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DETERMINING THE DENSITY OF

Oriental Pied Hornbills

IN SINGAPORE



Pioneer Marine Biologist Par Excellence
Where Have All the Masked Finfoots Gone?
Addressing the Nature-Deficit Disorder in Singapore
CAT Walk Plus Made Me a Citizen Conservationist





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NSS Exco's Message

I AM HONOURED to write the message for this edition of *Nature Watch*. Nature Society (Singapore) is one of the longest established societies in Singapore. We have helped Singapore retain many aspects of her natural heritage over the past 70 years. NSS has greatly contributed to the concept of Singapore as a City in Nature, forming one of the pillars of the Singapore Green Plan 2030.

Like any living organism or ecosystem, NSS will continue to exist and flourish over time only if we pay attention to our own self-sustainability and self-renewal. It is no irony that the Society is also subject to the laws of nature. As such, NSS is undertaking this necessary journey of self-renewal in 2023. In February this year, we drew up a new Strategic Plan for the next five years. This behind-the-scenes planning session was held with our members, staff, volunteers and other stakeholders. It also revalidated our mission and goals.

One immediate outcome is to relocate the NSS Office, from the urbanised Geylang area to premises closer to our beloved natural heritage that we have helped preserve. You might say that we hope to enjoy the fruits of our labour.

In 2023, NSS received an elevation in status, from the 'intermediate' to the 'enhanced' tier of Singapore's Institution of Public Characters (IPCs). As mentioned in the last issue of *Nature Watch*, the NSS Exco has been streamlined. Exco members now have expanded roles to lead specific committees, as mandated by the Code of Governance of Charities and IPCs in Singapore. This move is essential to the smoother running of an IPC.

Beyond our strategic thrust, we intend to stay true to the fundamental roles that the Society has been playing all these years. Specifically, we will continue to encourage and support nature conservation in Singapore. We will also promote nature awareness and appreciation to the public through our outreach activities. The education of the next generation on the importance of nature is paramount. To this end, we have many projects, chief of which is the 'Every Singaporean a Naturalist' programme. We will also unceasingly strive to achieve a high level of expertise and credibility in specific areas through our Special Interest Groups.

For an expanded version of the refreshed NSS mission and goals, do look out for the new NSS five-year Strategic Plan. We expect to unveil this around the time of the next Annual General Meeting in May 2023.

Best wishes to all NSS members.

Sincerely Yours,



Dr Yeo Seng Beng

NSS Executive Committee Member



IN FEBRUARY THIS YEAR, WE DREW UP A NEW STRATEGIC PLAN FOR THE NEXT FIVE YEARS. THIS BEHIND-THE-SCENES PLANNING SESSION WAS HELD WITH OUR MEMBERS, STAFF, VOLUNTEERS AND OTHER STAKEHOLDERS. IT ALSO REVALIDATED OUR MISSION AND GOALS.



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NATURE WATCH

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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. 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.

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ON THE COVER

Oriental Pied Hornbills in Changi Village. Photo: Bee Choo Strange

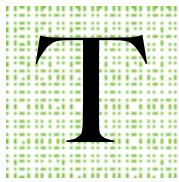


A female Oriental
Pied Hornbill.
Photo by
Brenda Yeo.

Determining the Density of
**ORIENTAL PIED
HORNIBILLS**
in Singapore

BY **BEE CHOO STRANGE**

This citizen science project set out to study the density of Oriental Pied Hornbills in Singapore. For six months in 2022, some 90 volunteers fanned out across the island to survey their allocated sites on a monthly basis for hornbill activity. Project Lead **Bee Choo Strange** of the Hornbill Research Foundation provides insights on this first-time study and its implications for future hornbill research.



Three species of hornbills have been recorded in Singapore: the regularly-encountered Oriental Pied Hornbill (*Anthracoceros albirostris*), the now

extinct Rhinoceros Hornbill (*Buceros bicornis*) and the recent-arrival Black Hornbill (*Athracoceros malayanus*). Singapore's hornbill population has fluctuated over the years.

Singapore's Hornbill History

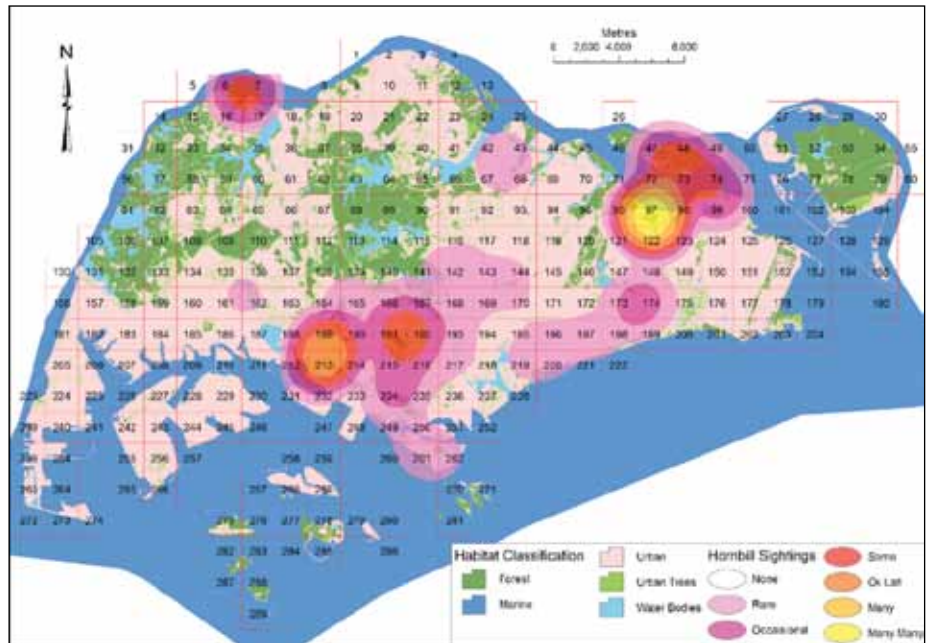
Back in the 1950s, there was no record of these birds in Singapore. A small population in the late 1960s to 1970s were presumed escapees. Things took a turn for the better in 1994 when some Oriental Pied Hornbills (OPHs) were found in Pulau Ubin. They were believed to be visitors from Malaysia. The first OPH breeding report came from Pulau Ubin on 26 April 1997 (Wang L K & Hails C J, 2007 and Lim K S, 2009).

There are more breeding pairs now and they have spread from Pulau Ubin to the main island of Singapore. The hornbill's breeding season in Singapore starts from December and ends in March or April. A clutch consists of one to four eggs, but usually only one to three chicks fledge successfully (Teo, 2012).

Several measures have been taken to boost the OPH population in Singapore. To overcome the shortage of tree holes for nesting, artificial nest boxes were installed



A juvenile hornbill at Berlayer Creek.
Photo by Bee Choo Strange.



Singapore's Oriental Pied Hornbill heat map based on iNaturalist sightings, laid underneath our grid made up of 2 km x 2 km grid squares. Image by Tony O'Dempsey.

by the Singapore Hornbill Project in Pulau Ubin in 2005. This was followed by OPH reintroductions to diversify the gene pool, taking place at the Istana in 2008, Sungei Buloh Wetland Reserve in 2010, and Pulau Ubin in 2013. Both assisted nesting and OPH reintroductions have contributed towards a significant increase in OPH population size throughout Singapore (Ong R Y, 2018).

Laying the Groundwork for the Study

In late 2021, I conceptualised a study using transect survey methods to determine the density of OPHs in Singapore. I then proposed a collaboration with NSS to implement the survey with the help of citizen scientists from the Society. NSS also provided the funds to hire a part-time researcher whose job was to manage the volunteer surveyors as well as devise the study methodology and survey routes. The transect took place between February and August 2022, encompassing three months each of the OPH's breeding and non-breeding seasons, with a month's break in May to allow for breeding hornbills to disperse from their nest sites.

Before we began the study, we had consulted several renowned researchers in Asia: Dr Rohit Naniwadekar from the Nature Conservation Foundation in India, Associate Professor George Gale from King Mongkut's University of Technology Thonburi in Thailand and Dr Yong Ding Li from the NSS Bird Group. We also did a literature review of hornbill and general urban bird survey techniques published in peer-reviewed journals.

We then established a grid laid over the map of Singapore with each square

measuring 2 km by 2 km. There were 289 grid squares covering the Singapore mainland, the Southern Islands, Pulau Ubin, Pulau Tekong, and some offshore areas. Subsequently, all offshore grid squares were excluded from the pool of possible samples, as were those over the Western Catchment, state land and private spaces (eg Changi airport and military areas). Heavily industrialised areas such as shipyards and Jurong Island were also excluded.

Once all non-viable grid squares were removed, we were left with 113 possible survey sites. These remaining grid squares were categorised by habitat type, identified by the largest percentage cover of defined land or water within the square. These fell under one of three habitat types: urban (>75% hard landscaping), forest (>75% forest cover), or semi-urban (percentage of hard landscaping and green cover between 25% and 75%). In total, we had 22 forest, 46 urban, and 45 semi-urban grid squares.

Based on iNaturalist records of OPHs in Singapore, coupled with the observations of experienced bird surveyors, it was apparent that hornbills were living in various clusters across Singapore. For the most part, they were found to the east and south of the Central Catchment Nature Reserve, as well as in Sungei Buloh Wetland Reserve, Sentosa Island and Pulau Ubin.

Study Methodology

For the purpose of this study, particularly in the breeding season, we focused on the southern and eastern quarters of Singapore. This enabled us to gain a thorough estimate of OPH populations in the areas where they were likely to be present.

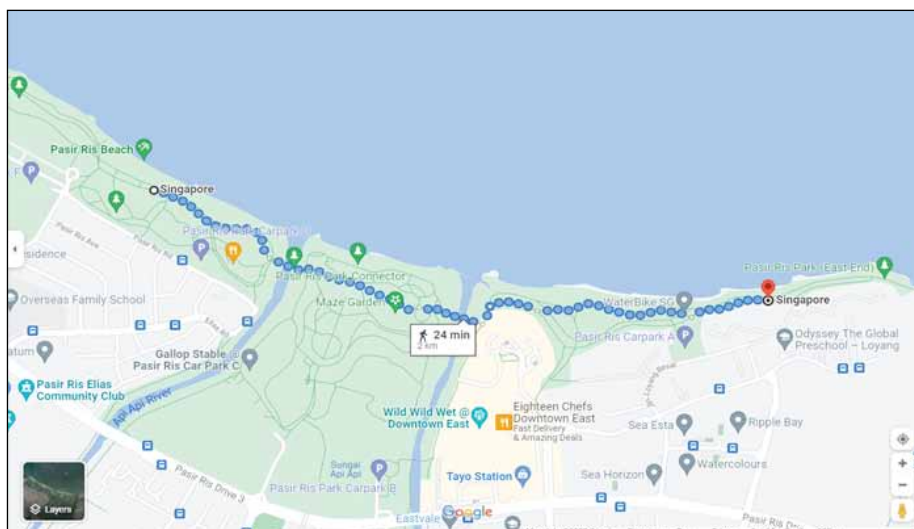
We systematically randomised the survey grid squares across the eastern and southern parts, ensuring that both urban and semi-urban categories were sampled. In this way, we established 32 transects for the study. Nearly 90 volunteers/citizen scientists signed up for these surveys.

In January 2022, part-time researcher Evan Landy and myself as project lead gave a two-hour presentation to all volunteer surveyors. We covered the subject of survey methodology and provided adequate knowledge on how to conduct the transects. The volunteer surveyors were asked to shortlist three preferred sites out of which they were assigned their survey routes. All 32 sites had leaders and most had partners.

Unfortunately, Evan departed for England in late February to start a new job. I then hired another part-time researcher, Karen Young, to take over. As coordinators, we had to ensure that the surveys were being carried out each month between February and August 2022, with a break in May. We faced challenges from volunteers who did not see any hornbills in their initial surveys. In May 2022, a second webinar was held for participants where Karen provided updates of the project status to keep engagement levels high. Most surveyors completed their quota of six surveys while a few requested to change sites.

Results and Conclusions

Out of the 32 sites surveyed, 17 sites had hornbill records while 15 did not. Please refer to the tables below for the list of sites with exact counts at each location, as well as those sites without any hornbills seen throughout the survey period. Sites without hornbill records were also important to the study. From this, we could infer the hornbill's preferred habitats and, for future studies, it could inform our hypothesis of where the species is likely to venture and how it will spread.



Sample survey route (Grid 97) from Pasir Ris Car Park A to the adventure playground.



A female hornbill raiding a Dollarbird's nest in Sentosa. Photo by Bee Choo Strange.

Survey Sites with Hornbill Records	Feb	Mar	Apr	Jun	Jul	Aug	Sites without Hornbill Records
Grid 7 - Sungei Buloh Wetland Reserve	2	-	1	-	2	-	Grid 69 - Sengkang
Grid 47 - Pulau Ubin	8	2	5	-	-	-	Grid 70 - Punggol Waterway
Grid 48 - Pulau Ubin	3	2	4	6	-	6	Grid 90 - Thomson Nature Park & Old Upper Thomson Road
Grid 97 - Pasir Ris Park	3	1	1	2	1	1	Grid 94 - Punggol Park
Grid 99 - Loyang Ave	12	6	4	14	7	-	Grid 119 - Hougang
Grid 100 - Changi Beach Park	-	-	2	-	3	-	Grid 138 - Bukit Batok Rail Corridor
Grid 122 - Tampines Eco Green	1	-	1	-	-	-	Grid 141 - Macritchie Nature Reserve
Grid 143 - Kallang River	-	-	-	-	-	2	Grid 147 - Bedok Reservoir North
Grid 148 - Tampines Urban	-	-	-	1	-	1	Grid 169 - Toa Payoh
Grid 162 - Jurong Lake Gardens	-	1	-	-	9	4	Grid 173 - Bedok Reservoir South
Grid 172 - Kaki Bukit / Bedok Town	-	-	-	-	1	2	Grid 192 - Cluny Road/Singapore Botanic Gardens
Grid 189 - Sungei Ulu Pandan	-	1	-	-	-	-	Grid 214 - One North
Grid 191 - Coronation Rd (Near SBG)	2	4	-	1	-	1	Grid 217 - Singapore River
Grid 198 - East Coast Park - East Section	1	2	-	-	-	-	Grid 220 - East Coast Park - West Section
Grid 234 - Telok Blangah Hill	-	2	1	-	-	1	Grid 236 - Tanjong Pagar
Grid 237 - Marina Bay	-	-	-	-	1	-	
Grid 261 - Sentosa	11	2	5	9	4	-	



A flock of eight Oriental Pied Hornbills sitting on an adventure park platform in Sentosa. Photo by Betty Shaw.

The data collected will be further analysed by Dr Rohit Naniwadekar and a paper is currently being prepared for publication in a peer-reviewed journal. This survey has given us useful insights into the habitat choices and geographic density of the OPH in Singapore. There is also work to be done to study further the OPH's ecology, most importantly its feeding habits.

On my own, I have been monitoring the nesting of OPHs in Singapore since 2022. I note factors such as nesting site locations, choice of cavities in trees or artificial structures as well as the timing and duration of these nestings. If you have any sightings of OPHs at their nests, please submit your record to <https://tinyurl.com/yckxu7rk>. 🌿



A male bird at East Coast Park bringing mud to seal up the female in her tree hole nest. Photo by Bee Choo Strange.

ACKNOWLEDGEMENTS

We are grateful to mapping specialist Tony O'Dempsey for helping to produce the survey maps. We thank all our volunteer surveyors (see list below), for without their efforts, the study would not have been possible. Thanks too to Lim Kim Chuah of the Bird Group who recommended the researchers and survey leaders; and to Dr Rohit Naniwadekar, Associate Professor George Gale and Dr Yong Ding Li for their advice on survey methodology and data collection.

We applaud our volunteer surveyors: Alex Lim, Alfred Chia, Andrew Young, Andy Bell, Ang Soo Khoon, Ang Xuan Xi, Angela Wong, Angus Lamont, Anne Liew, Anuj Jain, Bee Choo Strange, Betty Shaw, Chan Yi Qian, Chiang Wai Jeon, Chris Ward, Christine Chee, Chua Ling Huey, Chua Ling Yan, Chung Cheong Wong, Cynthia Wan, Diane Bell, Dylan Glover, Emily Kang, Foo Wei Zhen, Freesia Shee, Geoffrey Sanders, Gloria Seow, Huang Ningxin, Jai Humphries, Jeff Obbard, Jessica Lee, Jocelyn Chng, John Chin, John Spencer, Jonas Chia, Joshua Teo, Karen Chen, Karen Young, Kelvin Chiang, Kerry Pereira, Khoh Zhi Wei, Kieran Krygsman, Kiki Bianca Tan, Koh Jun Wang, Lee Ee-Ling, Lee Ming De Samuel, Lee Wee Meng, Liang Han Wong, Lim Hui Choo, Lim Kim Chuah, Loke Kok Fai, Lorna Haizelden, Marcel Finlay, Michelle Hariff, Michelle Lai, Morten Strange, Ng Xue-rui Chloe, Richard Sanders, Ross Glover, Rowan Lamont, Saker Subaraj, Samantha Choo, Shuna Maekawa, Sia Sin Wei, Steven Shields, Sung Mei Yee, Susan Knight, Tan Bee Lan, Tan Leng Seow, Tan Shin Ying, Tan Ying Lin, Tay Xue Ying, Terese Teoh, Thomas Mason, Timothy Pwee, Trinity Chua, Wilson Shee, Wong Chin Khuen, Woon Siew Yan and Zaheeda Binte Yahya.

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Bee Choo Strange is the International Coordinator of the Hornbill Research Foundation and Programme Manager of the IUCN SSC Hornbill Specialist Group. Her

work involves organising conferences and workshops as well as liaising with the international community on hornbill research and conservation. She has been a life member of NSS since 1987 and is active in the Vertebrate Study Group.

CAT Walk Plus Made Me a Citizen Conservationist

BY TANVI DUTTA GUPTA

Citizen Action for Tigers (CAT) Walk Plus, where volunteers regularly patrol an important wildlife corridor in Malaysia, is crucial for the conservation of the Malayan Tiger. **Tanvi Dutta Gupta** shares how this is so.

When people ask me about Southeast Asia, I often tell them about the jungles of Taman Negara in Malaysia. It has been four years since I left for my studies in the US, but so much of the forest experience has stayed with me. The drive from Kuala Lumpur airport as we watch the oil palm plantations give way to the dense forests of Pahang; the early morning river crossing; a typical day forging through a rainforest like no other: thick, vast, and humming with secrets that we could only glimpse the edges of. Like the gibbon we saw through a clearing swinging through the trees; like the hornbills we viewed through a gap in the interlocking branches, almost alien in their brightness silhouetted against the tropical sun. Most of all I have kept this: a feeling of connection with a higher cause, and the knowledge that my presence in these forests have made a difference for all the wildlife seen and unseen, from the smallest worker ants to the almighty king of the jungle.

In this trip, I was a participant in CAT (Citizen Action for Tigers) Walk Plus – a project led by the Malaysian Conservation Alliance for Tigers (MYCAT). MYCAT is an alliance of non-governmental organisations comprising the Malaysian Nature Society, Traffic Southeast Asia, Wildlife Conservation Society-Malaysia Programme and WWF-Malaysia. CAT Walk Plus trips are regularly held even today, to allow ordinary people from around the world

to play a part in implementing MYCAT's grassroot work towards tiger conservation in Malaysia.

Tigers in Malaysia are in dire straits. By the estimates of the Malaysian government, there are less than 150 individuals left in the wild. Hence, the survival of every single animal is critical to ensure that Malaysia's forests continue to keep their most iconic species and maintain their



apex predator for ecosystem stability. With so few left, it is becoming harder for the remaining Malayan Tigers (*Panthera tigris jacksoni*) to find each other in the vast forests. The constant threat of poaching for tiger products makes it all the more difficult. Every tiger killed in these parts puts the species closer to extinction.



Left and below: The NSS Vertebrate Study Group worked with MYCAT to monitor the wildlife at the Sungai Yu Ecological Corridor from 2015 to 2019. VSG members have always seen and learnt a lot on these trips.



Sungai Yu Ecological Corridor in Taman Negara is a critical passageway that connects the forest of the Main Titiwangsa Range with Taman Negara National Park, allowing animals to cross freely and interbreed. Photo by Bingyu Wu.

The state of Pahang, where MYCAT operates, plays a make-or-break role in the conservation efforts for the Malayan Tiger. Pahang state is where two critical forest habitats are connected. It lies between the Main Titiwangsa Range (an enormous stretch of rainforest that spans the spine of Malaysia) and Taman Negara National Park (the country's second largest expanse of forest).

The Sungai Yu Ecological Corridor in Pahang is the critical site connecting the two halves. When I first set foot in it four years ago, it seemed unremarkable – no more than a highway underpass. But as I learnt over two full days of CAT-walking through these forests, talking to the conservationists present, and gaining a deeper insight into MYCAT's mission, I realised that the Sungai Yu Ecological Corridor is much more than a mere underpass. Serving as the critical corridor between Malaysia's two largest forest patches, MYCAT's work

Fascinating Facts **THE MALAYAN TIGER**

The Malayan Tiger (*Panthera tigris jacksoni*) lives only in Peninsular Malaysia. Its original range extended to Singapore and southern Thailand, where it is now extinct. This subspecies is classified as critically endangered in the IUCN (International Union for Conservation of Nature) Red List. Tigers are solitary animals except when they have cubs. Two to four cubs may be born every couple of years. Cubs stay close to their mother until they are two years old, growing stronger and learning to hunt. Threats facing the Malayan Tiger include the illegal tiger trade, loss of habitat, and shrinking numbers of its prey species. Tigers are heavily poached for their bones and skin. The Malayan Tiger's population has been estimated at below 150 individuals, based on the comprehensive National Tiger Survey that took place between 2016 and 2020. There is a trend of population decline that continues to this day. Learn more about the Malaysian-wide effort to save this precious species at <https://www.malaysiakini.com/news/630029>.



Camera trap photo of the Malayan Tiger at Sungai Yu Ecological Corridor. Photo by MYCAT.

helps ensure that the Sungai Yu Ecological Corridor continues to provide an ecologically-sensitive and protected passageway between the Main Titiwangsa Range and Taman Negara for tigers.

This wildlife corridor could be the key to the survival of the Malayan Tiger. It allows tigers that live in the two ecosystems to cross freely, intermingle, and breed. This will hopefully grow their population size in the face of immense threats like poaching and habitat loss.

CAT Walk Plus ensures that Sungai Yu Ecological Corridor continues to play an outsized role in tiger conservation. On my final day there, still fresh and reeling from exploring these gorgeous forests, we as participants took a few hours to plant native trees at the corridor. One day, these saplings will grow to be as tall as the surrounding forests to enhance animal crossings, not just for tigers but for all other wildlife. By then, the animals will not notice where one forest reserve ends and the other begins. Indeed, the reforestation efforts are the capstone of each CAT Walk Plus expedition.

Back in our accommodation at night, we felt privileged to look at camera trap photos CAT Walkers have helped support. These trail cameras watch over the Sungai Yu Ecological Corridor when no one is around. The many photos captured provided an insight to the animals that use the corridor such as the Malayan Tapir (*Tapirus indicus*), Asian Elephant (*Elephas maximus*), Wild Pig (*Sus scrofa*) and more.



Elephant footprints are proof of the abundant wildlife at Sungai Yu Ecological Corridor. Poachers are drawn to critical chokepoints like this because animals are concentrated in the few wildlife corridors of Malaysia. Photo by Jocelyn Chng.

Trail cameras watch over the Sungai Yu Ecological Corridor when no one is around. The many photos captured provided an insight to the animals that use the corridor such as the Malayan Tapir, Asian Elephant, Wild Pig and more.

Launch of THE SUBARAJ TRAIL

By Dr Vilma D'Rozario, Co-director of Singapore Wildcat Action Group (SWAG)

We took *The Subaraj Trail* for the first time in September 2022. Situated at the Sungai Yu Ecological Corridor in the foothills of the Main Titiwangsa Range, this forest trail was named by MYCAT in memory of the late Subaraj Rajathurai. Subaraj was a renowned wildlife consultant, activist, tiger lover and co-founder of the NSS Vertebrate Study Group. True to the spirit of our dear friend, this trail was lush and 'tigerish', resounding with the songs of siamangs, cicadas and beautiful birds.

Our presence along *The Subaraj Trail* helped deter poachers looking to snare animals to supply the illegal trade in wildlife products. We were careful to look out for signs of illicit activities, such as animal traps or even a poacher's campsite. Thankfully, we found none. We were pleased to come across many signs of wildlife using the trail, from mousedeer and Malayan Tapir (*Tapirus indicus*) hoof prints to mud rubbings on tree barks left by Wild Pigs (*Sus scrofa*) as well as trail camera images of Barking Deer (*Muntiacus muntjak*), Malayan Porcupine (*Hystrix brachyura*) and Malayan Tapir. Aside from community ranger patrols, the added protection afforded by citizen conservationists doing a CAT Walk Plus trip will help keep this important wildlife corridor safe from poachers.



CAT Walk Plus participants from Singapore were there to launch The Subaraj Trail in September 2022, accompanied by MYCAT general manager and conservation head Dr Kae Kawanishi (second from right). Photo by SWAG.



CAT Walk Plus trips are regularly held even today, to allow ordinary people from around the world to play a part in implementing MYCAT's grassroots work towards tiger conservation in Malaysia.

The knowledge that there are people patrolling the forests of Sungai Yu Ecological Corridor – the thousands of CAT Walk Plus participants who have come over the years, on top of the work of local community rangers – will deter poachers from operating there. Photo by Bingyu Wu.

Poachers are often drawn to critical chokepoints like Sungai Yu Ecological Corridor because animals concentrate there, in the few wildlife corridors of Malaysia. The presence of CAT Walkers month after month, year after year, can be one of the best ways to protect tigers from poachers. On forest patrols, CAT Walkers keep watch for the snares and traps that are the markers of poachers' activities and the killers of wildlife. If any is found, we will alert the authorities to promptly remove and destroy them.

The knowledge that there are people patrolling these forests – the thousands of CAT Walkers who have come over the years – will help deter poachers from operating in this area. Our actions may be the crux of Malayan Tiger conservation. By going on a CAT Walk Plus trip, you too can become a forest protector and citizen conservationist. 🌿



Tanvi Dutta Gupta is studying biology, ecology and science communication at Stanford University. She loves writing, baking and photography. She went for a CAT Walk Plus trip for the first time in 2018 and values the friends, lessons and memories of this trip till this day.

→ Upcoming 3D/2N CAT Walk Plus Trips

Citizen Action for Tigers (CAT) Walk Plus is a citizen conservation programme that empowers the public to get directly involved in protecting the Malayan Tiger and other threatened wildlife sharing the same habitat. Organised by MYCAT (Malaysian Conservation Alliance for Tigers) and SWAG (Singapore Wildcat Action Group), you will be walking in the Sungai Yu Ecological Corridor to deter potential illicit activities like poaching and illegal mining by your presence. Look out for wildlife signs such as Sun Bear tracks. Listen for Siamang calls from high up in the trees. Let the rain-forest soothe your stress away. Walk the same trails as Asian Elephants. Dip in cool forest pools. Stand a good chance of spotting a Leopard Cat. Help check and maintain the trail cameras installed by MYCAT to monitor the abundance of wildlife. Sign up today to help protect the last wild Malayan Tigers!

To find out more, please visit <https://www.swagcat.org/cat-walk>.

DATES

13 - 15 May 2023
10 - 12 Jun 2023
8 - 10 Jul 2023
5 - 7 Aug 2023
9 - 11 Sep 2023
7 - 9 Oct 2023
4 - 6 Nov 2023
2 - 4 Dec 2023

FEE

RM1,000 per person

→ Leopard Cat Quest @ Ubin

The Singapore Wildcat Action Group (SWAG) has been organising the Leopard Cat Quest walks since 2022 to search for Singapore's only native wildcat on Pulau Ubin. Critically endangered with an estimated population of just 50 individuals, the Leopard Cat is found in mainland Singapore inhabiting the Central Catchment Nature Reserve and Western Catchment, as well as in the islands of Pulau Ubin and Pulau Tekong. The Quest is a guided night walk where participants seek out the Leopard Cat along Ubin's kampong lanes and forested areas, hopefully encountering the Greater Mousedeer, Common Palm Civet and other wildlife as well. Please visit <https://www.swagcat.org/store/> to learn more.



DATES

19 May 2023
21 Jul 2023
15 Sep 2023
17 Nov 2023

TIME

7 pm to 11 pm

FEE

\$88 per person (adult/child, inclusive of boat rides to Pulau Ubin)

Where Have All the Masked Finfoots Gone?

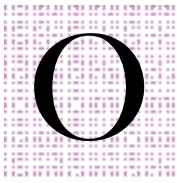
BY DR YONG DING LI

The Masked Finfoot is one of Asia's rarest waterbirds. A recent study estimated the global population of this taxonomic oddity at around 350 individuals. The finfoot was last seen in Singapore in 2009, while the last verifiable encounter in Peninsular Malaysia was in 2015.

Dr Yong Ding Li examines the bird's known habitat and behaviour, and highlights what could be done to reverse its worrying decline in Southeast Asia.



The bulk of the Masked Finfoot's population is found in the Sundarbans of Bangladesh, the largest mangrove forest in the world. This photo by Yann Muzika was taken in the Sundarbans.



On 26 December 2009, hundreds of bird-watchers and nature photographers flocked to Singapore's Upper Seletar Reservoir to seek out one of the rarest waterbirds in Southeast Asia. The quarry was an adult Masked Finfoot (*Heliopais personatus*), discovered a day earlier in a forested inlet near the Singapore Zoo and opposite the former Mandai Orchid Gardens. I stood amongst the eager birders gawking at and photographing the finfoot as it paddled leisurely and fed alongside the Simpoh Air (*Dillenia suffruticosa*) lined fringe of the reservoir. This one-off sighting joined the handful of records of this little-known waterbird in Singapore.

Previous reports were of single birds from Sungei Buloh and the Central Catchment reservoirs seen by one or two observers; few were backed with photographs or detailed notes. Little did we realise that the Upper Seletar Reservoir sighting was to be the last record of the species in Singapore.

Distribution Range & Behaviour

Listed as critically endangered by IUCN, few species of waterbirds in Asia are as iconic as the Masked Finfoot. The bird is instantly recognisable with a facial appearance unlike any – a black face mask and neck with a banana-like bill and a knob on its forehead; a duck-like gait; and large-webbed feet that recall those of grebes and coots. Globally, there are only three species of finfoots. They belong to a unique family of duck-like waterbirds found across the Old World tropics and the Americas. The best known is the African Finfoot (*Podica senegalensis*), which is just as secretive and little observed. Asia's Masked Finfoot is the least known of the three, and the most imperilled.

Once upon a time, the Masked Finfoot ranged widely across the lowlands of northeast India, Bangladesh and Southeast Asia, occurring along densely forested rivers and swampland. The fate of this species is very much intertwined with the fate of tropical Asia's forested rivers.

The Masked Finfoot has persisted a little longer in Peninsular Malaysia compared to Singapore. About 15 years ago, one of the best ways to see it was via a motorboat cruise along the Tahan River in Taman Negara National Park. This locality was where many visiting birdwatchers probably encountered their first finfoot. Old timers remembered seeing several finfoots placidly swimming alongside Taman Negara's river banks. Once in a while, they would perch by the water's edge to reveal their oversized toes.

Today, no one has any recent memory of the last time a finfoot was seen in the waterways skirting Taman Negara. It is likely that none have been encountered for a few years now, according to experienced bird guide James Neoh who visits the national park several times a year.

There have been very few records of the Masked Finfoot in Peninsular Malaysia since 2010. One of the most recent sightings was that of an adult finfoot observed at an abandoned tin mining pool in Perak (A Lee, C E Tan in litt) for two consecutive years. This report from the limestone-rich Kinta Valley of Perak stemmed from observations made in 2014/15 with none thereafter.

The very last verifiable sighting occurred in February 2015 when a lone female bird was seen in the mangroves of Langkawi by several birdwatchers. There have been speculations of where else in Malaysia this species could occur, as well as hearsay of low-profile records in Taman Negara. But none of these have been definitively verified.

Factors Affecting the Masked Finfoot's Decline

Why has the Masked Finfoot become so rare in Peninsular Malaysia and Singapore in the last decade? There are a few likely causes. For one, forested rivers are increasingly disturbed by higher human traffic and fishing activities. Low-lying riverine forests, such as those in Taman Negara and Ulu Muda where finfoots have been recorded, are obviously a key habitat. These are extremely hard to come by as lowland forests have largely been cleared across much of Peninsular Malaysia and Singapore, or are flooded by damming. Remaining habitats are either widely scattered or incredibly hard to access.

Second, ornithologists have good reasons to believe that the finfoots seen on the Malay Peninsula are migrants or dispersants. They likely come from populations breeding further north in Southeast Asia, although from where exactly is unclear.

Finfoots are known to breed in the riparian forests of northern Cambodia and Myanmar. Those in Cambodia have been monitored regularly by experts from the Wildlife Conservation Society and Cambodia's Ministry of Environment. Similarly, birds in Myanmar are under surveillance by conservationists from the Wildlife Conservation Society and the Forest Department.

Unfortunately, recent surveys have detected a steep decline: there has been no sightings from Myanmar for many years now. This is potentially the result of increasing disturbance and hunting in these forest landscapes. If the birds sighted in the Malay Peninsula indeed originate

Globally, there are only three species of finfoots. They belong to a unique family of duck-like waterbirds found across the Old World tropics and the Americas.



The iconic Masked Finfoot in Taman Negara captured by the late Ong Kiem Sian. She was a pioneering bird photographer in the region.

Low-lying riverine forests are a key habitat for the Masked Finfoot. These are extremely hard to come by as lowland forests have largely been cleared across much of Peninsular Malaysia and Singapore, or are flooded by damming or disturbed by human activities.



One of the most notable knowledge gaps in Mask Finfoot ecology is how Southeast Asian populations are dispersing or migrating through the region. Photo: Lee Tiah Khee.



Knowing the finfoot's movement patterns will allow conservationists to work with stakeholders to better protect the landscapes identified as important. Photo: Ong Kiem Sian.

With a population in the low hundreds, the Masked Finfoot is caught in the same precarious position faced by many of Southeast Asia's rarest waterbirds. These include the Storm's Stork, Sarus Crane, Giant Ibis and Black-necked Stork.

from the Cambodian population, then it is not surprising to observe a parallel decline in Masked Finfoot encounters in Singapore and Malaysia.

A recent study and survey of the Masked Finfoot's global population across its known territories did not offer an optimistic outlook. There are very few records from the Southeast Asian part of its distribution range outside Cambodia. As with Malaysia, the species appears to have declined steadily in Thailand. It was only some 15 to 20 years ago that visiting birdwatchers could rent a boat to observe the finfoots in a mangrove creek not far from the bustling town of Krabi. When one appeared in Khao Yai National Park in the spring of 2010, birdwatchers from across the country rushed down as it remained near a pond for several days.

In a 2020 review of the world population of the Masked Finfoot by Sayam Chowdhury, myself and our colleagues, we estimated that the global population of the finfoots may be as low as 350 adults. The bulk of them are found in the eastern Sundarbans, a vast area of mangrove forests in Bangladesh increasingly threatened by encroachment.

Suggested Conservation Priorities

One of the most notable knowledge gaps in Mask Finfoot ecology is how Southeast Asian populations are dispersing or migrating through the region. No one has really studied the movements of this species in any level of detail. The South Asian population in Bangladesh is not known to be migratory. However, data collected and the seasonality of records in Cambodia, Thailand and Malaysia suggest that the mainland Southeast Asian population is most likely migratory.

There is a fast-narrowing window of opportunity for scientists to study the Masked Finfoot's migration. Transmitters can be placed on the individuals observed in parts of Cambodia. Knowing their movement patterns and how presumed breeding populations connect with places where they spend the dry season or winter would be extremely instructive. Conservationists can then work with local people and government stakeholders to develop a plan to better protect the landscapes identified as important for the species.

With a population in the low hundreds, the Masked Finfoot is caught in the same precarious position faced by

many of Southeast Asia's rarest waterbirds. These include the Storm's Stork (*Ciconia stormi*), Sarus Crane (*Antigone antigone*), Giant Ibis (*Pseudibis gigantea*) and Black-necked Stork (*Ephippiorhynchus asiaticus*).

Once widespread, these waterbirds are all teetering on the brink of extinction. They have lost the bulk of their populations, with agricultural expansion and forest clearance fast wrapping their tentacles all over the lowlands of Southeast Asia. As a result, much of their favoured low-lying habitats have been wiped out.

Sadly, the Masked Finfoot is most probably gone from the Malay Peninsula, and the chances of it being seen again in Singapore is extremely slim.

Going forward, scientists and conservationists should act quickly before the window of opportunity to save the populations in Bangladesh and Cambodia closes. We certainly do not want this species to slip into extinction in our lifetime. 🌱

ACKNOWLEDGEMENTS

I thank the late Ong Kiem Sian, the late R Subaraj, A Rashid, Dave Bakewell, Lee Tiah Khee, Philip Round, Tan Choo Eng, Auto Lee, Wendy Chin, James Neoh, Sayam Chowdhury and Hymeir Kamaruddin for sharing with me their observations and notes of the Masked Finfoot in Singapore, Thailand and Malaysia.



Dr Yong Ding Li is regional coordinator for migratory bird conservation at BirdLife International. He has been instrumental in setting up bird conservation initiatives throughout Asia. He has written several books and papers on birds and biodiversity in the region.

80 Years & Moving Forward

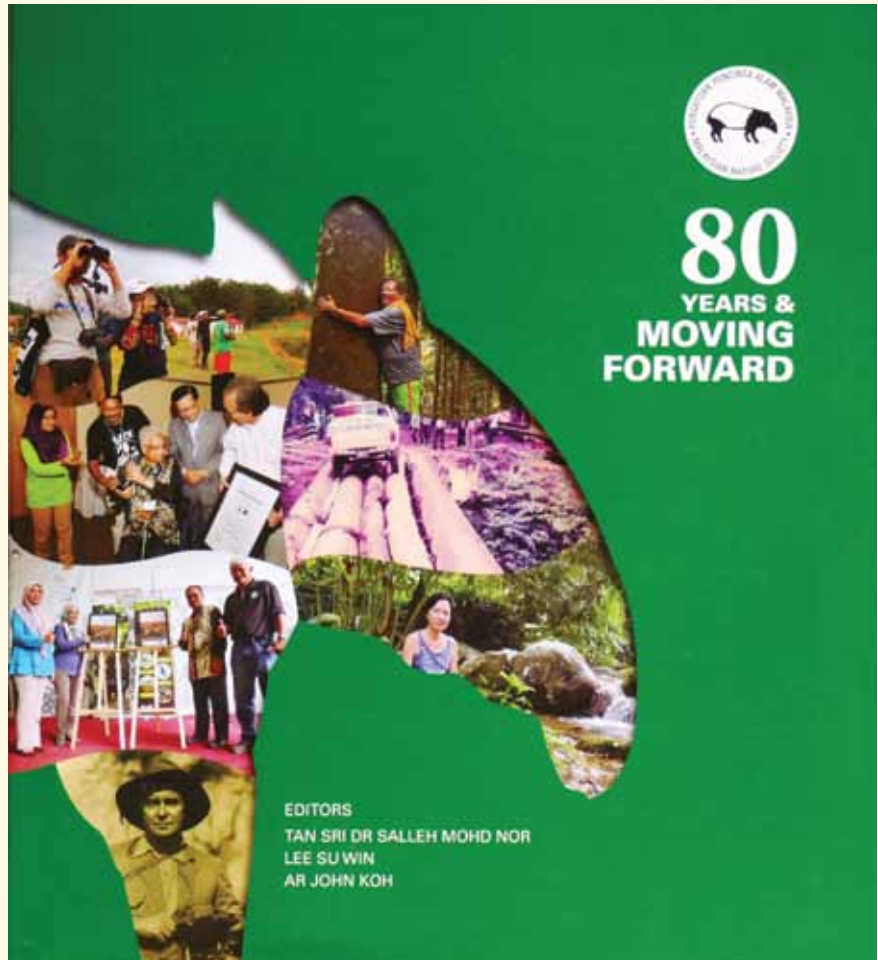
BY MORTEN STRANGE NSS ASSISTANT HONORARY SECRETARY

Many NSS members have no idea that the precursor to our current day Society was formed over 100 years ago on 30 May 1921, when the Singapore Natural History Society was inaugurated. In a 1921 excursion, bird lovers were delighted at the appearance of the "beautiful little red Sun-bird (*Aethopyga siparaja*) which is quite common on Bukit Timah". This charming trip report, together with many other fascinating old records, can be found in our NSS office at The Sunflower. The same Crimson Sunbird (*Aethopyga siparaja*) still occurs on Bukit Timah Hill. Today, this bird has even become our unofficial National Bird.

Notably, as the first Society's activities were not continuous in the years that followed, we at NSS do not count our official birthyear as 1921. Instead, we use 1954 - when the Singapore Branch of the Malayan Nature Society (MNS, later renamed Malaysian Nature Society) was formed. We celebrated our 60th anniversary in 2014 with a special 48-page issue of *Nature Watch* magazine entitled the *Nature Society 60 Years Commemorative Issue*. There are still copies of this important issue available in our office. It is packed with interesting historical facts and anecdotes.

Just last year, our sister organisation MNS did one better on us. They published a mammoth 458-page tome *80 Years and Moving Forward* to commemorate their 80th anniversary. Editors Ar John Koh, Tan Sri Dr Salleh Mohd Nor and Lee Su Win have pulled out all the stops to make this amazing coffee table book a worthy tribute to MNS's storied past. It provides an astonishingly comprehensive account of MNS's history, dating back to its founding in 1940. Technically, the book should have been published in 2020. But we are all too familiar with Covid-induced delays. It has definitely been worth the wait.

The publication showcases MNS's historical and unending struggle to save some of the world's most



valuable flora and fauna, largely through voluntary work and without government aid. It presents an intricate patchwork of contributions and essays from 82 prominent members. Dr Geoffrey Davison was a major contributor to many of the older, pre-independence accounts.

The editors have managed to make the text flow seamlessly. Most chapters are just two to four pages long. Richly illustrated with photographs on every page, the book is an easy and enjoyable read. In addition, the design and printing are first class. I especially like that the writing style has been kept light-hearted, informal, and even humorous at times. Each writer has been allowed to bring forth his or her own individual style, with many inclusions of personal

anecdotes, observations and memories. I know this as I contributed a four-page essay entitled *An Old-timer Looks Back*. My proposed box-like photos-with-captions format was not changed!

The 36-page chapter on the formation of Nature Society (Singapore) in 1991 has drawn contributions from then president Dr Wee Yeow Chin, current president Dr Shawn Lum, as well as long-time members Ilsa Sharp, P N Avadhani and many others involved in those early days of NSS. As such, this book is also relevant to all NSS members and supporters who want a deeper insight into the background of the Society to understand what is going on today. 🌿



The book is priced at RM180 plus shipping. Get your copy today from the MNS shop: <https://shopmns.easy.co/>. Alternatively, contact Stephanie Bacon at mns.stephanie350@gmail.com for orders.

Addressing the Nature-Deficit Disorder in Singapore

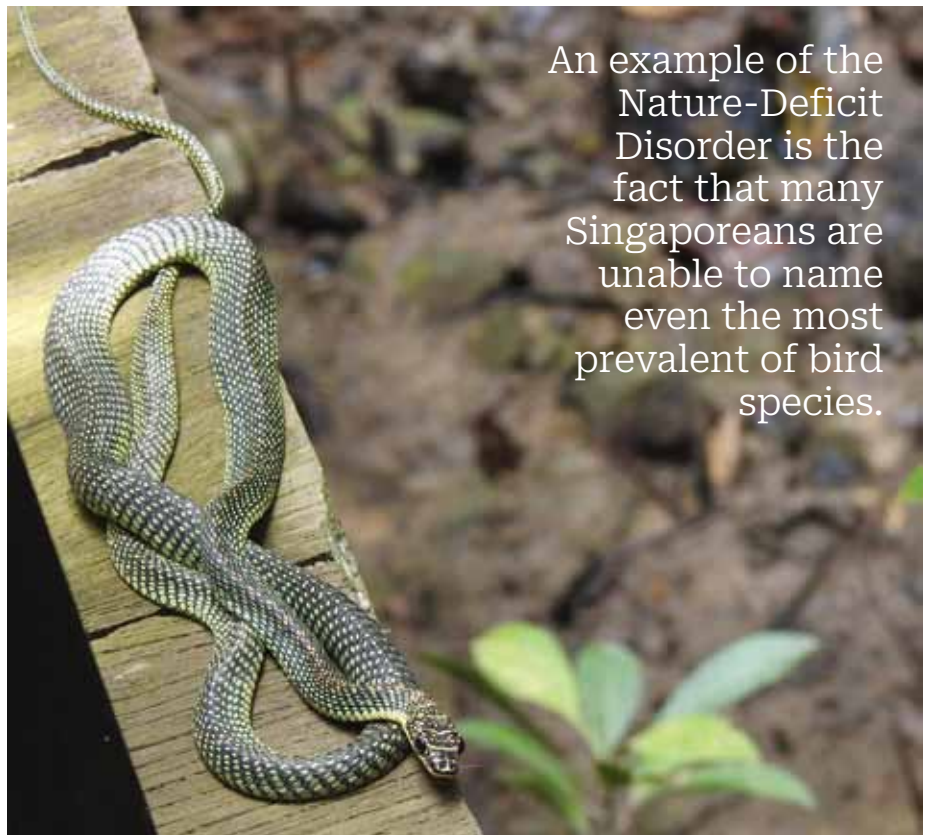
BY KELLIE LEE

Is the Nature-Deficit Disorder prevalent in Singapore? Many are venturing into nature areas and are starting to notice the biodiversity in their everyday spaces. How will they react to wildlife – in fear or with respect? What will it take to achieve conviviality between urbanites and nature? **Kellie Lee** examines the issue.

Unlike most urban areas where species diversity is on the decline, Singapore stands as a contender for being one of the most biodiverse cities in the world. Besides *Homo sapiens*, living in our 725 km² home and the surrounding seas are an estimated 23,000-28,000 species of terrestrial organisms and 12,000-17,000 species of marine life.

All that greenery and wildlife share the space with about 8,000 persons per km². Given the high density of people, plants and animals, it may seem surprising that the majority of Singaporeans lack exposure to and are disengaged from nature. They suffer from what Richard Louv terms the Nature-Deficit Disorder, an increasing alienation from our natural environment. Louv cites the main causes as the proliferation of tech devices, urban planning that precludes open spaces, a shift in educational priorities, and fear-mongering by news outlets. The disorder itself is not an official medical diagnosis. However, growing scientific evidence suggests that it can lead to a host of medical conditions. They include attention difficulties, obesity, and other physical and psychological illnesses.

An example of the disorder is the fact that many Singaporeans are unable to name even the most prevalent of bird species. They refer to common birds with descriptors like “the black one that you always see” or “the yellow bird that can fly”. The vast majority have not heard of our native Leopard Cat (*Prionailurus bengalensis*), the last species of wildcat to inhabit Singapore. Co-director of the documentary *The Last Wildcat* Sean Ng was filming captive leopard cats at their exhibit in Singapore’s nocturnal wildlife park, the Night Safari. Ng remarked that nine out of 10 park visitors did not know what a Leopard Cat was. They referred



An example of the Nature-Deficit Disorder is the fact that many Singaporeans are unable to name even the most prevalent of bird species.

Animals like snakes appear threatening to the casual observer largely due to a person’s own ignorance. People can live harmoniously with wildlife when they possess sufficient knowledge of them, even if that understanding is superficial. The photo shows a Paradise Tree Snake (*Chrysopelea paradisi*) at a boardwalk in Pasir Ris Mangroves. Photo: Gloria Seow.



Left: Nature is not a distant ideal, far removed from where we live. Wildlife can be found right in our backyards. The photo shows an Asian Toad (*Duttaphrynus melanostictus*) hopping onto someone’s shoe.

to it as “baby leopard” or “kitten”. Few bothered to find out its name from the accompanying signboard.

Underlying the Nature-Deficit Disorder is the nature-culture dichotomy that puts humans outside of and above the biophysical world. People with the disorder hold on to the traditional mindset that the city is defined by the exclusion of nature. To them, the wilderness cannot coexist

with environments highly modified by human activity. They idealise a distant nature, a romantic notion of a wilderness far removed from where they live. They do not realise that nature is present in their own backyards.

As a result of the Covid-19 travel restrictions, those who usually sought nature experiences outside Singapore turned to exploring local parks and nature reserves for the first time. There were so many people outdoors that we had an unprecedented problem – overcrowding. However, I question whether these trips actually helped increase ecological literacy. Or were people simply visiting nature areas because they were on trend?

I was in Sungei Buloh Wetland Reserve with some friends, all of whom were not nature enthusiasts. They showed no interest in the explanatory signboards, were mostly oblivious to the fauna hiding in the vegetation, and quickly became tired in the tropical heat and humidity. They were ready to get out just 10 minutes into the walk, having taken enough Instagram-worthy pictures.

On another trip to Sungei Buloh, I was quietly watching a Mangrove Pit Viper (*Trimeresurus purpureomaculatus*) when three passers-by started screaming upon seeing the snake. Despite the snake going about its own business and having done nothing to them, they were terrified. Singapore Parliamentarian Louis Ng once told me that snakes are really difficult to help because they are always portrayed as the villains. This has been imprinted in our minds since young. To the uninitiated, animals are always and everywhere a threat to their physical and mental health. Some are seen as disease-carrying vectors; macaques and wild boars attack; snakes and insects bite. Even harmless animals trigger an irrational fear.

But what are they afraid of exactly? Veteran nature volunteer Dr Vilma D’Rozario recounted a time when her neighbour killed a snake that had ventured into his backyard. She felt that the death could have been averted if he had known that it was of a non-venomous species. In her words, it was “because he didn’t know that it was not a dangerous one”. Between the time an animal registers the presence of a person, to the time it turns aggressive, it would have sent out many signals through its movements, body language and facial expressions. But people still get attacked by wildlife “because they don’t know how to read the signs”, according to biodiversity lecturer at the National University of Singapore N Sivasothi. They therefore respond incorrectly to the animal’s warnings and posturing.

Animals appear threatening to the



To achieve conviviality between urbanites and nature, Richard Louv prescribes nature exposure and education as the cure to the maladies of disconnect and ignorance.

casual observer largely due to a person’s own ignorance. To remedy the problem, an increased exposure to wildlife and an understanding of their behaviour and characteristics are recommended. In fact, members of the public have demonstrated the potential to live harmoniously with wildlife when they possess sufficient knowledge, even if that understanding is but superficial.

Take for example animals that are frequently sighted in built-up areas – pigeons, ants, spiders, as well as other birds and insects. While the non-nature enthusiast may know little about their physiology or ecology, their level of acceptance of these animals is higher. Through repeated encounters, people become familiar with how these backyard animals behave. They know how to avoid unpleasant confrontations, which most of the time amounts to simply leaving them alone. I quote a friend, Jacqie Thio, who recognises this as a plausible solution: “Prolonged exposure leads to knowledge. Like the bird at the park outside my house. I don’t have to know what it’s called. But I see it every day. I know it’s not going to do anything to me. We can coexist if we don’t do anything to each other. If you put something else in the park, and I see it daily, I’m not going to be scared. Ignorance is why there is fear.”

However, most animals are seldom seen in parks. They shy away from people and show themselves infrequently in areas of human habitation. Nature groups and independent nature advocates are

working to increase the awareness of such rarely-sighted wildlife and their behaviours. They hope that members of the public will learn to act respectfully when encountering unfamiliar wildlife instead of reacting in fear. Their irrational fear response may escalate into animal attacks and retaliations. However, there is much difficulty reaching out to the greater population. Dr D’Rozario puts it succinctly: “We are preaching to the converted.”

To achieve conviviality between urbanites and nature, Louv prescribes nature exposure and education as the cure to the maladies of disconnect and ignorance. We might not be able to reach the hearts and minds or change the attitudes of every single person. But we can start small and start young. We can tackle the problem one person and one generation at a time. I am optimistic that we in Singapore have it in us to lead an amicable coexistence with the flora and fauna sharing our city. 🌿



Kellie Lee is a wildlife anthropologist. She has worked with the private, public and academic sectors in researching present-day issues.

She finds new ways of peaceful coexistence between persons, institutions and nature. This article is an excerpt from her master’s research thesis on human-wildlife relationships in urban Singapore.

Pioneer Marine Biologist Par Excellence

ASEAN Biodiversity Hero Award 2022 winner, Emeritus Professor Chou Loke Ming, is a pioneer marine biologist par excellence and a NSS member for some 50 years. As the founder of the Reef Ecology Lab at the National University of Singapore and the Tropical Marine Science Institute, Prof Chou has been championing coral reef management, restoration and conservation in Singapore's waters since the 1960s. **Gloria Seow** catches up with him.



Emeritus Professor Chou Loke Ming in 1979 gearing up for a research dive.

■ **Gloria:** ASEAN Biodiversity Heroes are selected based on the impact of their contributions to biodiversity conservation in their respective countries, the replicability of their actions, and the recognition they received in their communities. How is this prestigious award special to you?

Prof Chou: Winning this award is a good recognition of my lifetime work in the marine sciences. It is a great honour to join the fraternity of biodiversity champions from the region. I truly look up to previous recipients like Professor Leo Tan and the late Professor Angel Chua Alcalá from the Philippines. In fact, when I was a student, Dr Alcalá's books on marine biology greatly inspired me. I feel humbled to be recognised alongside the top biologists in the ASEAN region.

■ **How did you come to pioneer coral reef management and restoration in Singapore? How has the situation evolved over the years?**

I first started coral reef monitoring in Singapore's waters in the 1960s as I wanted to find out how our corals were coping with the impacts of urbanisation. One challenge was the high sedimentation rates caused by massive land reclamation works. It affected the amount of sunlight available for coral growth. Over time, my colleagues and I found that there was a fair amount of degradation and destruction.

We started to think about how to slow and reverse the deteriorating trend. That was when we moved into coral reef management and restoration in the 1980s. One restoration technique to help corals cope with high sedimentation

was to cultivate them on mesh platforms. The platforms allow sediment to fall through and not accumulate at the base of coral fragments. Another method was the use of reef enhancement units (REUs). This is a dome-shaped fibre glass structure with holes that trap sediment in its interior, while its outer surface provides a substrate for corals to settle and grow on. Over time, we deployed many REUs in most if not all the degraded reefs of the Southern Islands. Some of these REUs worked quite well depending on their location and the sedimentation rate.

Land reclamation is ongoing to this day. From the 1960s to the 2000s, hardly any environmental impact assessment (EIA) studies were done before reclamation took place. This resulted in a lot of sedimentation generated. But things changed when the National Parks Board (NParks) became the government agency in charge of marine biodiversity in the 2000s. From then onwards, all development projects in or near marine areas required an EIA



Prof Chou (third from left) with colleagues at the NParks booth in the East Asian Seas Congress in Iloilo, 2018.



Prof Chou (front row on the extreme left) with Singapore scientists at the 4th Asia Pacific Coral Reef Symposium in Cebu, 2018.

and mitigation measures to prevent the spread of sediment. With such measures in place, the impact of sediments from modern reclamation projects is not as high as before.

The murky waters caused by sedimentation build-up typically clear in the March to April period. This is because the Northeast Monsoon drives water down from the South China Sea through the Singapore Strait in January and February. It has a flushing effect, resulting in clearer waters during this time.

■ **What were the major challenges you faced in the beginning and how did you overcome them? Have things changed for the better?**

There were lots of challenges in the 1980s. We had difficulty getting buy-in for reef restoration. People then had no understanding of ecosystem services including that performed by the coral reef habitat. Allowing reefs to degrade was the acceptable trade-off for economic development. The thinking then was that if you wanted to see corals, you could go to Malaysia or Indonesia.

We were on a constant quest to look for funding support. We had to grapple with obtaining small sums from external non-government agencies. This provided enough money for small scale research projects. Some of our earliest efforts in reef monitoring were funded by regional projects such as the ASEAN-Australian Living Coastal Resources. Other ASEAN countries were similarly embarking on monitoring efforts in their own waters. As funding was sporadic, we could only undertake small-scale reef restoration opportunistically. This was frustrating at times. In certain periods, we were not able to obtain funding for one to two years. There were identified projects, but no money to do them.

Even today, we have to keep looking for funds. There is no fixed yearly budget being allocated. Things have improved though. There is now an increased opportunity for funding under the National Science Foundation programmes managed by NParks. Marine science has been identified as one of the areas to be supported. Even then, we have to apply for funding and compete with other projects.

■ **Championed by civil society and academia, the Singapore Blue Plan takes stock of the state of our seascape, recommends enhancement measures as well as proposes protection for more areas. It has undergone several iterations to date. How has the Blue Plan informed decision making and conservation on the part of the authorities?**



Corals on a mesh platform – from attaching coral fragments (left) to having healthy *Acropora* growth after 18 months (right).

Singapore has lost 60% of our coral reefs. We need to look into how to create coral communities in places that do not support reefs now. We aim to reclaim original coral reef areas using tall artificial reef structures to increase surface area for coral growth.

I was heavily involved in the first three iterations of the Singapore Blue Plan and served as the scientific advisor in its fourth incarnation. There were many stakeholders in the creation of this science-based paper. NSS's Marine Conservation Group and other nature groups provided their inputs and analysis. Academics came in to represent different disciplines. We even had legal aspects of marine conservation sorted out. The fourth Singapore Blue Plan was a lot more comprehensive compared to the first one.

There is no fixed timeline for each of these plans. In the first two iterations, it was totally dependent on someone stepping up to take the lead. That person was marine conservationist Francis Lee who roped me in. In the early days, there was only the two of us working on this conservation paper. Over time, we found others.

Each Blue Plan was submitted to the authorities. The first two papers did not gain much traction or achieve their desired outcomes. The third and fourth reports were taken more seriously. NParks looked into the various studies and recommendations presented. These served to inform and back up

the agency's own management plans. One of the recommendations was to do a full-scale survey of the biodiversity in our mudflats, intertidal areas, coral reefs and sea beds. It resulted in the five-year long Comprehensive Marine Biodiversity Survey launched in 2010 to build a consolidated database of marine biodiversity. It was led by NParks and supported by many stakeholders including NUS.

■ **The 40-hectare Sisters' Island Marine Park (SIMP) in the Southern Islands was formed in 2014 after many years of campaigning. How has local marine conservation grown and matured over time?**

Coral reef restoration is part of the mandate and management strategy of NParks today, being the custodian of marine biodiversity. Singapore has lost 60% of our coral reefs. We need to look into how to create coral communities in places that do not support reefs now. We aim to reclaim original coral reef areas using tall artificial reef structures to increase surface area for coral growth. This has been done in SIMP. We are now aligned with NParks, and have received strong support for studying the development of reef biodiversity on these structures. One reason is because we now have a lot of the science to show that reef restoration can work in our sedimented waters. It has become an accepted management approach with proven results. I am happy that there is good opportunity for closer collaborations on this front.

Aside from SIMP, we hope to establish more marine parks in due course. Singapore's marine territory is not large and we face competing needs from other sectors. As such, we cannot afford to have a big area for any future marine park. SIMP may be compact but it is effective as a protected source reef for coral larvae to populate other areas in Singapore. In fact, recent research has uncovered that our reefs do not depend

on outside sources (i.e. reefs from other countries) for coral larvae. Local reef systems are connected by currents. They are self-seeding with all recruitment taking place from within. Some are source reefs (suppliers of coral larvae) while others are sink reefs (receivers of coral larvae).

For example, Bendera Bay in St John's Island is a sink reef as the corals there are not fully developed. It is currently being restored and used for research to provide good data and lessons on how biodiversity can be enhanced in local waters. Over time, this bay can play host to thriving coral, seagrass and mangrove communities.

Another sink reef is the pontoons in local marinas. Being off limits to visitors with access only to boaters, some of these pontoons have achieved good coral growth. They demonstrate that even a developed and urbanised sea-

them. The larvae of this species have not crossed the open sea barrier.

■ **You are the founder of both the Reef Ecology Lab (REL) in NUS and the Tropical Marine Science Institute (TMSI). Can you explain the difference in the work between these two organisations?**

REL sits within the Department of Biological Sciences in NUS. It is involved in teaching students, granting degrees and doing research. In contrast, TMSI is a pure research institute that has collaborations with REL but is not attached to any one faculty and has no students. There is a lot of research interaction between the two organisations. Academics in REL are also research affiliates at TMSI. The research work is not confined to marine biology but also encompasses physical oceanography, bioacoustics and more. TMSI was first founded as the Tropical Marine Science Initiative, but evolved

not have the problem of algae growth smothering our hard corals. If this happens, we could consider using biological controls such as marine snails to graze on the algae. Such measures can be done in contained systems like aquariums. However, any species introduction to an open reef system runs a high risk of causing further imbalances. We need to carefully consider how to contain the snails if they get out of hand.

■ **The ASEANAREAN Expedition Series was a private voluntary initiative to document the marine parks of the ASEAN region. Do tell me more about it.**

This major undertaking was initiated by Francis Lee and I contributed by providing scientific input. The expeditions aimed at strengthening networking and developing research collaborations with regional marine science institutes, their local communities and other interested sectors. We visited Thailand and Indonesia to document their marine biodiversity and the people dependent on them for their livelihoods. Both expeditions helped us establish contacts with the scientists there. Subsequently, we published two books, *The Marine Parks of Thailand* in 1998 and *Marine Parks of Indonesia* in 2013. The Indonesian project became the first Asian-led expedition to be given coverage by National Geographic Channel Asia, with three half-hour documentaries produced and telecast in 2002.

■ **What more can we do for our marine ecosystems?**

There is definitely more to be done. With rising sea levels, Singapore has to construct shore protection and coastal defence structures in the coming years. The height of these structures needs to be raised. Instead of just having a higher wall, why not build structures that will attract corals, seagrass and mangroves to grow on them? Such a living protective sea wall is an example of a nature-based solution to climate change. 🌿



Reef Enhancement Unit installed at Pulau Satumu (left); Reef Enhancement Unit showing coral growth. Photo by Karenne Tun.

scape can be host to biodiversity, similar to our urban parks hosting wildlife. Structures like pontoons provide opportunities for corals to settle and develop. We have an ongoing project with ONE°15 Marina in Sentosa where a coral garden has been transplanted and it is coming along nicely.

We do not have to worry about inbreeding. Our coral larval supply mostly comes from sexual reproduction and not budding or splitting. Coral spawning ensures genetic mixing and vigour. At present, there is no need to bring in external coral sources as our stock is sufficient. Having said that, we have lost two branching hard coral species in the intervening years since reef monitoring began. We could consider bringing them in from neighbouring countries at some point. Notably, the destructive Crown-of-thorns Sea Star (*Acanthaster planci*) that eats coral polyps is not found in our reefs, even though nearby Batam, Bintan and Tioman have

over time to become a full institute. One of its important research areas, which I am heavily involved in, is reef restoration as elaborated earlier.

■ **Is water pollution a concern for the health of local marine ecosystems?**

Water pollution is not a concern as Singapore has very good safeguards against it. The National Environment Agency controls and prevents pollution in all inland waters that eventually flow into the sea. The Maritime and Port Authority takes care of marine waters and handles incidents like the cleaning up of oil pollutants and spills. With regular reef monitoring, we have found that pollutants are within acceptable limits. This is one of the saving graces of our marine heritage.

Although there has been an increased flow of nutrients such as nitrates run-off from the land compared to the 1960s, it has not triggered any phase shift in our coral reefs. We do



Gloria Seow is a Professional Nature Guide and Educator with 15 years of experience leading wildlife walks and workshops in Singapore

for schools, corporates and private groups. Learn more at <https://lorisowl.wordpress.com/>. She chaired the NSS Education Committee from 2008 to 2016 and is the current Vice Chairperson. Gloria is the Editor of *Nature Watch* and the former Editor of *Nature News*.




UPCOMING ACTIVITIES



8 April 2023, Saturday

Butterfly Walk at Lornie Nature Corridor


Members Only - Fully Vaccinated

 Join Dr Ngo Kang Min for a walk on the wild side at Lornie Nature Corridor (also known as Lornie Park Connector). Be enthralled by the flying jewels at this previously-busy road. Following the traffic diversion to the adjacent Lornie Highway, nature has reclaimed her spot. Butterfly sightings here include the Cruiser, Horsfield's Baron, Royal Assyrian and Common Rose. Time: 9 am to 11.30 am. Please register at <https://tinyurl.com/nssbutterflywalk> by 3 April.

15 April 2023, Saturday

Fun with Coastal Wildlife at Berlayer Creek


Members Only - Fully Vaccinated

 Join the Education Committee for a fun walk to check out the coastal wildlife at Berlayer Creek and Labrador Nature Reserve. Led by Vice Chairperson Gloria Seow, we will explore the stretch of mangroves lining Berlayer Creek, the Bukit Chermin Boardwalk, as well as the coastline and parkland of Labrador Nature Reserve. Possible sightings include the White-bellied Sea Eagle, Smooth-coated Otters, mudskippers, birds and reptiles. Time: 8 am to 10 am. Maximum: 25 participants. Please register at <http://tinyurl.com/nsskidsevent> by 8 April. For enquiries, contact Gloria at gloria_seow@yahoo.com.

15 April 2023, Saturday

Ramble to Springleaf Nature Park


Members Only - Fully Vaccinated

 Join Pandian Parthasarathy in this ramble exploring Springleaf Nature Park. Ramble terrain ranges from easy to difficult. Participants must be medically fit. The walk is not suitable for children below 14 years old. Time: 7.30 am to 12 pm. Maximum: 25 participants. Please register at <https://tinyurl.com/nssramble3> by 7 April.

22 April 2023, Saturday

Plant Walk at Sungei Buloh Wetland Reserve


Members Only - Fully Vaccinated

 Join the Plant Group for a discovery walk at Sungei Buloh Wetland Reserve, led by Dr Sng Bee Bee and Mr Sia Sin Wei. Time: 9 am to 11 am. Maximum: 16 participants. Please register at <https://tinyurl.com/NSSPlantWalk2> by 14 April. For enquiries, contact Kerry at kerry@nss.org.sg.

6 May 2023, Saturday

Butterfly Walk at Dairy Farm Nature Park


Members Only - Fully Vaccinated

 Join Butterfly and Insect Group Chairperson Abiel Neo to seek out forest butterflies such as the Great Mormon, Blue Bottle, Blue Jay, Common Faun, Cruiser, Yamfly and Common Posy. Time: 9.30 am to 11.30 am. Maximum: 20 participants. Please register at <https://tinyurl.com/nssbutterflywalk2> by 28 April. For enquiries, contact Kerry at kerry@nss.org.sg.

13 May 2023, Saturday

Ramble to Historical Landmark Hill


Members Only - Fully Vaccinated

 Join Pandian Parthasarathy in this ramble to explore a historical landmark hill. Ramble terrain ranges from easy to difficult. Participants must be medically fit. The walk is not suitable for children below 14 years old. Time: 8 am to 12 pm. Maximum: 25 participants. Please register at <https://tinyurl.com/nssramble> by 5 May.

13 May 2023, Saturday

NSS Annual General Meeting


Members Only - Fully Vaccinated

 Nature Society (Singapore) warmly invites all members to a member lunch followed by the 69th Annual General Meeting (AGM). Please ensure that you have paid all membership dues and/or updated your membership details by 8 April. Only current members will receive the registration for AGM attendance on 22 April, to be circulated via the Second Notice. Time: 12 pm to 5 pm. Venue: to be announced soon.

20 May 2023, Saturday

Plant Walk at Bukit Batok Nature Park


Members Only - Fully Vaccinated

 Join Tony O'Dempsey for a leisurely plant walk in the secondary forest and parkland of Bukit Batok Nature Park. Time: 3 pm to 6 pm. Maximum: 15 participants. Please register at <https://tinyurl.com/NSSPlantWalk3> by 13 May. For enquiries, contact Kerry at kerry@nss.org.sg.

27 & 28 May 2023, Weekend

Festival of Biodiversity


Open to the Public

 This annual event aims to create awareness and foster a sense of appreciation for Singapore's natural heritage. Initiated in 2012, the Festival of Biodiversity is organised by the National Parks Board in collaboration with the Biodiversity Roundtable represented by over 20 NGOs. Come visit us at the NSS booth and participate in our workshop. Time: 10.30 am to 8.30 pm. Venue: Heartbeat@Bedok. Further details will be announced at a later date.

10 June 2023, Saturday

Pesta Ubin: Ramble at Pulau Ubin

Open to the Public - Fully Vaccinated

 Join Pandian Parthasarathy in a casual trek to celebrate Pesta Ubin by exploring this biodiverse island. Participants must be medically fit. The walk is not suitable for children below 14 years old. Time: 7.30 am to 12 pm. Maximum: 25 participants. Participants have to pay the boatman \$4 each direction for your ferry ride. Please register at <https://tinyurl.com/nssramble2> by 2 June.

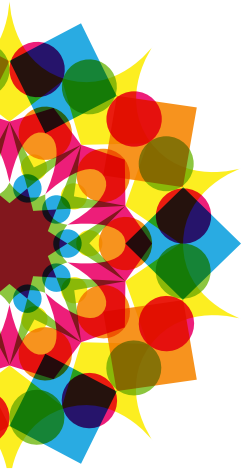
10 June 2023, Saturday

Plant Walk at Kent Ridge Road

Members Only - Fully Vaccinated

 Join the Plant Group to explore the belukar vegetation along Kent Ridge Road in the National University of Singapore campus. Trip Leaders: Amy Choong Mei Fun and Yap Von Bing. Time: 9 am to 11.30 am. Maximum: 20 participants. Please register at <https://tinyurl.com/NSSPlantWalk4> by 2 June. For enquiries, contact Kerry at kerry@nss.org.sg.





Snapshots of Past Events

BY GLORIA SEOW

See Page 19 for Upcoming Activities



KALEIDOSCOPE

NEWS AND HAPPENINGS AT NATURE SOCIETY (SINGAPORE)



Asia Dive Expo (ADEX) 2022, 16 to 18 September 2022. At the NSS booth, Marine Conservation Group volunteers and NSS staff shared about the Society's mangrove and coral reef conservation work as well as the Horseshoe Crab Rescue and Research Programme.



Plant ID Workshop: Looking at Leaves, 15 October 2022. Held at the NSS office in The Sunflower, this workshop taught plant identification skills through hands-on observation of fresh specimens of different leaf types. Photo: Kerry Pereira.



Wildlife Walk at Dairy Farm Nature Park, 4 December 2022. Organised by the Vertebrate Study Group, this wildlife walk produced many sightings of mammals, reptiles and birds. Photo: Sankar Ananthanarayanan.



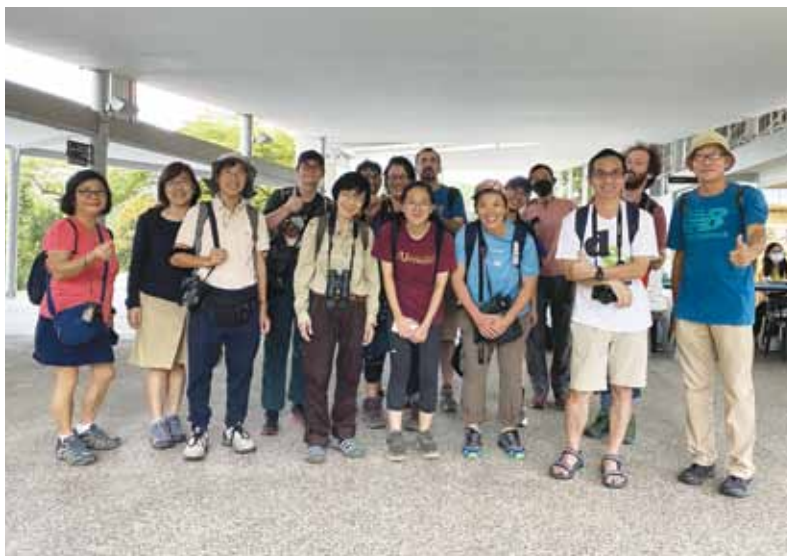
Plant ID Workshop: Looking at Flowers, 10 December 2022. This is the second in a series of botany workshops led by the Plant Group. Participants explored the varied shapes and forms of flowers by observing fresh specimens, as well as learnt about flower parts and pollination. Photo: Kerry Pereira.



New Year's Eve Birdwatching at Gardens by the Bay, 31 December 2022. Walking from Kingfisher Wetland in Satay by the Bay to the Marina Barrage, participants encountered many birds including the Malaysian Plover (*Charadrius peronii*), White-faced Plover (*Charadrius dealbatus*) and Pacific Reef Egret (*Egretta sacra*). Photo: Rofan Teo.



Birdwatching at Pulau Ubin, 4 February 2023. A total of 40 bird species were seen and heard including the Oriental Darter (*Anhinga melanogaster*), Grey Heron (*Ardea cinerea*) and Mangrove Pitta (*Pitta megarhyncha*). Photo: Yap Wee Jin.



Butterfly Walk at Sungei Buloh Wetland Reserve, 4 February 2023. Participants saw 18 butterfly species including the Grey Pansy (*Junonia atlites atlites*) and Julia Heliconian (*Dryas iulia modesta*) as well as dragonflies such as the Grenadier (*Agrioptera insignis*) and the Dark-tipped Skimmer (*Cratilla metallica*). Photo: Spencer Yau.



Birdwatching at Rifle Range Link, 29 January 2023. Despite the morning shower, the stretch from Rifle Range Link to Jelutong Tower yielded the Banded Woodpecker (*Chrysophlegma miniaceum*), Greater Racquet-tailed Drongo (*Dicrurus paradiseus*) and Dark-sided Flycatcher (*Muscicapa sibirica*). Photo: Dr Yeo Seng Beng.



Plant Walk at Rifle Range Nature Park, 11 February 2023. Led by Plant Group Chairperson Bian Tan, this discovery plant walk at the recently-opened Rifle Range Nature Park attracted 28 persons. From strangler figs to durian trees and invasive species, participants had a good time botanising in this neck of the woods. Photo: Lena Chow.



Ramble to Admiralty Park, 18 February 2023. Led by the Nature Ramblers, participants saw a good range of wildlife including the White-bellied Sea Eagle (*Haliaeetus leucogaster*), Malayan Water Monitor (*Varanus salvator*), Lesser Banded Hornet (*Vespa affinis*) and Lua's Cricket (*Lebinthus luae*).



Fun with Butterflies at Jurong Lake Garden, 25 February 2023. Organised by the Education Committee in collaboration with the Butterfly and Insect Group, 22 participants including children delighted in the presence of butterflies – not just adults but also their caterpillars, pupae and eggs. Photo: Om Prakash.



SWWD Ramble from Coney Island to Punggol Container Park, 11 March 2023. In support of Singapore World Water Day (SWWD), this ramble saw 10 participants traversing the north-eastern part of Singapore. Highlights include the Jerdon's Baza (*Aviceda jerdoni*), Streaked Weaver (*Ploceus manyar*) and Smooth-coated Otter (*Lutrogale perspicillata*).



SWWD Dragonfly Walk at Lorong Halus Wetland, 11 March 2023. World Water Day is held on 22 March yearly, to celebrate freshwater and raise awareness of the 2.2 billion people living without access to safe water. In support of Singapore World Water Day (SWWD), this dragonfly walk at the water filtration ponds of Lorong Halus produced eight common species despite the cloudy weather.



Butterfly Walk at Thomson Nature Park, 12 March 2023. Fifteen participants had a good morning chalking up 27 butterfly sightings including the Malayan Plum Judy (*Abisara saturata kausambioides*), Plain Nawab (*Polyura hebe plautus*) and Five Bar Swordtail (*Pathysa antiphates itamputi*). Photo: Loh Jing Ling.

Nature Outreach at SIM's Sustainability Fair 2023

BY NATASHA RAINA, HONORARY SECRETARY



NSS WAS INVITED to be an exhibitor at the Singapore Institute of Management's (SIM) Sustainability Fair on 13 January 2023. This annual flagship event was organised by its student-led environmental group Eco-SIM. Eco-SIM helps undergraduates bridge the gap between students and their natural environment.

The focus of the 2023 Fair was on the United Nations Sustainable Development Goals. It showcased local efforts in the sustainability and conservation scene. Many other non-government organisations, government agencies, private companies, and various advocate groups were present. At the NSS booth, we were able to share our mission of nature education and conservation to SIM students and staff alike. NSS also recruited several new members, volunteers and interns.

In a similar vein, NSS has been an active participant in many other exhibitions and fairs around Singapore, where meaningful nature outreach by our volunteers can take place. If you wish to help us out in this area, kindly contact ningxin@nss.org.sg.



NSS Strategic Planning Initiative

BY NATASHA RAINA, HONORARY SECRETARY

KALEIDOSCOPE



Graphic recording of the first NSS strategic planning workshop held on 18 February 2023.

THE NSS EXECUTIVE COMMITTEE (Exco) for 2022/2023 has embarked on a strategic planning initiative to clarify and refresh our goals as well as discuss key priority areas for the next five years. We are holding a series of workshops to create a revised and updated version of the NSS Strategic Plan for 2023-2028.

This exercise was prompted by a renewed interest from corporates who want to partner with NSS, as well as an influx of new members and volunteers who seek to contribute to the Society. It was clear from internal discussions that we did not have the capacity to conduct this exercise ourselves. We needed an external consultant to organise and facilitate the workshops between NSS Exco, Council and other core members.

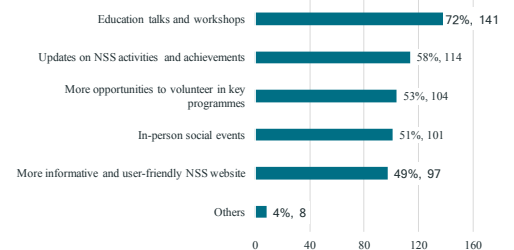
We became aware that the National Council of Social Service (NCSS) was funding consultancy grants. These grants assist charities like us to hire consultants to review and revise their strategic plans. In October 2022, we applied for the NCSS Consultancy Grant. We were happy to receive an \$80,000 award sum in January 2023. We have since hired Binomial Consulting as our external consultant.

The first of a series of three workshops was held on 18 February 2023. Take a look at the graphic recording for a summary of what transpired. The first workshop's output culminated in a poll of members, to obtain their feedback with the intent to align our direction. We thank all who responded for taking the time to do the online survey.

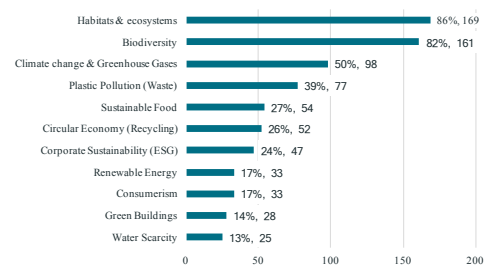
The second workshop took place on 15 March 2023. It saw the same core members from the first session reconvene to discuss the member survey results and map areas of priority for the Society. Out of a maximum score of five, the question 'What is your overall member experience?' had 58% of respondents giving NSS a rating of four or five, 37% returning a score of three, and 6% rating us two or one. Please see the collated responses to some of our other key questions in the three slides showcased.

We are targeting the final roll-out of the NSS Strategic Plan at the upcoming Annual General Meeting (AGM) on 13 May 2023. Stay tuned for these updates as well as the invitation to join us for a member lunch on the day of the AGM.

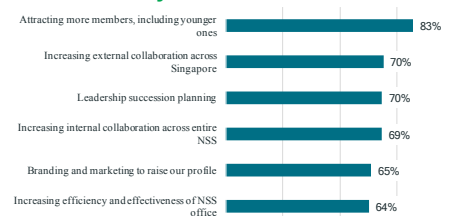
How might we better engage members like yourself?



Which areas should NSS focus on?



Rank the key issues for NSS to work on in the next 5 years



THE REWILDING PROJECT was officially launched on 10 February 2023 along the Rail Corridor, just north of Sungei Kadut Avenue. We envision the rewilding of the Kranji area as a long-term habitat restoration and enhancement project. In collaboration with various government agencies that own the land, a 3.8-km stretch of the 24-km long Rail Corridor is slated to be planted with native trees by volunteers.

The launch was attended by eight NSS members and three students from the Singapore University of Social Sciences (SUSS). The SUSS student representatives are part of a larger team that will help us organise events for the Rewilding Project throughout 2023.

The Project first sparked off as a presentation to NParks as part of their OneMillion Trees (OMT) community outreach in April 2021. NSS was invited to present a proposal related to the OMT programme. We then proposed rewilding this 3.8-km stretch of the Rail Corridor at Kranji. What ensued was a long and painful process to bring the Project to reality. There were numerous presentations and negotiations with various government agencies. We are proud that it has finally borne fruit. This is the first truly ground-up tree-planting project that seeks to deepen community involvement in all the steps of restoring a covered-canopy habitat. We would like to express our great appreciation to our programme sponsor Bloomberg, for their steadfast support throughout the rocky start of the Rewilding Project.

NSS is taking a unique approach. Instead of relying on foreign workers and machines to do the job, we are involving our members and volunteers in almost every step of the process. A lot of hard labour will go into every tree planted. This includes clearing the grass, preparing the soil, collecting seeds, nursery work, tree planting, site maintenance, and tree monitoring. We believe that our



Launch of the Rewilding Project at the Rail Corridor

BY DR NGO KANG MIN & CHIA MING HUEI

approach will give a greater sense of ownership and appreciation of our local nature. The data collected from tree monitoring will also help inform future planting events in terms of species and site selection.

Since November 2022, NSS has had the good fortune of working with the SUSS Rewilding Team of 11 students as part of their Community Engagement (CE) programme. The CE programme seeks to develop well-(g)rounded graduates through deepening their social awareness and responsibility, and nurturing them to be effective contributors in society. This group of students are undertaking the Community Service-Learning pathway, an initiative curated by SUSS staff to maximise a student's learning and development.

"I decided to join this meaningful CE project to care for the environment while creating opportunities for others to play an active role too. I wish to help



A lot of hard labour will go into every tree planted, including clearing the grass, preparing the soil, collecting seeds, nursery work, tree planting, site maintenance, and tree monitoring.

educate people from all walks of life on climate change matters through this venture. Although planting trees is tiring, we will smile after seeing the fruits of our labour. We the younger generation should not take our environment for granted. Resources are limited and we are the ones responsible towards future generations. It is important that we learn the importance of conserving habitats," said SUSS student leader, Austin Han Wen Guang, reflecting on his CE experience.

To date, the students have helped clear about 100 m² of grass and assisted with the planting of the first 50 trees on launch day. The SUSS team will be organising a series of rewilding events on some Saturdays of the month throughout this year.

■ If you would like to participate in our rewilding efforts, please join the SUSS team's Telegram group at <https://t.me/+bF9FMqtXmiszZTII> for access to all announcements.



Instead of relying on foreign workers and machines to do the job, NSS is involving our members and volunteers in almost every step of the rewilding process.



Some 110 volunteers and members were at NSS's inaugural Welcome Tea.

Volunteer Opportunities at the Welcome Tea

BY HUANG NINGXIN
VOLUNTEER MANAGEMENT COMMITTEE CHAIRPERSON

THE SOCIETY'S INAUGURAL WELCOME TEA was held on 25 February 2023, organised by the newly-minted Volunteer Management Committee. This session brought our members and volunteers together to let our passion and ideas cross-pollinate. It fulfilled one of NSS's aims to focus on meaningful engagements with our members.

Held at the Hollandse Club, we were encouraged by the turn-out of 110 volunteers and members. Both long time members and new ones came together to discuss nature volunteerism and the impact we have made thus far. Chairperson of the Conservation Committee, Leong Kwok Peng, shared his experience in the advocacy for the Rail Corridor and his involvement in coral reef relocation projects in Singapore. Various NSS Exco and Council members elaborated on the Society's plans for 2023.

We canvassed for volunteers to help make each and every NSS programme a success. Specifically, we have identified four broad areas that require volunteer support:

- 1 Education Committee and Every Singaporean a Naturalist (ESN) Project where NSS engages teachers and students of different ages
- 2 Outreach events such as Singapore World Water Day, Festival of Biodiversity and NLB Green Market
- 3 Conservation projects including rewilding activities and the clean-up of Sungei Pang Sua
- 4 Administrative Support in data management, PDPA compliance and future volunteer management events

We wrapped the programme with a networking session over food. It was an opportune time for members to meet like-minded nature lovers, with many trading stories of their nature adventures and making new friends.

■ If you missed the Welcome Tea but are keen to learn more about volunteer opportunities, please visit <https://tinyurl.com/NSSvolunteersignup>.



Chairperson of the Conservation Committee Leong Kwok Peng sharing his volunteering experience.

NSS IT Upgrades & Revamps

BY DR NGO KANG MIN
PROGRAMMES & OUTREACH
COMMITTEE CHAIRPERSON

IN 2020, when pandemic lockdowns were prevalent, NSS took the opportunity to revisit our processes and IT systems. We determined that the Society could use a reliable CRM (Customer/Constituent Relationship Management) system. Following months of research into the right CRM system for us, we signed up for the Salesforce Non-Profit Success Pack (NPSP). It provided 10 free licenses to non-profit organisations like NSS.

In a parallel development, the National Council of Social Service (NCSS) had started providing grants to charities for large-scale infrastructural upgrades. We spent several months preparing the grant application for a complete revamp of both our front-end website as well as our back-end member and volunteer management system.

This involved connecting with at least three potential vendors, compiling a table of key performance indices, listing our exact requirements and more. Our application was submitted and approved within two months. Encouraged by the success, we put in another application to NCSS to automate our accounting system with XERO software. The second grant proposal was successful as well. I would like to thank our NSS staff and the IT Committee for their help in putting up these two applications.

The NSS team is now working with our vendor Pixely to implement the Salesforce CRM system as well as website revamp. Concurrently, another vendor is transitioning all NSS accounting records onto the XERO system by end March 2023.

Our next system upgrade is to develop a Biodiversity Database. Please get in touch with me at kangmin.ngo@nss.org.sg if you would like to help. Watch out for further IT updates as we look to deliver a better membership, volunteer and donor experience.

NATURE SOCIETY (SINGAPORE)

Watching The Wild, Watching Over The Wild



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, birdwatching, butterfly and insect watching, plant walks, intertidal walks, horseshoe crab rescues, nature surveys and censuses, clean-ups of nature areas, diving trips, Zoom and in-person talks, exhibitions, as well as overseas nature appreciation trips for its members and the public. Going on an NSS outing allows you to meet people of all ages, ethnicities, nationalities, and from all walks of life with a common passion – to appreciate and conserve nature.

The Society also publishes books on nature and organises conferences and workshops on the conservation and preservation of our amazing natural habitats.

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.

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

Nature Watch Subscription Only

ANNUAL SUBSCRIPTION

Annual subscription (four issues) is inclusive of postage

S\$24	Singapore
S\$28	Malaysia & Brunei
S\$38	Countries in Asia
S\$45	Rest of the world (include Australia, New Zealand, Japan, America, Europe & Middle East)

How to Join NSS or Subscribe to *Nature Watch*

- 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.
- To subscribe to *Nature Watch* only, kindly email contact@nss.org.sg.

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.
- We also welcome individual and corporate donations to the Society. Please inform us via email (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.





Let Singapore's Abundant Biodiversity Be Your Legacy

Have you loved nature all your life? Please consider helping our conservation work with a gift to Nature Society (Singapore) in your will.

How to make a gift to the Society in your will

You can choose to inform us if you have considered us in your will, but it is not strictly necessary. Please ensure that your solicitor writes in the full name of the Society. We suggest below suitable forms of words that can appear in your will:

*I give to Nature Society (Singapore) (hereinafter called NSS), **Unique Entity Number S61SS0142H**, _____ % of the residue of my estate*

OR

a specific gift of _____

and I direct that (i) the proceeds may be used for the general purposes of NSS and (ii) a receipt signed by a person for the time being authorised by the Executive Committee of NSS shall be a good and sufficient discharge to my executors.



NATURE SOCIETY
(SINGAPORE)



NSS works to protect creatures such as the Mangrove Horseshoe Crab (*Carcinoscorpius rotundicauda*), whose numbers are in decline due to habitat loss and anthropogenic activities.
Photo: Lester Tan