

# Analysing the effectiveness of: Rope Bridges

**Group members:** Charlotte Lim, Guo Cheng Guang, Emma, Joan, Leticia Tan, Sai Parthish, Sandy Lim, Vismaya Vasanthraj, Toh Ying Ying  
**Mentors:** Sebastian Ow, Rachel Ong



## Methods

- 24h surveillance camera footage from January 2022 to October 2023 from one of the two rope bridges along OUTR were analysed.
- The surveillance cameras start recording when motion is detected, capturing short clips of videos. The recordings were viewed and individually coded.
- Positive triggers are camera recordings caused by animals using the rope bridge whereas false triggers refer to camera recordings caused by other factors.

## Is it effective?

- (1) It was found that the rope bridge is effective as it was used by six animal species.

It was primarily used by primates and other arboreal mammals, with no reptiles and few birds recorded using the bridge.

### Why?

- Arboreal mammals were observed crossing between forest patches whilst using the rope bridges, possibly to access resources or returning to their roosting sites.
- The gap between the rope bridge and the nearest tree may have discouraged reptiles from accessing the bridges due to the relatively large distance to leap.
- Bird species possess the ability to fly and may not require rope bridge to cross between forest patches
  - There were four records of Sunda scops owls, but observations revealed that they were only perching on the rope bridges momentarily.

Thomson Nature Park (TNP) is a key conservation site for wildlife such as the critically endangered Raffles' Banded Langur (RBL). The rope bridges constructed between TNP and Central Catchment Nature Reserve above Old Upper Thomson Road (OUTR) provides safe passages for arboreal wildlife between the two patches, reducing vehicular-wildlife collisions, access to resources and potential mates.

In this study, the rope bridge is deemed effective if it had:

- (1) a variety of arboreal species using it
- (2) it was used often by animals to completely cross between forest patches. The animal is determined to have crossed the rope bridge completely if it traversed from one end of the bridge to the other, and incompletely for all other cases.

Arboreal species	No. of recordings
Long-tailed macaque (LTM)	659
Plantain squirrel (PS)	152
Dusky langur (DL)	50
Sunda scops owl (SSO)	4
Raffles' banded langur (RBL)	2
Slender squirrel (SS)	2

Crossing	LTM	PS	DL	SSO	SS	RBL	Total
Complete	262	121	6	0	2	2	393
Incomplete	408	26	16	4	0	0	454

### (2) Complete vs Incomplete Crossings

- We have recorded 393 instances of animals using the rope bridge to cross between forest patches completely, avoiding the road underneath.
- However, there were 454 incomplete crossings, which may be contributed by the 408 observations of LTMs not crossing the rope bridge completely.
  - The LTMs were observed carrying out social activities such as grooming and playing on the bridge instead.
  - This observation was expected as the LTMs, being social in nature, were often observed using the bridges in larger numbers.
  - The troops of LTMs may have already considered the rope bridge to be part of their territory and therefore, were not using it solely for crossing between forest patches

## Conclusion

Our results revealed that rope bridges are continually used by at least six species, and that there may be other species undetected by the surveillance camera crossing between forest patches along OUTR.

- At least two confirmed RBL sightings from the present data and the five other arboreal species which is a positive sign of possible adoption of the rope bridges by more arboreal mammals such as the Common palm civet or even the highly elusive Sunda slow loris.
- With at least 393 detected complete crossings in 22 months, the rope bridges are deemed effective in enhancing ecological connectivity for arboreal wildlife between forest patches.

### Future studies

- Explore ways catering to other animals to facilitate safe crossings
- Utilise AI to help make research work more efficient



Plantain Squirrel

Long-Tailed Macaque

Raffles' banded langur

Dusky langur

Sunda scops Owl

Slender squirrel

# Create Nature Play Booklet or Leaflet for Children in HortPark

Project Members: Chen Yingzi, Chua Zoe, Go Ruo Qi, Janelle Low Chia Yee, Kwek Yi Xuan, Lee Zhi Jun Carmine, Lim Hui Ting, Ryan Adam Bin Iwan Dharman

Project Mentors: Camelia Mahendran, Pearl Ho

1

## SITE VISIT

A trip to HortPark enabled us to observe the potential for interactive learning experiences and play opportunities at the various gardens.



Sunny the Guide

2

## DESIGN

Armed with valuable insights, we designed a Play Booklet that would engage children in meaningful interactions with nature while fostering curiosity, creativity, and environmental stewardship through their five senses.



3

## FEEDBACK

Throughout the design process, our ideas and designs were reviewed by our mentors. The comments given were very much helpful and enabled us to create a thoughtful Play Booklet to serve our target audience.

4

## CONCLUSION

With teamwork and cooperation, we managed to accomplish our goal whilst gaining meaningful experiences and pleasant friendships along the way.



HortPark  
the gardening hub





# Design and Implement a Butterfly Garden

at Neram Crescent Playground

## Site visits

Conducted three pre-planting surveys at Neram Crescent Playground located in the Yio Chu Kang district to collect data on the different butterfly species observed in Neram Crescent Playground.



Chocolate Pansy



Grass Blue



Plain Tiger



Painted Jezebel

Some common species that we saw !

## DID YOU KNOW?



Butterflies play a critical role in maintaining the health and balance of ecosystems. They are essential pollinators, aiding in the reproduction of many flowering plants. This, in turn, supports food webs that sustain birds, mammals, and other insects.

At Neram Crescent Playground, the establishment of a butterfly habitat will not only enhance the aesthetic appeal of the park but also contribute to local biodiversity and environmental sustainability.

## Designs & considerations

The planting design carefully balances butterfly-host plants and nectar plants. These plants were selected not only for their ecological benefits but also for their ability to create a vibrant, eye-catching garden that blooms throughout the seasons.

It's crucial to select the right plants to ensure they provide the necessary resources for butterflies throughout their lifecycle and to avoid introducing invasive species that could disrupt the local ecosystem.

Our design sites:



## Planting session

After analysing the recorded data, specific plants were chosen for planting to increase the presence of butterflies at the site.



## Butterfly-friendly plants !!



*Ruellia repens*

Host and nectar plant for Grass Blue



*Lantana camara*

Host and nectar plant for Chocolate Pansy



*Rhapis excelsa*

Ornamental plants



*Calotropis gigantea*

Host plant for Plain Tiger

## Post-planting survey

After analyzing the recorded data, specific plants were chosen for planting to increase the presence of butterflies at the site. Post planting site visit was done to record the changes in butterfly biodiversity!

## What you can do to help with butterfly conservation

By taking these actions, you can contribute to the conservation of butterflies and help create a healthier environment for all!!

1. Plant native host and nectar plants in your garden to provide essential resources for local butterfly species.
2. Avoid using chemical pesticides and herbicides.
3. Offer your time to help with community projects, such as planting butterfly gardens or maintaining natural habitats in parks.
4. Educate yourself about local butterfly species, their lifecycles, and their roles in the ecosystem.

### TEAM MEMBERS:

TAN NICOLE, BOEY LUE SHAN, ZHANG XIMIN, CELESTE SAPUTRA, JOLENE ELIZABETH DEVASAHAYAM

### PROJECT MENTORS:

CHEW CHI SIN, GENIE LEW



# [YSN 2024] Nature Quest: Fort Canning Park Edition

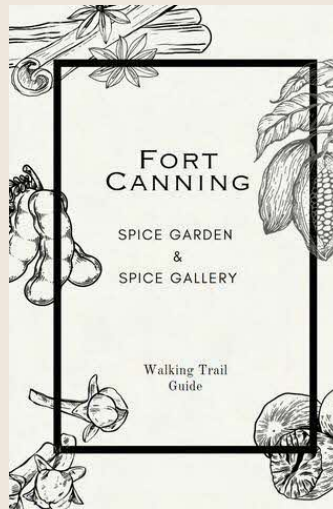
Team Members: Daphne Gan, Koh Yu Qing, Lee Boon Sin  
Project Mentors: Felix Siew, Denise Chen



## Primary Objective

Improve park visiting experience for children (accompanied by an adult) with an interactive walking guide

Treasure map used to mark the different checkpoints of the Spice Trail



## Walking Guide

Using the platform Google My Maps, we will create a walking trail where participants can click on a checkpoint on the map (in Google Maps) and see photos/videos of flora and fauna



Appeals to children!  
Our target audience is aged 10-14

## Bingo-style Game

Game sheets will encourage children to look out for the different plants/animals

Highly educational and easy to understand



Plant Bingo



Animal Bingo

Learn to identify the different species of animals and plants

Fun and interactive way to engage with nature!



## Benefits

1. Encourage children to learn more about plants and animals in parks (highly educational)
2. Improves park visiting experience





Team Members: Jay Lee,  
Danish Henky, Irfan Ruhaizat

Project Mentors: Felix Siew,  
Denise Chen

# YSN 2024: FORT RANGERS

@Trees of the Fort Trail

## Our product:

Fort Rangers! An app that incorporates interactive and immersive content that engages the visitor throughout the trail

## Project objectives:

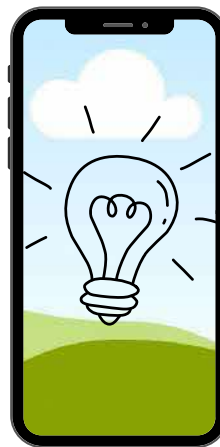
- 1) To increase the engagement of Fort Canning Park's trails among youths
- 2) To enhance the visiting experience by using content like interactive games incorporated into a digital trail guide

## Project Initiative: Digital gamified trail, Fort Rangers!



Pictures of Trees

1. After downloading our app on your phone to start the amazing race, when approaching a nearby checkpoint, there will be a beep to alert users (Bluetooth Low Energy technology)



### Quiz/Video

2. User completes quiz or watches a short video to complete a checkpoint
3. User who completes the checkpoints and finishes the game will have their name displayed on a leaderboard

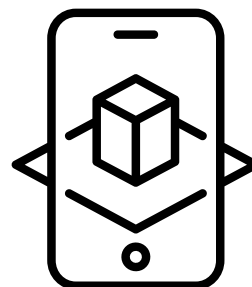
## What is featured in the app?



- New and improved trail map
  - 29 trees
  - 5 **NEW** trees!



- Clear pictures of the trees, fruits and flowers



- Immersive experience using AR filters on Instagram



- Video and audio clips of wildlife that can be spotted along the trail



# Design and Implement a Landscape Plan for Keppel Coastal Trail at Labrador Nature Park

**Team Members:**  
Breanna Lim Yen Ru,  
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Bin Muhammad Iskandar,  
Bryan Teo,  
Ting Ya Xuan,  
Venus Vernyce Koh

**Project Mentors:**  
Meisy Wong,  
Derek Chan

**NParks Staff:**  
Michael Teo,  
Tan Boxin,  
Ooi Pin Choong

## Outline :

Learning from site visits to forests and nature areas

Classroom sessions on coastal plants and design

Hands-on design session with some drawing

## What we have learnt

We learnt about Coastal Forests and Plants, and how we can use the forest as an example to mimic and create Ecological Corridors for animals to travel through.

Site Location at Labrador Park

## Design PART I

showing the essence of the design forms used to guide the planting layout

## Ecological Principles

showing butterfly plants, plant heights, fauna sheltering

### 1 Patchwork Concept Bioswale 1

Imagining a landscape like a patchwork of planting

### 2 Topographic Concept

forms like topography have been an inspiration for this concept

### 3 Flows Concept BIOSWALE 3

A planting concept based on wavy flows

Coastal plants native to Singapore have been chosen

We have produced 3 designs for 3 bioswales using Coastal Plants

## Our Designs

### Artist's impression of the Topographic Concept

The planting design utilises what we learnt in terms of ecological principles like providing butterfly plants, food source plants, plants for shelter, as well as aesthetic considerations like heights of plants, shapes and forms of leaves, and the colours of flowers.





# DEVELOP AND IMPLEMENT A SYSTEM FOR THE REPORTING OF ABANDONED, LOST OR DISCARDED FISHING GEAR (ALDFG)

By: Wan Bing Hui, Emily Thong, Jeslyn Chua, Poh Jun Ming, Livia Leong, Shaun Lau, Tang Yong Jen

NParks Mentor: Rebecca Loy, Wu Siqi

**Abandoned, Lost, or Discarded Fishing Gear (ALDFG)** is a type of marine litter that severely threatens ocean biodiversity.

## Drivers of ALDFG in Singapore

- Lack education for safe gear disposal and sustainable fishing methods
- Insufficient reporting avenues for ALDFG disposal
- Minimal gear disposal initiatives

## AIMS for this research initiative is to

- Encourage sustainable fishing
- Create an ALDFG reporting system for the general public to report any ALDFG sightings

## Why a reporting system?

- A means of collecting data on ALDFG hotspots to mitigate harm towards biodiversity
- Fill an information gap in ALDFG response

## OUR FINDINGS:

Through interviewing local anglers, visitors and PAssion Wave staff, we found that sentiments differed.

Passion Wave @ Sembawang

Punggol Jetty

Pasir Ris

Gillnets used by nearby fish farmers in sampans

Different groups use gillnets for subsistence fishing

Most anglers do not use gillnets as they interfere with angling equipment

## Types of ALDFG in SINGAPORE

### GILLNETS

A gillnet is a wall of netting that hangs in the water column. Gillnets can be attached to something, or drifting at a certain depth.

Gillnets are usually *abandoned* after use or *littered* in the ocean when broken, and trap any animals that gets tangle.

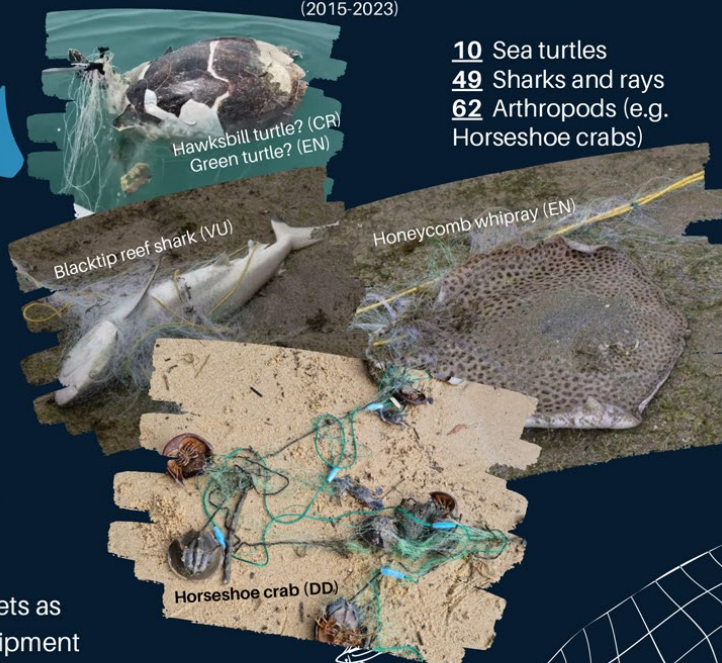
### RECREATIONAL FISHING GEAR

Commonly used fishing gear in Singapore include fishing weights, hooks, sinkers, lures, crab traps, lines and fishing rigs.

They are commonly caught on rockier parts of the designated fishing areas. When that happens, the lines are cut and left in the water with the hook and sinker still attached.

## IMPACTS OF GILLNETS

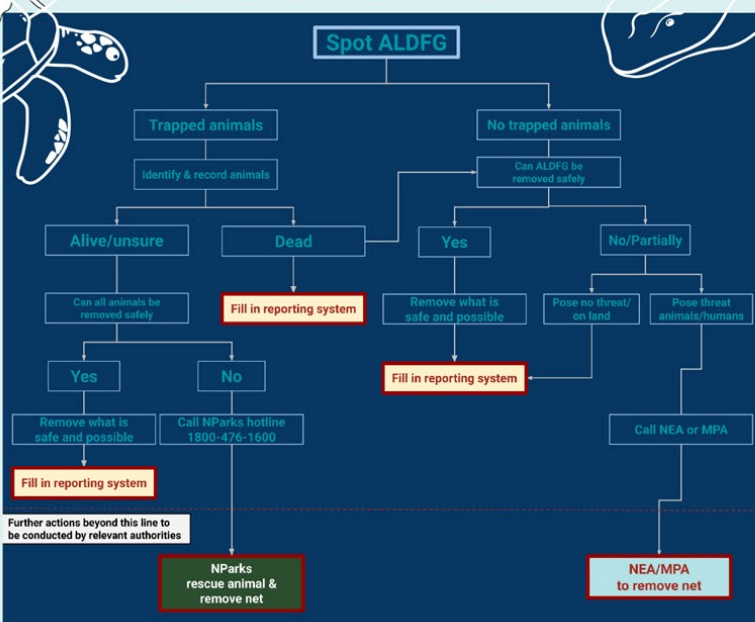
Reported sightings of all animals trapped in abandoned nets (2015-2023)



- 10 Sea turtles
- 49 Sharks and rays
- 62 Arthropods (e.g. Horseshoe crabs)

## PROPOSED REPORTING SYSTEM FOR ALDFG

We suggested a reporting flowchart to guide public reporting of ALDFG



### SCAN TO REPORT ALDFG!



### Additional considerations

- Aim to involve commercial fish farms to help tackle issues causing ALDFG
- Educating the anglers for them to understand the ways to **reduce ALDFG** and **use reporting system**
- Putting up signages in multiple languages **encouraging proper disposal** of unwanted fishing gear

### Future work

- Increase **reach** to more stakeholders including boat owners, nature groups, fish farmers etc.
- Better understand MPA, PUB, NEA, PCG's scope and **identify possible role** to play in responding to ALDFG sightings
- Understand the **ALDFG reporting and response** in other countries with established response systems in place (e.g. Canada, Norway, USA, Australia)

### Purpose of flowchart & reporting system

- ALDFG retrieval by relevant agencies and contractors
- Facilitate **collection of ALDFG data** for research
- To understand ALDFG **hotspots** and **affected biodiversity**
- Quantification of ALDFG data from **clean ups**
- **Accessible** reporting system for public
- Starting point for follow-up

### What this is NOT meant to do

- **Enforcing** individuals or corporation
- Encouraging **unauthorised retrieval** from citizen scientist (NOTE: it is a good thing but by no means is this intended as a call-to-action)
- **Tracking source** of ALDFG
- Comprehensive data collection

### Acknowledgements

We gratefully acknowledge the support of NParks for the opportunity to work on this project and for all the resources provided. We would like to thank all the willing individuals who participated in our ALDFG interviews, especially Marissa from PAssion Wave @Sembawang who helped in our understanding of the problem she face. We would also like to thank Prof. Zeehan Jaafar for her feedback and Ms. Ria Tan for her invaluable insights on Project Driftnet.



# AI for Camera Trap Footage Classification

Exploring novel AI platforms, models and techniques

**Team Members** (in alphabetical order):  
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John Tan, Liam Wells Ayathan,  
Nguyen Quoc Anh, Scormon Ho, Stanley Han

**Project Mentors** (in alphabetical order):  
Wildlife Management Research (WMR)  
Max Khoo, Tay Li Si

## Deers, macaques and wild boars - say cheese!

Camera trapping is a commonly used remote monitoring method to study wildlife populations without disturbing their natural behaviour.



### How do camera traps work?

- Triggered by motion
- Can capture videos or images

### Challenges

- Large data volume
- Presence of false triggers
- Difficulty in species identification



**Significant man-hours** are required to sort and process the camera trap footage fully and properly



## Setting up the stage @ Wallace Education Centre

### Hands-on Session

The team went on a field trip to the Wallace Education Centre to:

- Understand the features and functions of camera traps
- Learn how to setup and deploy cameras in the field
- Experience camera trap retrieval and process footage manually

## Superpower up! We trained our own AI detective to spot animals!

### Project Goal

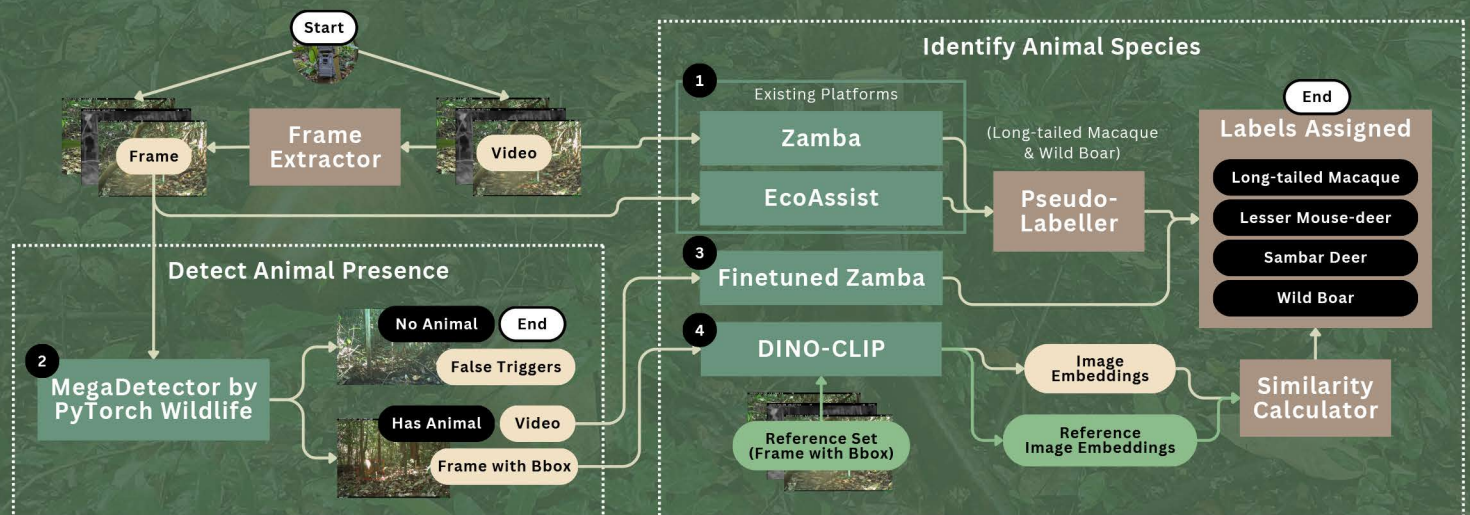
Explore new methods to improve the manual method of processing camera trap footage

### Project Focus

To classify four native species: lesser mouse-deers, long-tailed macaques, sambar deers and wild boars

### Our Methodology

Open-source pre-trained models make up the backbone of the workflow. To ensure the models performed well in Singapore's context, these models are refined using NParks' camera trap footage. The workflow is also customised to WMR team's needs.



### Evaluation

Image frames, originating from the same videos, were split into train-validation-test sets using the 70-20-10 split. The same split was used in all four approaches for standardisation and fairness. The following table shows the best performing models across the approaches:

	Model Name	Usage	F1-Score
2	MegaDetector	Animal Presence	0.98
1	EcoAssist European Model	Wild Boar	0.92
3	Finetuned Zamba - African Model	All four species	0.84
3	Finetuned Zamba - European Model	All four species	0.82
4	DINO-CLIP Similarity Search	All four species*	0.8
1	Zamba African Model	Long-tailed Macaque	0.75

\* This can be scaled easily to classify more species via data curation, with no model training required.



### Our Recommendation

**Short-term:** Leverage existing platforms  
**Longer-term:** Develop in-house workflows

## Why does this matter?

By leveraging novel AI models, promising alternatives to improve camera trap data workflows were identified, which allows for

- More efficient manpower usage
- Better understanding of animals

This, in turn, can help to

- Protect endangered species
- Maintain healthy ecosystems





# Enabling Community-Based Disease Biosurveillance in Pets

## Team Members

Aaron Tan, Annika Loi, Felix Lim, Kendra Yap, Syafina Imran, Teh Zhi Xian, Tiffany Chan, Zara Mufti and Zyon Wee

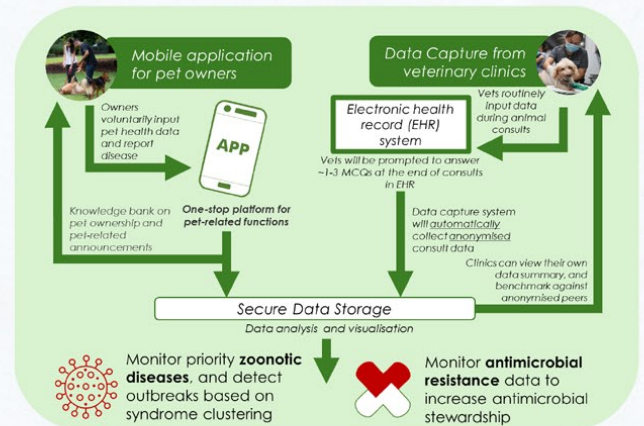
## Project Mentors

Alwyn Tan, Heng Zhan Pei, Kelvin Ho, Kelvin Lim, Johnathan Wong, and Wendy Sng

## Our Objective

To develop a one-stop mobile application to help pet owners to actively support their pets' health by:

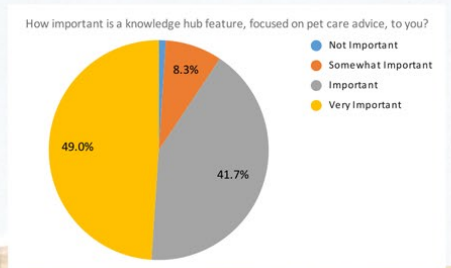
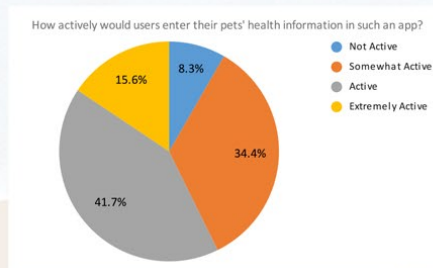
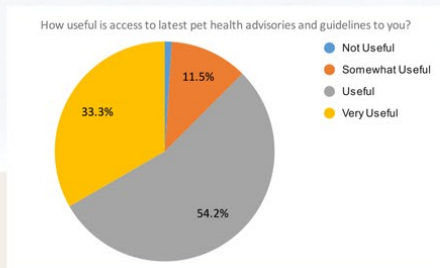
- 1 Monitoring the disease status of companion animals
- 2 Access to trusted information on pet care & health for awareness on diseases & prevention, e.g. zoonotic disease
- 3 Increasing owners' awareness, understanding, and monitoring of symptoms
- 4 Promote communication and information sharing between vets, pet owners, and NParks



## Survey @ PetExpo

The team crafted and conducted a survey to derive quantitative and qualitative insights from pet owners to understand their needs. The team then implemented features to address these needs and encourage long-term use of the application

## Survey Findings

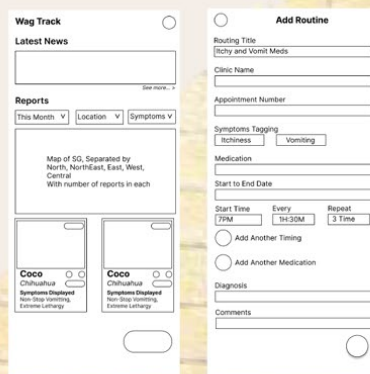


Some of the key survey findings which ultimately determined the features included in the prototype

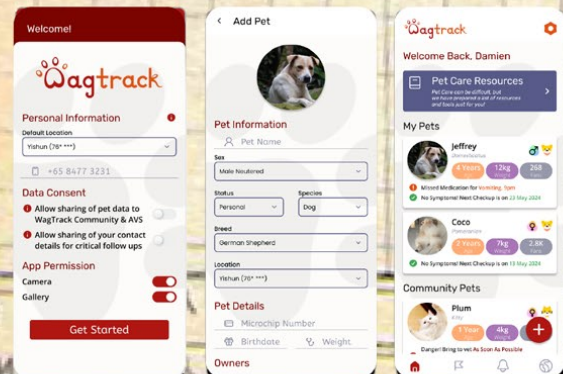
## Development and Prototyping

Over several weeks, we organised multiple team meetings and Zoom sessions to design our app collaboratively. Leveraging Figma, we meticulously crafted the outlines and user interface based on the survey results to deliver what users want.

### Wireframe



### Prototype



## Conclusion and Further Developments

The surveys showed a positive response where pet owners found a need for such applications. The project has also raised awareness in the public about the transmission of zoonotic disease through our survey outreach. The development of the prototype is still ongoing with more feedback required regarding the navigation and layout of the application

# PET PALS

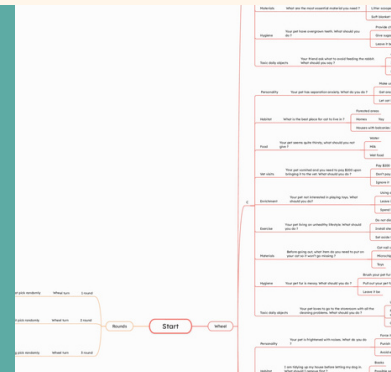
An educational and interactive app for Kids

## HOW TO PLAY ?

1. Spin the wheel ! A random animal will be chosen
2. A situation card will be drawn upon selected animal
3. Choose an action card
4. Drag the cards into the wrong or correct box below the screen
5. Repeated cycle until three rounds are obtained
6. Able to try again if did not get two correct in the three rounds

## PROJECT TIMELINE

- Finalising of card designs
- Approval from mentors
- Background layout of game
- Prototype testing
- Data collection
- Final end product



## CHALLENGES WE FACED

- Fitting our schedules together
- Simplifying the game to make Kids understand better
- Refining the appeal factors to pique interest in the Kids to play the game



## WHAT WILL BE ACHIEVED FROM THIS GAME ?

- Kids will be well educated on animal welfare
- Kids might be able to sympathise well with animals
- There will be a slight decrease in animal cases



## OUR DATA COLLECTION PROCESS

- Data from young children with parents consent and help
- Responses collected through google form



# Improve & Promote Nature Ways

**Team Members:** Heng Kuan Xin, Priscilla Loi, Shermaine Sim, Tan Yi Zen, Wong Dalton

**NPark Mentors:** Seng Chin Teck, Ronnie Mak, Chua Tiong Ghim

## Overview

There is **low public awareness** of Nature Ways. We seek to repurpose Nature Ways into **educational corridors**, supporting biodiversity and engaging pedestrians

## Aims

To promote public engagement with signages through:

1. Interesting signages with images
2. Inclusion of interactive element
3. Identifying better signage locations

## Field Study

We tested our prototypes at different locations, to determine the importance of sign placement in attracting readers.



Low Human Traffic (Footpath)



High Human Traffic (Pedestrian Crossing)



Observations: Public Interactions

Nature Way	Type of Interaction	Number of Interactions:		
		Original Location		High Traffic Location
		Original Design	New Design	New Design
Tengah Nature Way	Stopped to Read	0	4	38
	Took Photo/Scanned QR	0	0	0
	Interacted with Sign	0	0	3
Yishun Nature Way	Stopped to Read	0	12	29
	Took Photo/Scanned QR	0	1	2
	Interacted with Sign	0	1	2



Existing Sigange

Our Prototype



Making Leaf Models for Prototype

## Results

From the study, we observed:

1. Location of signages influences public engagement
2. Interactive elements (clay model) engaged a younger demographic

## Conclusion

1. Standard signages may not be attractive, consider **more engaging forms to increase awareness**
2. Building signages with a specific **target audience** in mind



# Influencing Behaviour of Visitors to Nature Reserves & Nature Parks

## Team Members:

Anika Udayakumar, Cheong Wai Lun, Leo Tan Yong Kang, Nicholas Ng Jing Heng, Tan Pui Lok, Yeo Wen Xin Clarice

## Project Mentors:

Ruth Foo, Fadzleen Arriffin

## Introduction & Aim

The project aims to identify visitor impacts to biodiversity, and aid in the design and implementation of an educational campaign for greater understanding of the Parks and Trees Act. Investigations are to be done to understand locals' interests & demands for, and propose possible outreach activities and programmes in nature parks and reserves.

## Methodology

To carry out this project, we did a pre-survey reece in Bukit Timah Nature Reserve and Rifle Range Nature Park to identify some of the problems encountered in regards to visitor behaviour in nature areas. We then conducted in-person interviews at Bukit Timah Nature Reserve (BTNR) and Rifle Range Nature Park, and put up posters for online surveys in various nature areas to identify the impacts of visitors on biodiversity, and understand the needs of park visitors.

## Results

- We observed litter being left around Bukit Timah Nature Reserve, and macaques were picking them up and eating from them.
- Trees at BTNR were carved into by visitors, causing tree damage.
- Instagram was the preferred social media for 38.6% of respondents.
- Most people input 'excessive noise' and 'bringing pets to nature parks' as unusual behaviours observed.

## Recommendations

Based on the current results, we propose that outreach programmes to the public on biodiversity of nature parks and reserves should be held on Instagram. Such programmes should be more focused on improving the public's perception of nature, and could be tailored to be location-specific to increase park visitors' engagement.





# INVESTIGATING BIRD NEST PREVALENCE AND THE FACTORS INFLUENCING THEIR DISTRIBUTION IN SINGAPORE'S URBAN GREEN SPACES

Project Mentors: Gabriel Low & Malcolm Soh  
Project Members: Cheryl Teo, Goh Ye Xiang, Hannah Bock, Javer Woong,  
Jay Wong, Ong Jhin Yee, Uma Sathappan,



## Introduction

Amid rapid urbanisation, **natural habitats are disappearing**. Urban Green Spaces (UGS) such as parklands and gardens are **fragments of wildlife habitat** for fauna. It is increasingly important to **understand the factors that impact biodiversity in UGS**, which is crucial for biodiversity conservation. However, it is **unclear how birds in Singapore utilise UGS for successful nesting**, which is a **critical stage in their life cycles** and a requirement for their persistence.

## Objectives

- Ascertain prevalence of birds utilising trees and shrubs in UGS for nesting
- Determine environmental factors preferred by nesting birds

## Methodology

### Field Surveys

Within 15m from survey point (Subset of Garden Birdwatch Points)

**Bird Survey:** Species, count, activity  
**Bird Nest Survey:** Type of nest, tree it was found in and bird species  
**Vegetation Survey:** Tree measurements

### Data

**Gathering:** Kobo Toolbox, Google Sheets  
**Analysis:** Python, R

## Data Cleaning

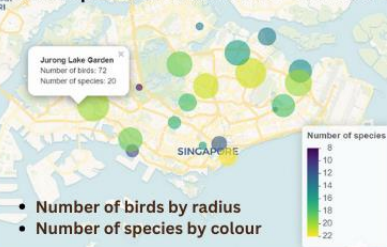
1. Raw text input cleaning
2. Dimension reduction of correlated categorical variables (e.g. number of trees in various height ranges -> short versus tall trees, and tree DBH to thin and thick trees)
3. Shannon Diversity Index to determine each point's bird species diversity.
4. Normalisation of numeric columns/variables

## Modelling

1. Prediction of nest occurrence: **positive binomial model**
2. Prediction of bird species diversity (based on the Shannon Diversity Index): **negative binomial model**

## Preliminary Findings

### Bird & Species Abundance Per Location



- 20 Survey Locations
- 78 Survey Points
- 67 Bird Species
- 992 Birds Seen

• Generally, as number of birds increases, number of species increases

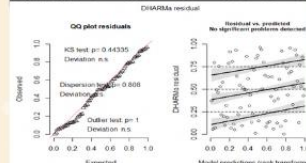
• Transects with relatively fewer birds but higher species number: Marina Bay East, Singapore Botanic Gardens, Fort Canning Park, Pearl's Hill City Park



## Model Performance

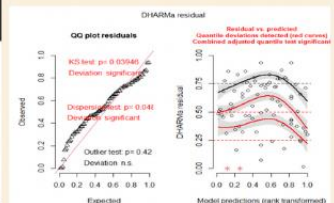
### Nest Occurrence

```
glmer(formula = ~nest ~ habitat + IPR + N_species + N_Tree_Short +  
SD + SMI + 1, family = binomial, data = scaled_df)  
Coefficients:  
Intercept -12.9286 3956.1806 -0.003 0.89729  
habitatForest 15.0121 3956.1807 0.004 0.99607  
habitatMangrove -4.0363 4829.9176 -0.001 0.99955  
habitatParkland 11.8387 3956.1806 0.003 0.99761  
habitatWaterland -9.3640 1594.8880 -0.002 0.99866  
IPR 0.7538 0.4019 1.875 0.06073  
N_species 0.8668 0.3819 2.269 0.02327  
N_Tree_Short 1.3401 0.5772 2.322 0.02025  
SD 0.7181 0.3179 2.263 0.02394  
SMI 1.4061 0.4570 3.077 0.00209  
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```



### Bird Diversity

```
glmer(formula = ~birds_int ~ WB + 1, family =  
negative.binomial(NBmodel$theta),  
data = scaled_df)  
Coefficients:  
Intercept 4.15882 0.03403 122.216 <2e-16 ***  
WB -0.34775 0.16912 -2.056 0.0432 *  
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```



### Significant predictors found for:

- **Nest occurrence:** Presence of shrubs, number of species, number of short trees
- **Bird diversity:** Lower presence of water bodies (but best model still exhibits nonlinearity, indicating that does not explain diversity well across predictor ranges)

### Limitations:

- Possible surveyor bias (environments where nests are easier to spot)
- Insufficient sample size with 78 points
- Imbalanced data (e.g. more parkland than mangrove) potentially causes variables such as habitat type to not be significant

## Takeaways

- More survey locations with varying habitat and vegetation types for more balanced spread and more accurate prediction
- More research into specific vegetation types to determine which type contributes to increased bird diversity



# Nature Kakis Youth Stewards



Nature Kakis Network was launched in May 2023 with the goal of establishing community-led chapters in each constituency to self-organise City in Nature activities and promote community stewardship.

We were recruited in Oct 2023 and got to know our mentor through virtual interview sessions before we participated in two physical gatherings in Nov and Dec 2023. During these sessions, we got to know each other better and foster camaraderie.

Based on our indicated areas of interest, **36 Nature Kakis Youth Stewards** were assigned to five workstreams, namely (1) **publicity & comms (events)**, (2) **publicity & comms (social media)**, (3) **recruitment**, (4) **digital mapping**, and (5) **strategic programmes**. Our involvement spans a year, with a mid-year stock-take in July coinciding with YSN closing.

Before delving into our respective workstreams, we were trained as facilitators, scribes, and emcees within a month to prepare for the annual Nature Kakis Workplan & Appreciation event on 20 Jan 2024. These roles were in addition to our concierge roles for the event, which was attended by 100 Nature Kakis from 34 constituencies. We also helped to set up for the event the day prior and strived to execute it to the best of our abilities.



Take a look at our workstream posters to find out more on what we have been up to over the past half year! We will also convene in end July onwards to discuss and devise the design, planning, and execution of next year's annual appreciation event for Nature Kakis Network.

**Join us on our social media pages to find out more on the exciting projects that we are planning and executing for the rest of the year!** If you know of any youths who would like to join our Nature Kakis Network next year, do join our social media pages to stay updated on the upcoming recruitment that will open in 4Q of year 2024.





# Nature Kakis Youth Stewards

## Publicity & Comms (Events)

### Co-leads:

Phuan Jieyi & Cheng You Ning

(Covering Co-Leads:

Nabilah Binte Kamarudin  
& Michelle Yap)

### Members:

Chew Yu Hui

Germayne Tan

Rajendran Geethapriya

Alina Lee



## Design of EDMs

Led by Jieyi, our passionate members Geetha, Alina, and Germayne are the brains behind the creative conceptualisation of the EDMs sent out to the Nature Kakis. Their eye-catching designs incorporate elements of the Nature Kakis identity.



## Ice Breakers Planning

Led by You Ning and our passionate members Michelle, Yu Hui, and Nabilah, they are involved in creating engaging ice breakers to warm up participants. The ice breakers give a preview of the programme that will be covered in the induction.



## Events Execution

We are actively involved in executing the Nature Kakis induction programmes, serving as a bridge between the Nature Kakis and Youths to facilitate the engaging and informative sessions.



COMMEMORATING WITH GROUP PHOTOS



PRESENTATIONS BY NATURE KAKIS & YOUTHS



INTERACTIVE ACTIVITIES DURING INDUCTION





# Nature Kakis Youth Stewards

Publicity & Comms  
(Social Media)

Co-leads:  
Mildred Ng & Gavin Neo

Members:  
Esther Chong  
Seah How Jim  
Teh Jialin  
Tan Zhi Xuan  
Shania Lee  
Brigitte Wong  
Isabelle Lim  
Neo RuiEn  
Sarah Tan



## Instagram & Facebook

Under Gavin and Mildred's guidance, the youths in this workstream have been tirelessly updating our social media feed with the latest events (and there are plenty!). Leveraging our keen eye for photography and filming, along with captivating scrapbook elements, we curated a visually appealing feed that continuously attracts new followers. Thanks to everyone's hard work, we reached a total of more than 8000 unique accounts in the last 30 days.

### Youth Introductions



### NK Events



### NParks Reels



WE POST ON  
BIODIVERSITY



WE POST ON ARTS  
IN THE PARK



WE POST ON  
GUIDED TOURS



WE POST ON  
INTERTIDAL WALKS



<https://www.facebook.com/naturekakissg>



<https://www.instagram.com/naturekakissg>

Scan the QR codes and  
follow us today!





Co-leads (Digital Mapping):  
Malcolm Wong & Kango Lee

Co-leads (Recruitment):  
Joan Seah & Valence Leung

# Nature Kakis Youth Stewards

## Recruitment & Digital Mapping



Members:  
May Han  
Valerine Cheow  
Donna Tan



Members:  
Ariel Lau  
Chan Wei Yao

### Co-Creation of new Nature Kakis website

Together with youth graphic designers,  
Jialin & Isabelle, from social media team

Led by Joan & Valence, the youths in the recruitment workstream enhanced our new website by carefully vetting its layout and wording. We adopted the perspective of a public volunteer and suggested wordings for copy-editing, recommending clearer call-to-action wordings and a more intuitive information arrangement to improve user experience.

Additionally, we refined the website's content, infusing it with vibrant, motivational language that highlights the unique benefits of joining Nature Kakis. Our efforts resulted in an inviting website that attracts and engages potential volunteers, aligning with Nature Kakis' mission and values.

Through brainstorming, our recruitment youths worked with our youth graphic designers from social media to design the following graphic banners for the website:



Scan below to  
check out  
the new  
Nature Kakis website:



<https://go.gov.sg/naturekakis>

Led by Malcom and Kango, the Digital Mapping team created a map that includes the location and contact information of existing Nature Kakis Chapters on the new website.

Through the map, existing members can easily reach out to other chapters to collaborate, while potential members can find out which chapters they can join based on the proximity to where they live.



\*Note: Above map was created and managed by Nature Kakis Youth Stewards.





# Nature Kakis Youth Stewards Strategic Programmes

Co-leads:  
Ella Zhang &  
Spencer Heng



Members:  
Charis Wong  
Akmal Ilham  
Ang Xuan Xi  
Kaylynn Yu  
Vann Chia  
Muhammad Danial

Led by Ella and Spencer, the Strategic Programmes team plans and executes new activities and events to train our Nature Kakis chapters in order to impart useful and valuable biodiversity-related knowledge to their fellow residents.

Currently, we are in the midst of preparing for the Nature Kakis Arboriculture Induction Programme with a theme centered on the Heritage Trees of Singapore. A training session is planned to be conducted in July for interested Nature Kakis.

Subsequently, these trained volunteers will facilitate the actual Induction Programme conducted in September at the Singapore Botanic Gardens, our UNESCO World Heritage Site since 2015. We hope that a tour bringing the participants around the Gardens to showcase our heritage trees will impart our Nature Kakis with interesting facts and history of our heritage trees in Singapore.



**Recruiting Nature Kakis Heritage Tour Guides!**

Join us in exploring the history behind a UNESCO Heritage Site.

Learn about the biodiversity and history behind the Singapore Botanic Gardens, and share your knowledge and stories with fellow Nature Kakis!

**HIGHLIGHTS**

- Training on Conducting Heritage Tours
  - Intro to Heritage Trees Talk by NParks Heritage Trees team
  - Gamified Heritage Tour conducted by NParks Singapore Botanic Gardens team, with resources (including Bingo) provided by Nature Kakis Youth Stewards
  - Hands-on Heritage Tour practice with guidance from Singapore Botanic Gardens team
- Conduct Heritage Tours for fellow Nature Kakis
  - Put your newly learnt skills to good use by bringing fellow Nature Kakis on a Heritage Tour around Singapore Botanic Gardens during the Arboriculture Induction Programme

**EVENT DETAILS**

Date	Time	Venue
Training: 20 July 2024, Sat	9am - 5pm	
27 July 2024, Sat (backup)		
Optional Recap: 24 August 2024, Sat	9am - 1pm	Singapore Botanic Gardens
31 August 2024, Sat (backup)		
Induction Programme: 7 September 2024, Sat	1pm - 5.30pm	

Limited slots available!  
SIGN UP NOW!



Our workstream is now busy preparing the suite of resources to help build confidence in Nature Kakis to conduct guided walk, such as tour notes, detailed guide script, gamified Bingo cards and Google map walk-through for wet weather plans.

## Example of Tour Notes



**Tembusu Tree**  
*Cryptocorymbus fragrans*

- Species native to Singapore
- 180 years old, 32m tall and 6m girth
- Displayed on 5-dollar bill





OUR TEAM AT SITE RECCE!



CONDUCTING  
PRIMARY RESEARCH

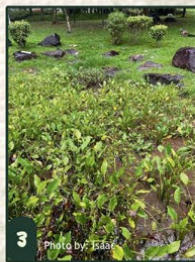


BRAINSTORMING!



# BISHAN-AMK PARK

## REJUVENATION AND BIODIVERSITY MONITORING FOR LOTUS POND



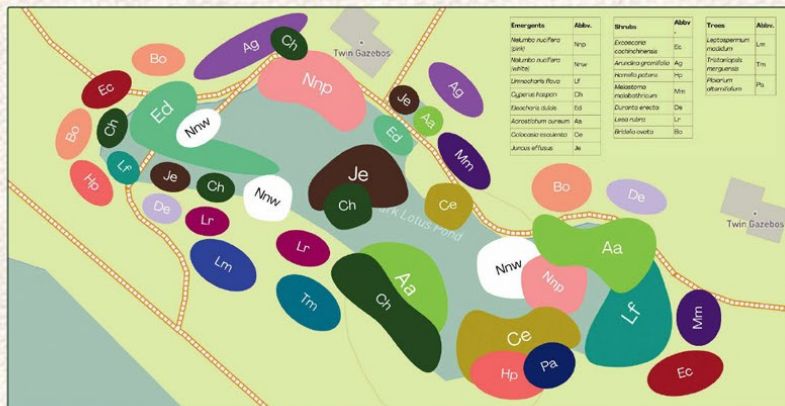
### BACKGROUND

Lotus Pond, a small but iconic feature of Bishan-Ang Mo Kio Park, is home to numerous dragonfly species. The pond is overpopulated by submerged water plants and has persistent low-oxygen levels, leading to a significant decrease in the lotus population and Odonate diversity. Our project aims to enhance the conditions of the Lotus Pond to restore odonates diversity by curating a planting palette and plan for the rejuvenation of the pond environment. This will provide suitable habitats for odonates to hunt, perch, and breed.

### PRE-PLANTING SURVEY Jan/Feb

- Survey Methodology:** A transect survey was conducted along the boardwalk to measure water parameters and obtain an odonates species count.
- Poor Water quality:** We found that the pond waters had a relatively acidic pH (6.11) which fell below an ideal level of 7.5 to 8.5. Dissolved oxygen was similarly low at 26.08%, below the ideal value of 80%.
- Invasive Plants:** We also observed certain plant species such as *Echinodorus palifolius* and *Hydrilla verticillata* outcompeting other macrophyte species in the pond. Additionally, invasive fauna species such as the Apple Snail may lead to increased competition with odonates for pond resources.
- Low Species Richness:** An average of 15 different species were recorded, a significant decrease from the 24 species observed in 2017.
- Eutrophication:** Presence of Red-eared Sliders might indicate high concentrations of nitrates from generated manure, which contributes to clouded, algae-filled water.

### PLANTING PLAN Mar-May



### WE SELECTED: MACROPHYTE SPECIES

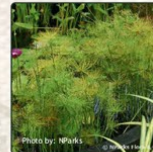
8



*Eleocharis dulcis*



*Colocasia esculenta*



*Cyperus haspan*

Providing riparian-like environments for adult odonates to perch and nymphs to hunt/hide, as well as remediate eutrophic conditions.

### SHRUB SPECIES

13



*Bridelia ovata*



*Hamelia patens*

Planted at pond margins to catch runoff, plant matter and grass clippings to prevent pollution of the pond.

### TREE SPECIES

3



*Leptocarpum madidum*



*Tristramia murgensis*

Insect-pollinated trees like the *Tristramia murgensis* can provide prey for adult dragonflies.

### POST-PLANTING Jun-July



Moving forward, the introduction of fauna species such as Singapore Shrimp or endemic Guppies could enrich the existing food-web, serve as prey for odonate nymphs, and help control the level of algae in the pond.



Additionally, the use of aerators and sumps can be considered to enhance beneficial nitrifying bacteria in pond water, facilitating the breakdown of organic waste and preventing the over-accumulation of nitrates.



Continued planting of submerged macrophytes within the pond, along with regular pruning, should be considered. Volunteer groups such as Dragonfly Watch can also be involved in conducting surveys to ascertain the long-term outcomes and success of this project.



Our post-planting survey showed an **increase in % of Dissolved Oxygen** to 41.3%, suggesting a decrease in the effects of eutrophication.

However, the **pH level remains below 7.5**, suggesting that long-term monitoring and additional measures are required to achieve ideal water conditions.

On May 29, five new Odonate species were observed following the completion of the first phase of the planting plan, with a total count of 60 individual Odonata.



Emperor (Anax imperator)



Banded Skimmer (Pseudothemis jonia)



Crimson Darning (Trithemis aurora)



### AFTER PLANTING

Team members: Javon Tan, Gabriel Tam, Isaac Ong, Kyal Sin, Chua Ming Ern, Muhd Izz  
Project mentors: Anisah Ikhar, Hanim Yahman, Lim Zi Yun





# Rejuvenation of a Naturalised Stream at Choa Chu Kang Park

Team Members: Kayden Javier Chong, Chang Yu Xuan, Bong Shi Hui Jolin, Julian Tang Jing Le, Titus Lim Hao Yang  
Project Mentors: Xia Yixuan, Mayura Patil, Cai Yi Xiong

## Introduction

The site features a stream with a dense, clay-like substrate, situated in the heart of Choa Chu Kang Park.

The project aims to **increase biodiversity** in and around the stream by **introducing suitable plant species**.



Learning to record data



Calculating canopy cover



Using tray nets



Site reconnaissance

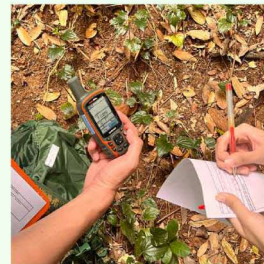


Using a Flowmeter in the Stream

## Instruments Used:



Multiparameter meter

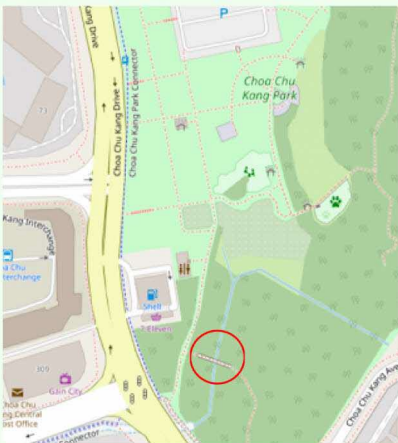


GPS



Densiometer

## Site Location



Area circled is the proposed area for the design

From left to right:

- **Flowmeter:** Used to measure the flow rate of the stream.
- **Multiparameter meter:** Measure pH, DO(Dissolved oxygen), conductivity, temperature.
- **GPS:** Locate exact location coordinates and mean sea level.
- **Densiometer:** A convex mirror with a grid overlay to calculate canopy cover.

A **reddish precipitate was observed** in the stream, suggesting the presence of **iron phosphate**, as documented in previous baseline studies of other streams (Yeo & Lim, 2010).

## Habitat Observations

From March to April, we conducted several stream habitat surveys to collect data using the equipment mentioned above and nets to carry out stream biodiversity survey to determine the various species present in the stream. Both **non-native species** and native species were observed.



*Aplocheilichthys lineatus* (Killifish)



*Gambusia affinis* (Mosquito fish)

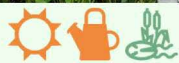


Dragonflies (and nymphs), mainly *Orthetrum chrys*



*Trachemys scripta elegans* (Red-eared slider)

## Plant Palette



*Thalassia dealbata*



*Pandanus amaryllifolius*



*Typha angustifolia*



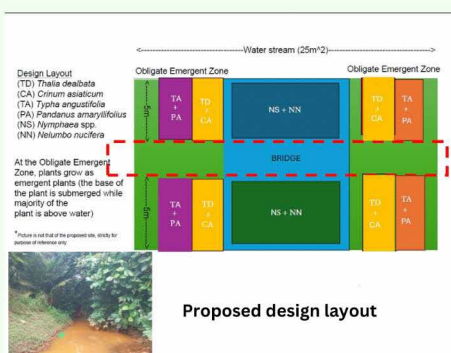
*Crinum asiaticum*



*Nelumbo nucifera*



*Nymphaea* spp.



## Layout Plan

These plants are selected as they can **bioremediate** and **breakdown organic pollutants**, such as nitrogen and phosphate, in the stream. Additionally, these plants are able to breakdown heavy metals which may be present in the stream to further **improve water quality** and create **more liveable conditions** for existing dragonflies and fishes.

## Conclusion

Through this project, we aim to **increase the biodiversity** at the Choa Chu Kang Park Stream by **introducing suitable plants**. These plants function to improve the water quality of the stream. The **provision of a healthy stream habitat** can **attract more biodiversity** to the stream and encourage native species to thrive.

\*Photos are taken from Department of Biological Sciences, National University of Singapore and NParks flora and fauna website

Yeo, D. C. J., & Lim, K. K. P. (2010). A Non-Native Killifish (Actinopterygii: Cyprinodontiformes: Aplocheilichthys) in Singapore. Nature In Singapore 2010, 3, 327-332. <https://lcnhm.nus.edu.sg/wp-content/uploads/sites/10/app/uploads/2017/06/2010nis327-332.pdf>



# THE EFFICACY OF EFFIGIES IN CROW DISPERSAL



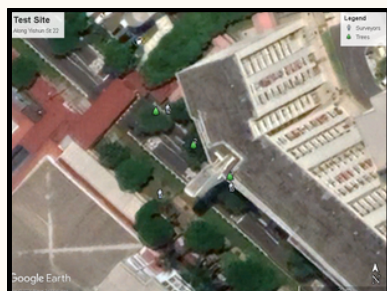
Team Members: Hesther Ong, Josephine Seng, Melody Yeo, Yu Xun Chin  
Project Mentors: Eunice Ong, Nur Hazirah

## INTRODUCTION

- House crows are among the problem-causing wildlife species in Singapore, with NParks receiving 3,000 to 4,000 cases of crow-related feedback annually relating to noise and potential crow attacks (Tang and Lim, 2023)
- NParks has employed several science-based methods to reduce the volume of feedback, to varying degrees of success
- A possible method to explore is to place effigies (fake, dead-looking crows) at crow roosts, to scare and disperse them from the area
- This study thus seeks to understand the effect of effigies on crow numbers and crow roosting behaviour in an urban setting in Singapore

## METHODS

- A test and control site were selected based on roost size after site reccees



Test Site (Yishun) - 2,148 sqm



Control Site (Marina) - 1,892 sqm

	M	T	W	T	F	S	S
Pre-Treatment		X		X		X	
Treatment		X		X		X	
Post-Treatment		X		X		X	



- The study was conducted concurrently at both sites over six weeks, which were split into three two-week long phases: pre-treatment, treatment (where an effigy was installed at the test site), and post-treatment
- Three surveys were carried out per week in the evening, where between one to three surveyors counted the number of crows every ten minutes for half an hour

## RESULTS

- The mean number of crows at the roost at the test site (5) was lower than at the control site (24.5)
- The percentage decrease in the mean number of crows from pre-treatment to treatment phase and from pre-treatment to post-treatment phase was much higher at the test site

TEST SITE

↓ 72.6%  
from pre-treatment  
to treatment

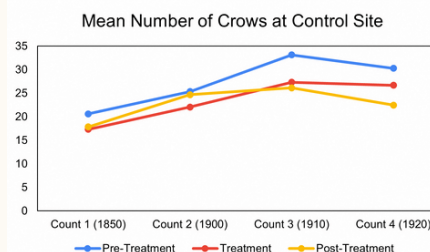
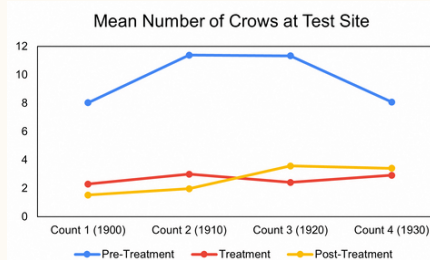
↓ 73.0%  
from treatment  
to post-treatment

CONTROL SITE

↓ 14.6%  
from pre-treatment  
to treatment

↓ 16.7%  
from pre-treatment  
to post-treatment

- After the initial installation of the effigy at the test site, the crows were alarmed, flying around the area while calling loudly
- During the treatment phase, no crows were observed landing on the tree with the effigy, and there was a marked decrease in the number of crows on trees within 14m of the tree with the effigy
- Although crow numbers increased during the post-treatment phase, they did not rise to pre-treatment levels



## DISCUSSION AND LIMITATIONS

- The effigy seems to have some effectiveness in dispersing crows, with an effective radius of about 14m, and crows displaying alarm responses
  - These findings align with those reported in studies by Peterson and Colwell (2014) and Avery et al. (2008)
- However, our study was limited by human error, which could have been caused by difficulties in counting crows after sunset, and insufficient manpower on some days
- Differences could also be due to confounding factors such as the use of a laser by a resident to disperse crows at the test site

## CONCLUSION

- The preliminary success of the effigy in dispersing the crows at the test site potentially indicates that effigies can be deployed at other crow roosts to disperse crows
- However, considerations of roost characteristics must be made (Avery et al., 2008)
  - For larger roosts, effigies may not be sufficient, and a combination of methods such as pyrotechnics or distress calls may be required for effective crow dispersal



# WORLD WILDLIFE DAY REGIONAL YOUTH SYMPOSIUM 2024

**Team Members:** Alexis Goh, Ansel Lim, Audrey Chan, Bryan Soh, Chan Ming Lun, Christabel Yow, Chui Qing, Collin Chua, Deborah Goh, Erica Chay, Erika Ng, Eugene Tan, Goh Yu Yang, Gretel Seet, Joel Tan, Kaylea Chua, Lee Wee Meng, Lei Hong Wei, Letitia Chen, Nur Insyirah, Saloni Swaminathan, Sow Jeng Wei, Tan Ee Naa, Vera Loh, Zann Teo

**Project Mentors:** Darren Choo, Hazelina Yeo, Regina Tan, Sandra Chia, Steffi Tan, Tay Li Si



The third World Wildlife Day Regional Youth Symposium was held physically in Singapore from 23-25 February 2024. The event was organised by 25 youth stewards under Singapore's National Parks Board (NParks) Youth Stewards for Nature (YSN) programme, with support from NParks, Mandai Nature, the ASEAN Centre for Biodiversity (ACB) and other key partners. The symposium also saw the debut of a new segment, Youth Showcase. The event successfully brought together youth attendees to engage in discussions, workshops, and networking opportunities focused on youth involvement in wildlife conservation and environmental stewardship.

## OBJECTIVES

- Anchor and grow Southeast Asia's youth conservation network
- Connect Southeast Asian youth with mentors and role models in the wildlife conservation sector
- Raise international awareness of innovative practices for nature conservation in Southeast Asia
- Spotlight creative and novel use of digital solutions and technology for monitoring and protecting wildlife
- Encourage environmental stewardship, protecting nature for future generations

## WWD24 at a glance

**500**  
in-person attendees

**10**  
workshops

**89%**  
expressed interest  
in returning for  
the next rendition  
of the symposium

**12** speakers  
& guests

**14** youth  
showcase  
groups

**15**  
countries

including Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam, India, France, Korea, United Kingdom & United States



## DAY 0

Facilitators and Youth Showcase project teams attended the Cultural Exchange, an informal networking session consisting of games, trainings and briefings, to form connections with peers and prepare for the upcoming Focus Group Activity (FGA) on Day 1 and Youth Showcase segment on Day 2.



## DAY 1

Before the commencement of the event, some of our regional attendees had the opportunity to attend a nature walk at Coney Island, jointly organised by the WWD 2024 Organising Team and Punggol Coast Nature Kakis.



The event kickstarted with a line up of speakers below and tracked themes:

### Opening Speakers



**MR DESMOND LEE**  
Minister for National Development & Minister-in-Charge of Social Services Integration, Singapore



**DR JANIL PUTHUCHERRY**  
Advisor of Punggol Coast and Senior Minister of State for Communications and Information, and Health



**MS SOPHIANNE ARAIB**  
Group Director, National Biodiversity Centre and Horticulture & Community, National Parks Board, Singapore



**MS IVONNE HIGUERO**  
Secretary-General, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)



**DR THERESA MUNDITA LIM**  
Executive Director, ASEAN Centre for Biodiversity



**DR SONJA LUZ**  
CEO, Mandai Nature

### Track 1 - Technology and Innovation



**MR ANTON L. DELGADO**  
Environmental Reporter and Multimedia Photojournalist, The Pulitzer Center, Cambodia



**DR MALCOLM SOH**  
Principal Researcher, Wildlife Management Research, National Parks Board, Singapore



**MR NGUYEN VAN THAI**  
Founder, Save Vietnam's Wildlife, Vietnam

### Track 2 - Leadership and Community Engagement



**DR TRANG NGUYEN**  
Founder & Director, WildAct, Vietnam



**MRS REAKSMY LUY**  
Executive Director, Culture and Environment Preservation Association (CEPA), Cambodia



**MR ALEX WAISIMON**  
Founder, Iryo Hill's Eco-Tourism, Indonesia

## DAY 2

### Workshops

- ArtScience Museum Workshop: Understanding Nature Through Technology**  
Held in partnership with the ArtScience Museum.
- Bird Paradise Workshop: Soaring into Ex-Situ Avian Conservation and Sustainability**  
Held in partnership with Mandai Nature and Mandai Wildlife Group.
- Ethnobotany Workshop: Connecting People, Plants and Culture**  
Held in partnership with the Singapore Botanic Gardens.
- GYBN SEA Workshop: Mapping ASEAN Youth Contributions to the Kunming-Montreal Global Biodiversity Framework**  
Held in partnership with the Global Youth Biodiversity Network Southeast Asia.
- Illegal Wildlife Trade Workshop: Caught in the Act! From Crime Scene to Lab/Rehab**  
Held in partnership with Centre for Wildlife Forensics, Centre for Wildlife Rehabilitation, and Wildlife Trade, National Parks Board.
- LKCNHM Workshop: Revealing Conservation Narratives through Taxonomy**  
Held in partnership with the Lee Kong Chian Natural History Museum, National University of Singapore.
- Mandai Conservation Workshop: Innovations Behind Singapore Zoo's Conservation Efforts**  
Held in partnership with Mandai Nature and Mandai Wildlife Group.
- Marine Conservation Workshop: A Deep Dive into SINML's Cutting-Edge Research**  
Held in partnership with the St. John's Island National Marine Laboratory.
- Nature Storytelling Workshop: Crafting Compelling Content to Engage Audiences**  
Held in partnership with Kong Man Jing (Biogiri, MJ) and Jayaprakash Jogjee Bojan.
- WWF-Singapore Workshop: Capturing Citizen Science for Conservation**  
Held in partnership with World Wide Fund for Nature (Singapore).



### Youth Showcase

In the afternoon, attendees gathered at One Punggol for the Youth Showcase segment. Attendees and members of the public had the opportunity to visit up to 14 project booths featuring youth-led conservation efforts. Attendees could earn a sticker for participating in unique booth activities with those managing to collect up to eight stickers being able to claim prizes as part of the ongoing sticker rally activity.

