## How to Join NSS as a Volunteer or Intern

- To join as a NSS volunteer, please fill in this form <http://tinyurl.com/NSSvolunteerform>.
- To apply for internship, please fill in this form <https://tinyurl.com/NSSinternshipform>.

## Payment for Subscriptions & Donations

- Payment for donations and magazine subscriptions can be made by PayNow or PayLah! by scanning the QR code or doing a PayNow transfer to Nature Society (Singapore)'s **Unique Entity Number (UEN) S61SS0142H**. Please enter your name, contact number or email address in the UEN/Bill Reference Number. 
- Fund transfers can also be made to Nature Society (Singapore)'s **DBS Bank Current Account Number 0339023574**.
- For other modes of payment, please get in touch with us via email: [contact@nss.org.sg](mailto:contact@nss.org.sg).
- We also welcome individual and corporate donations to the Society. Please inform us via email ([contact@nss.org.sg](mailto:contact@nss.org.sg)) of the amount you wish to donate, along with your name, title or organisation. Donations may be made by the payment methods mentioned above. Your generosity is much appreciated. Donations are tax exempt.

maple*tree*

Sponsor of Singapore Bird Race since 2019

# Which T-Shirt Have You Raced In? Stay tuned for this year's design!



**The 39th Singapore Bird Race**  
returns again this year on  
**4 & 5 November 2023**

Follow us on Facebook and Instagram  
for registration details coming soon!

Venue sponsor:

maple*tree*  
BUSINESS CITY

   MapletreeArtsintheCity