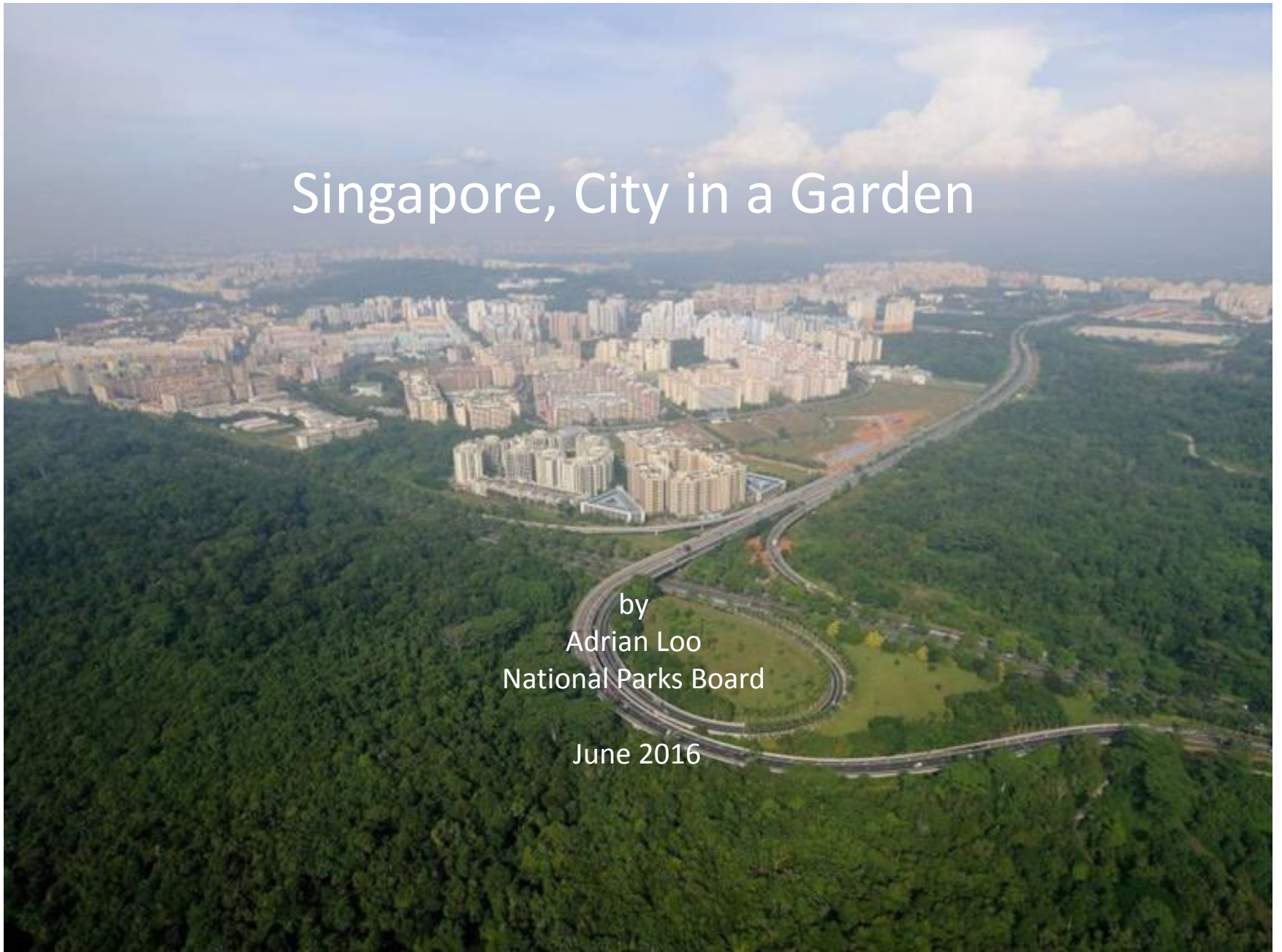


Singapore, City in a Garden

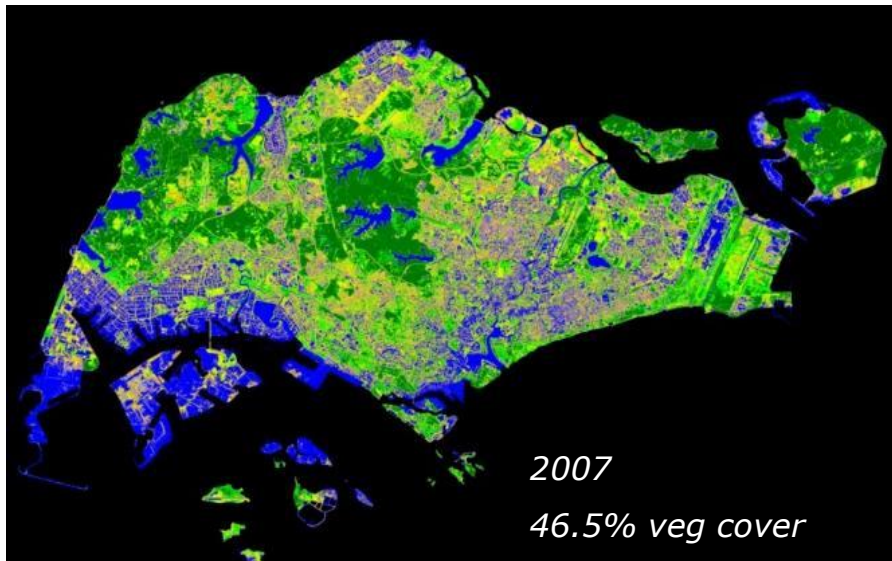
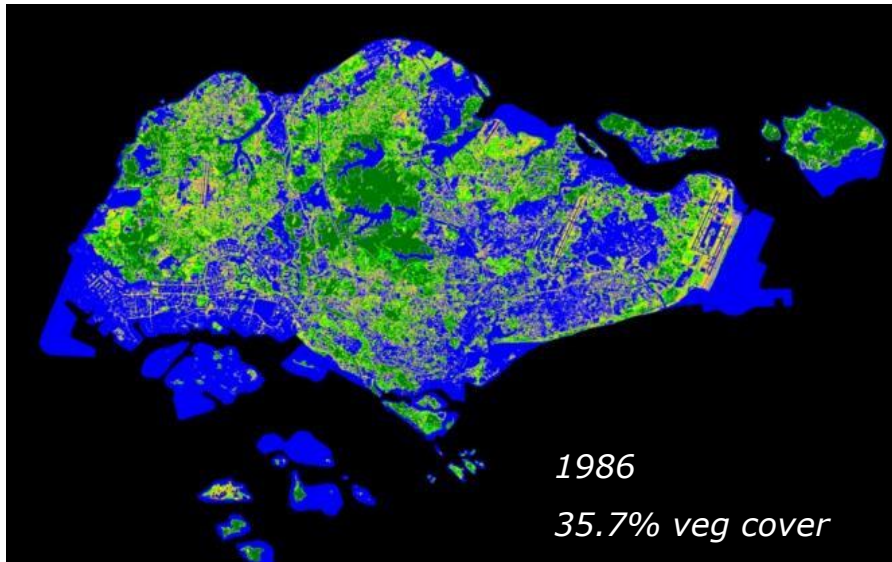
by
Adrian Loo
National Parks Board

June 2016



Statistics on Singapore's Biodiversity

- **2145** native vascular plant species
- **384** bird species
- **109** reptile species
- **85** freshwater fish species
- **318** butterfly species
- **125** dragonfly species
- **>800** spider species
- **29** amphibian species
- **35** true mangrove tree species
- **12** seagrass species
- **255** hard coral species
- **50** sea anemone species
- **>200** sponge species
- **>68** echinoderm species
- **>30** sea fan & sea whip species



Where can we find Singapore's biodiversity?

- Nature Reserves, National Parks and Nature Areas
- 350 parks
- 300 km of PCN
- 3500 km of streetscape
- Coastal and marine areas
- Sky rise greenery

Ecosystems



Lowland Dipterocarp Forest

A wide-angle photograph of a lush, green lowland forest with rolling hills in the background under a hazy sky.



Freshwater Swamp & Streams

A photograph of a freshwater swampy area with scattered trees and a body of water in the background.



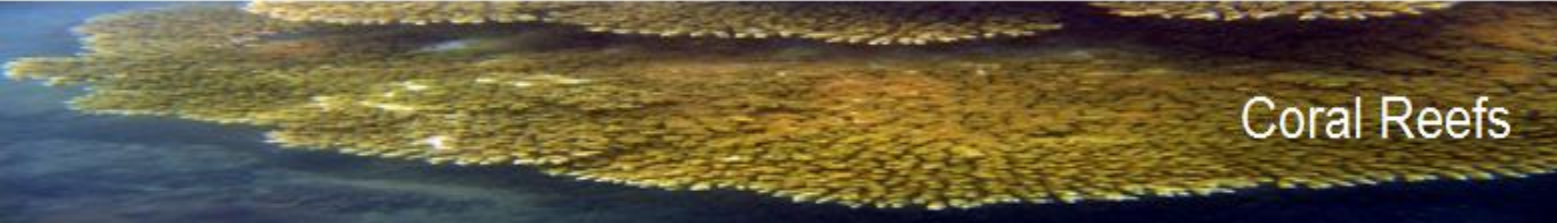
Mangroves

A photograph of a mangrove forest with dense green foliage and visible prop roots.



Inter-tidal

A photograph of an inter-tidal zone showing a vast expanse of reddish-brown mudflats or sandbars.



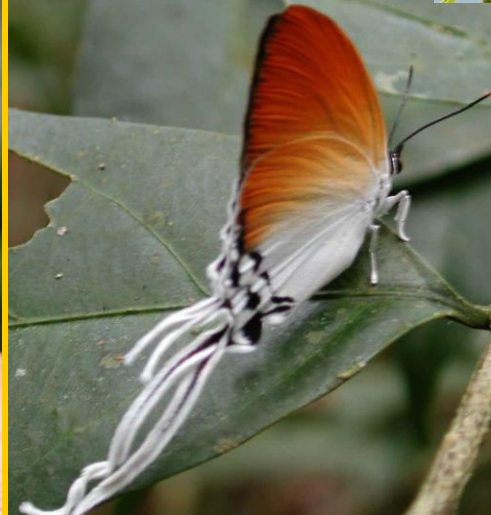
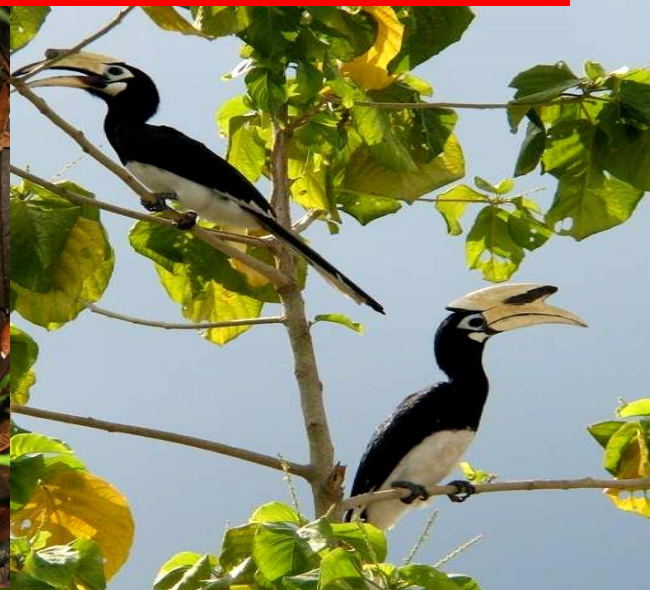
Coral Reefs

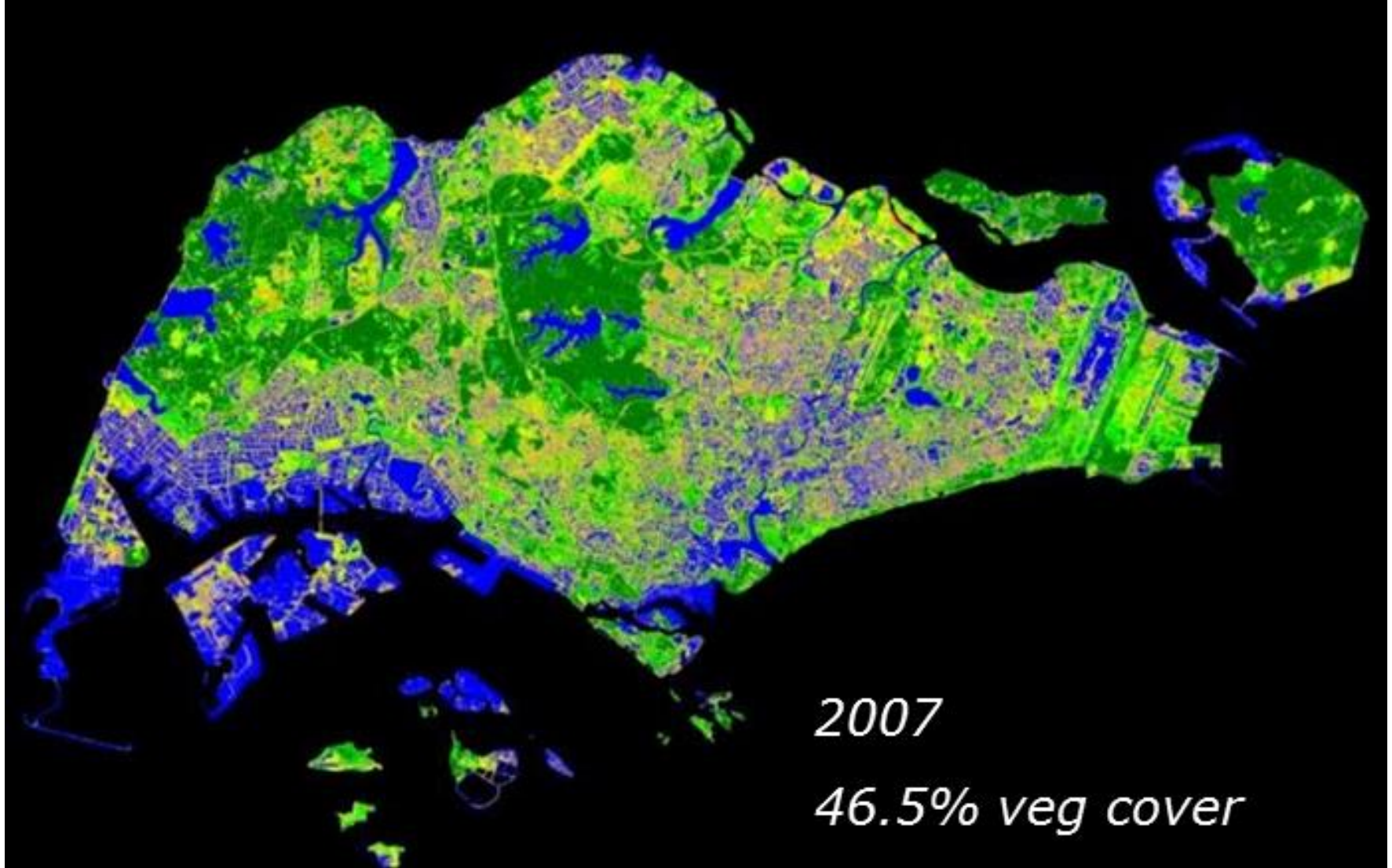
A photograph of a coral reef system with a large, flat, yellowish-brown coral patch in the foreground and blue water.

Flora



Fauna





Over 100 sites of varying sizes identified by NParks as Important for Biodiversity

Subject to impact assessment studies if development occurs near or in them (100m buffer).

Allocation as parks, incorporated into streetscapes or upgraded to Nature Areas or Nature Reserves as proposed in the Nature Conservation Master Plan.

Why carry out habitat enhancement and restoration in Singapore?

- Rapid development in Singapore
- Small size of areas, increased vulnerability (e.g., edge effects)
- Need to ensure sufficient, suitable and diverse habitats / ecosystems to sustain biodiversity
- Habitat enhancement is prerequisite to species recovery
- Long term investment, long term returns

**National Biodiversity
Strategy and Action Plan
(NBSAP)**

**Nature Conservation
Master Plan**

**Conservation of
Key Habitats**

**Habitat
Enhancement,
Restoration and
Species Recovery**

**Applied
Research in
Conservation
Biology and
Planning**

**Community
Stewardship and
Outreach in
Nature**



Tridachna squamosa
Fluted Giant Clam



Brachygonia oculata
Pixie Dragonfly



Zingiber singaporense



Johora singaporensis
Singapore Freshwater Crab

Ecological Restoration Framework

Rapid Site Assessment



Ecological State of the Forest
(Stages of degradation/regeneration/succession)



Determine the restoration/reforestation techniques



Enhancing site conditions



Reforestation methods



Assisted-Natural
Regeneration
method

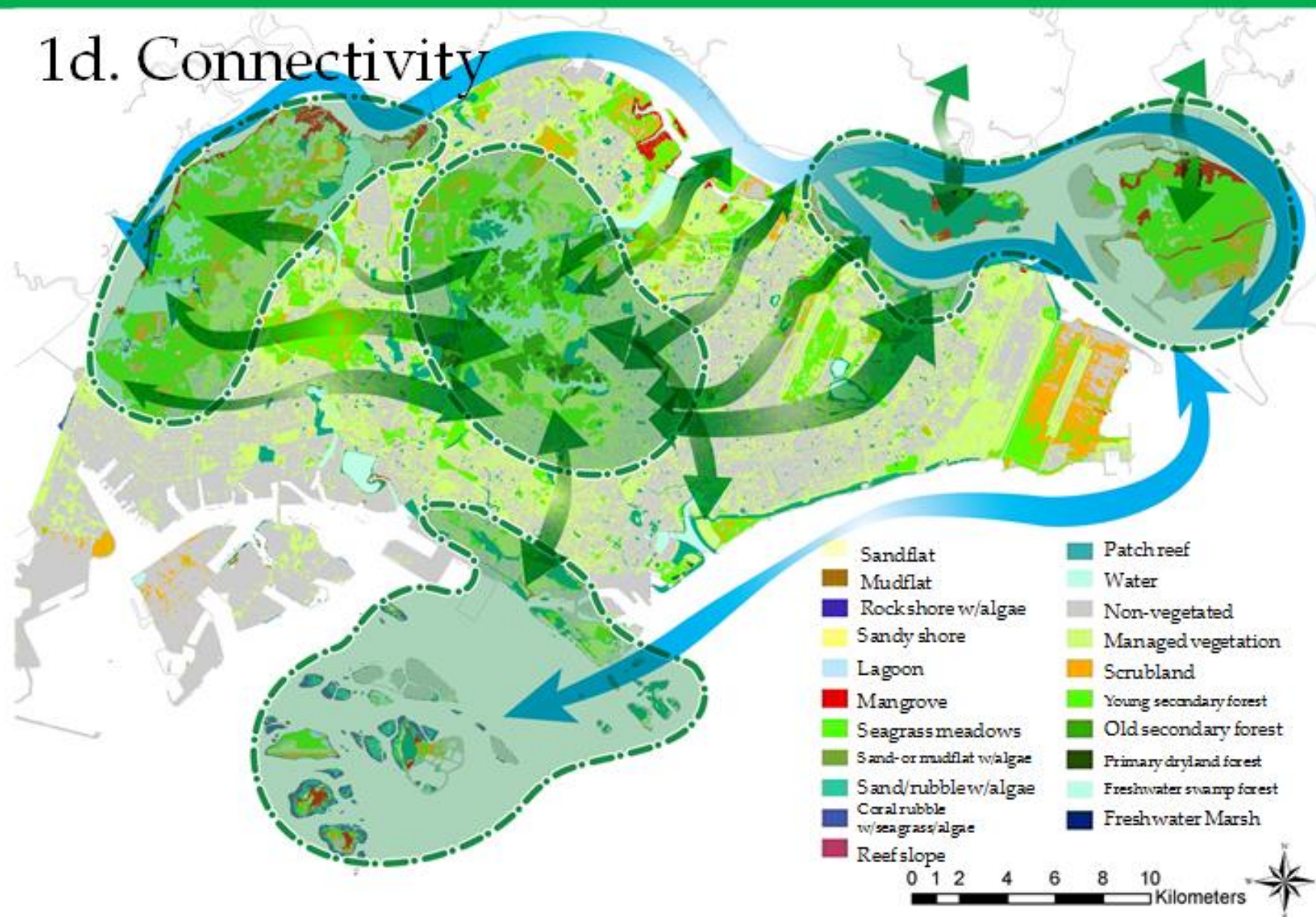
Framework Matrix
Species (10% of
dominants for planting)

Maximal Species Diversity
(as much of all the climax
species as possible for
planting)



Monitoring
(Flora and Fauna)

1d. Connectivity

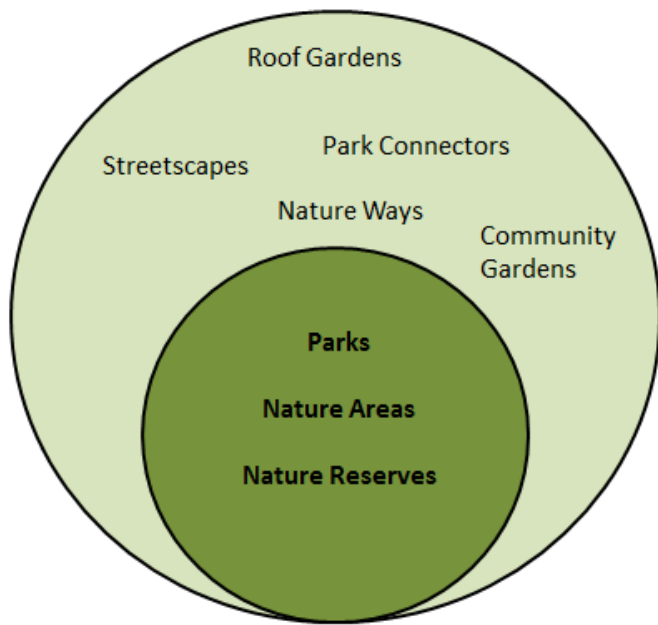


Ecological network

A framework of spatial components including **nodes** (core habitat areas) and **corridors** (physical habitat links between resource patches) which provides the physical conditions to **support biodiversity** in a human-dominated landscape.



Nodes & Corridors



- 2416 ha of tree-lined streetscape
- 1.08 mil trees (Total no. of trees in Singapore – 30mil)
- 11 mil shrubs







AUGUST 2013



NOVEMBER 2013



JUNE 2014



NOVEMBER 2015





FACTS AND FIGURES

\$16 million

COST OF BUILDING BRIDGE

62m

LENGTH OF BRIDGE

3,000+

NATIVE PLANTS

8

CAMERAS INSTALLED





Species Recovery Programme

Flora

Fauna

Critically Endangered, Endangered, Vulnerable

Terrestrial Species

- 63 critically endangered
- 16 new records & 4 endemics

Orchids

- All 228 to be in NOG (170 Nationally Extinct)
- 19 of 58 extant spp recently rediscovered
- 7 species reintroduced

Gingers

- 14 of 26 spp planted in Bt Batok, SBG, Istana
- Tissue culture of *Zingiber singapurens* (success)

Mangroves

- *Bruguiera hainesii*
- *Avicennia marina*
- *Kandelia kandel*

Sea Grasses

Translocation studies

Terrestrial

Mammals

Banded Leaf Monkey
Sunda Pangolin
Sunda Slow Loris
Leopard Cat
Small Clawed Otter
Bats

Birds

Red-wattled Lapwing
Baya Weaver
Blue-throated Bee-eater
Blue Rumped Parrot
Green Imperial Pigeon

Insects, Arachnids

Dragonflies, Butterflies,
Spiders

Crabs

Captive Breeding of 2
endemic species

Marine

Hawksbill Turtle

Hatchery at Small Sisters

Sea Horse

Population Studies

Giant Clams

Rearing and Transplanting

Corals

Hard Coral Gene Bank

Neptune Cup Sponge

Transplants to Sisters' Island

Highlights





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