

Where are the hot spots of ecosystem services?



Photo credit @ Alamgir

Mohammed Alamgir¹, Steve Turton¹ and Petina L. Pert^{1, 2}

¹Centre for Tropical Environmental & Sustainability Sciences, James Cook University

^{1, 2}CSIRO, Land and Water Flagship, c/-James Cook University



Introduction

Ecosystem Services--- the benefits community obtain from ecosystems.



Introduction----



Research Questions

i) How are ES spatially distributed across the Wet Tropics?

ii) Where are the hot spots of ES production?

Wet Tropics Bioregion



- One of 85 bioregions in Australia.
- It covers two million hectares (approx.)
- Located in northeast Queensland, extending from Cooktown to south of Townsville, and includes Mt Elliot ($15^{\circ}47' - 18^{\circ}56'S$, $144^{\circ}46' - 146^{\circ}2'E$).

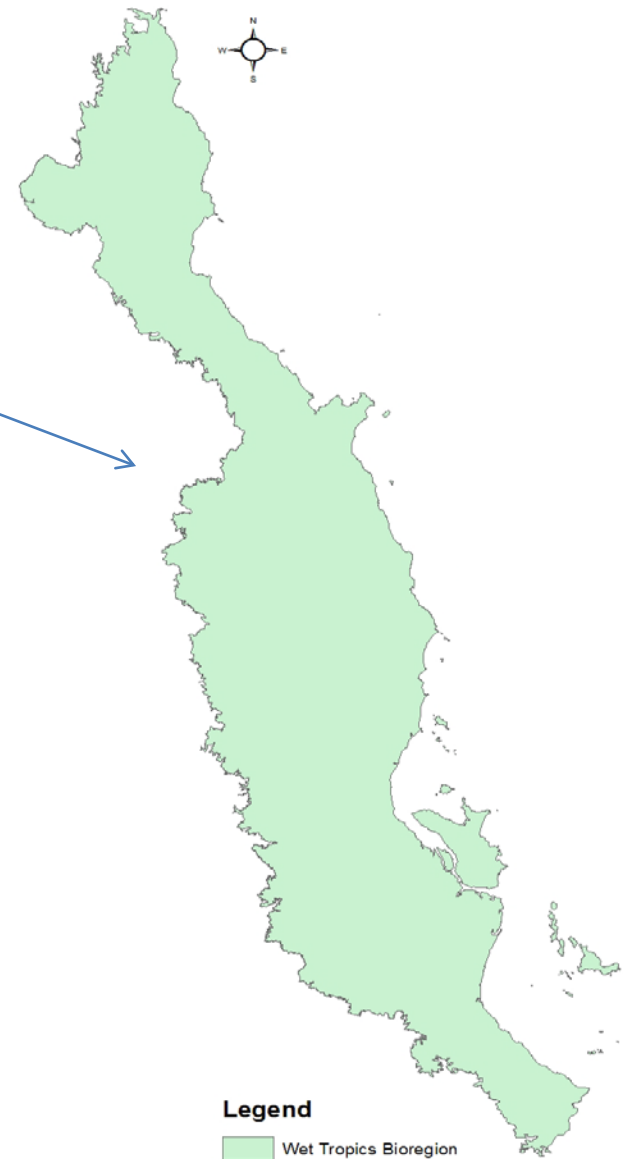


Fig. Wet Tropics Bioregion

Wet Tropics Bioregion: An area of national and global ecological significance

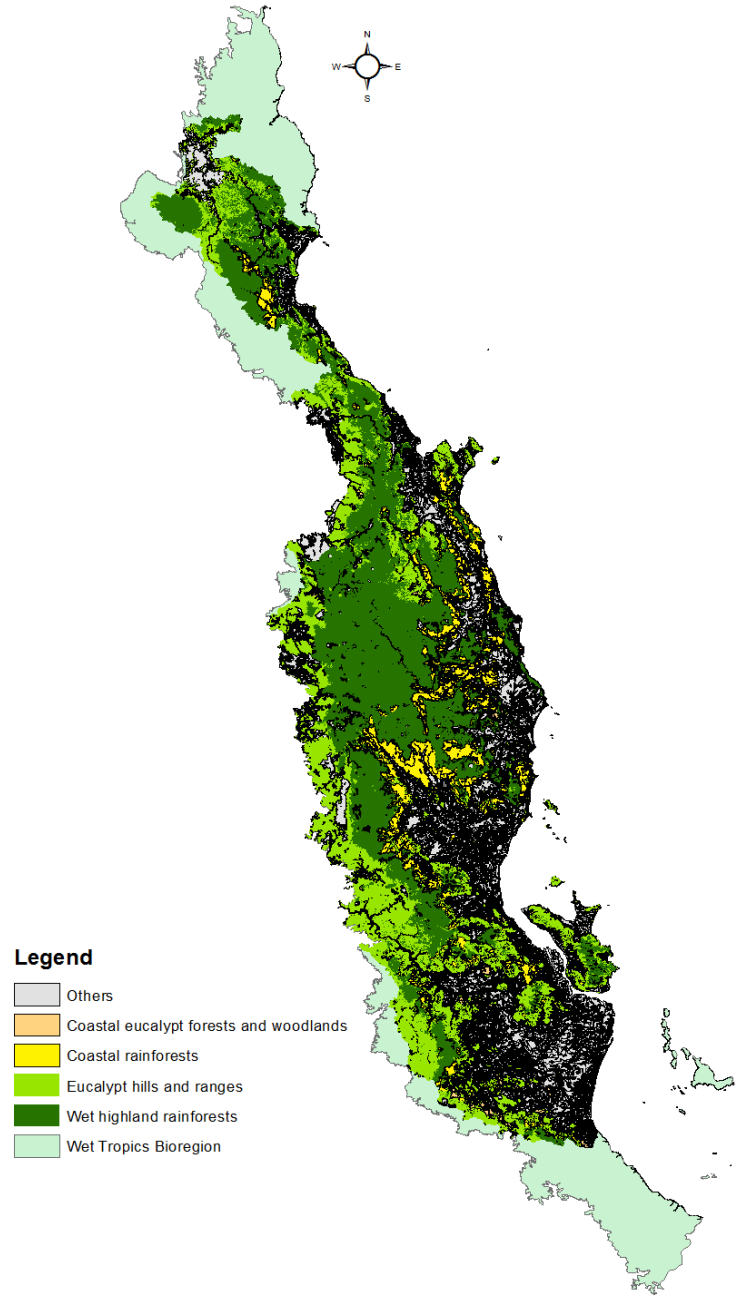
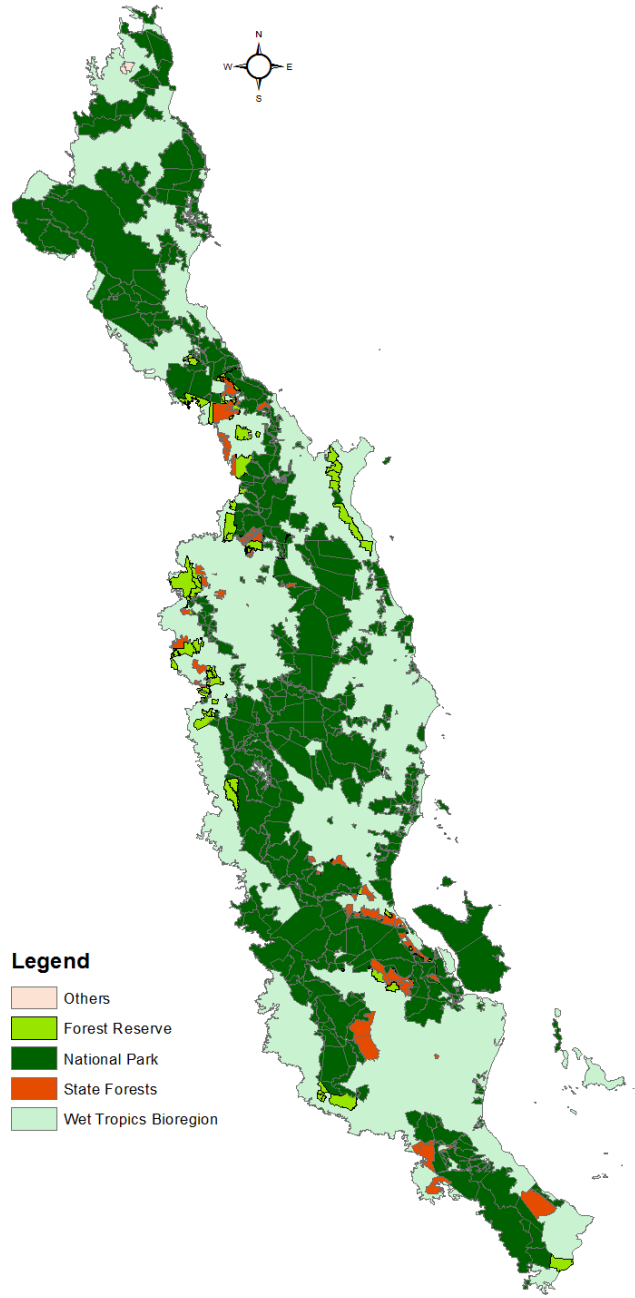
- Includes entire Wet Tropics World Heritage Area (WTHA)
- The WTHA is the second most irreplaceable World Heritage Area on the Planet
- The WTHA has been ranked sixth irreplaceability based on all species, eighth based on threaten species) among the protected areas in the globe
- More primitive plant taxa than any other area on the Earth.
- One of the largest rainforests World Heritage Area
- The rainforests of the WT is one of the oldest rainforests on the Earth
- Catchment of Great Barrier Reef
- The largest remaining rainforests in Australia

Table. Wet Tropics contribution to global biodiversity

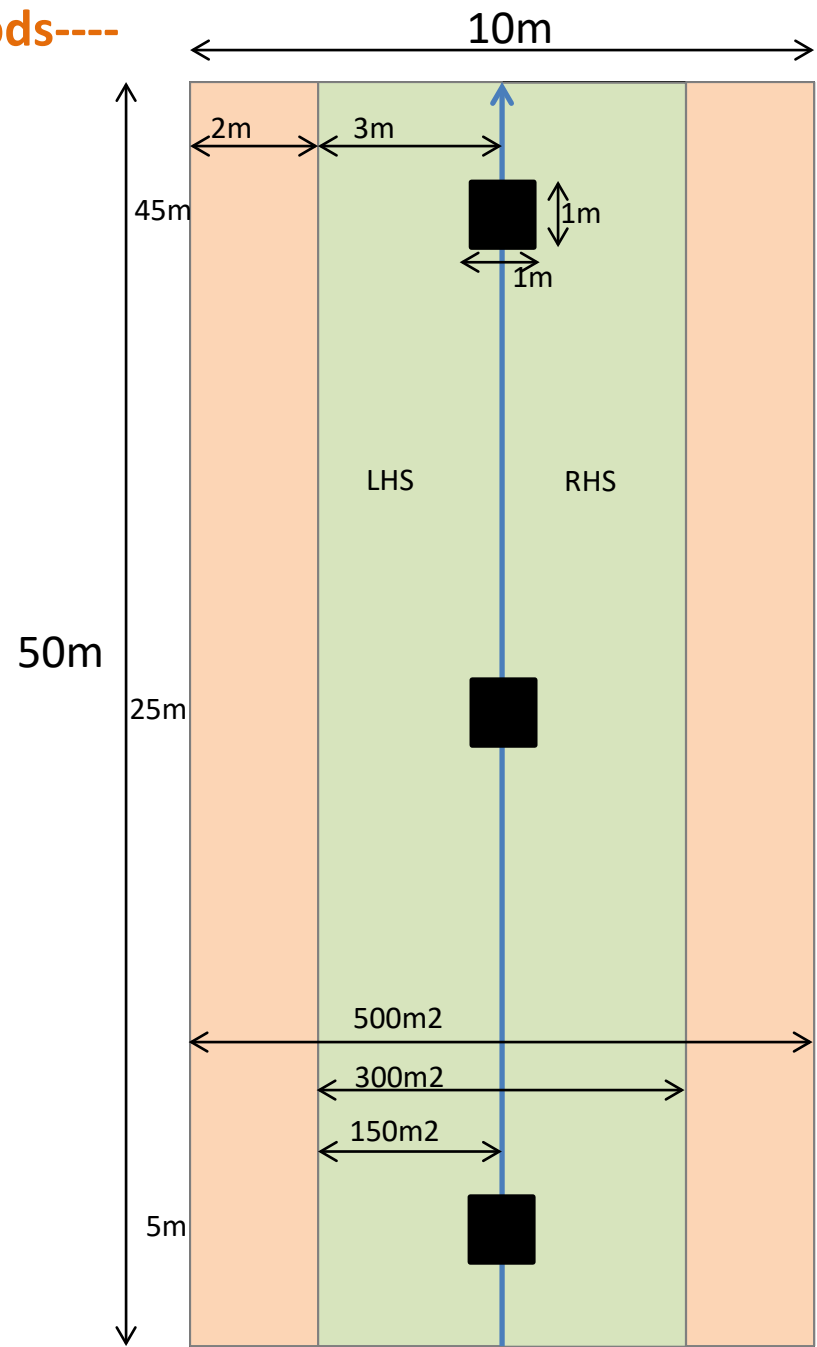
Group	Proportion of the world's total found in the Wet Tropics (%)
Vascular plant species	1.7
Mammal species	2.5
Bird species	3.4
Amphibian species	1.1













0.013% of
Earth's land
surface

Methods---



Methods-----

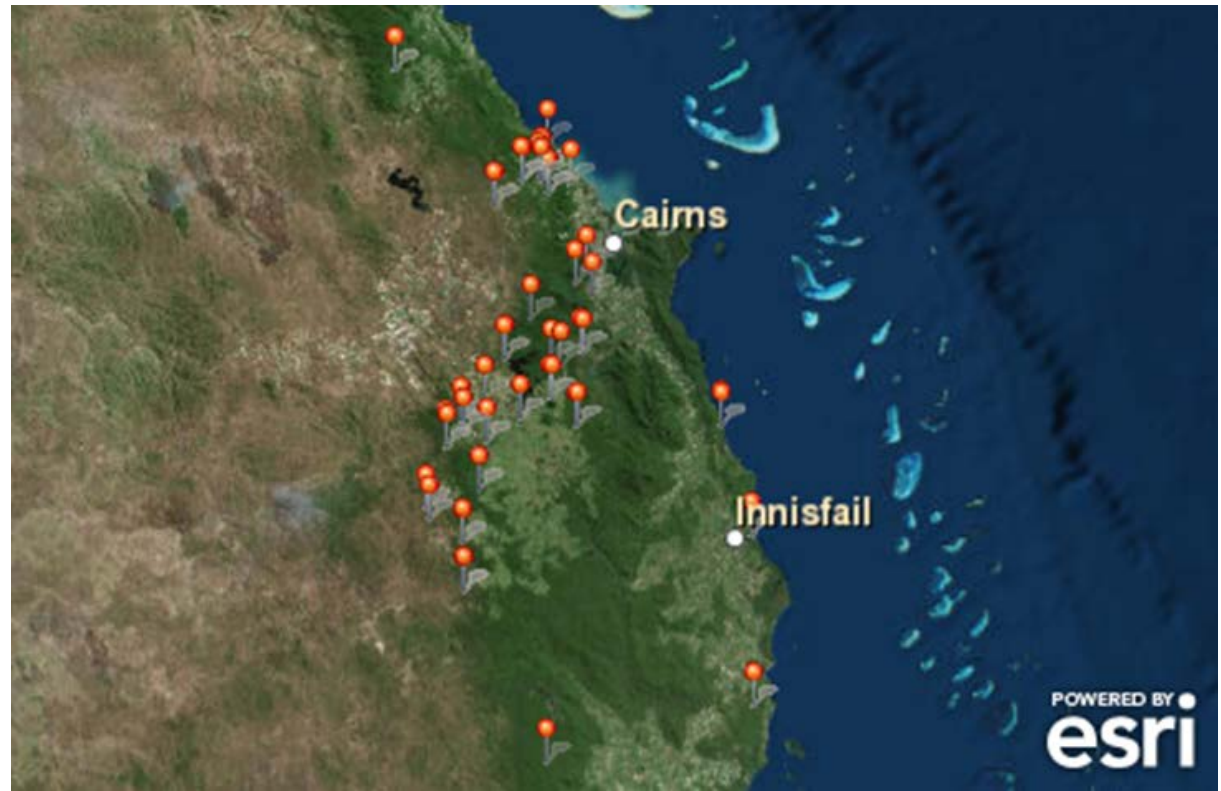


-  50m transect line- woody debris
-  Ground cover
-  All stems ≥ 2.5 cm dbh (height > 2 m)
-  Shrubs 1-2m height
-  LHS
-  Stems ≥ 10 cm dbh
-  RHS
-  Special life forms
-  Canopy cover and height
-  LHS RHS
-  Stems ≥ 20 cm dbh
-  both sides

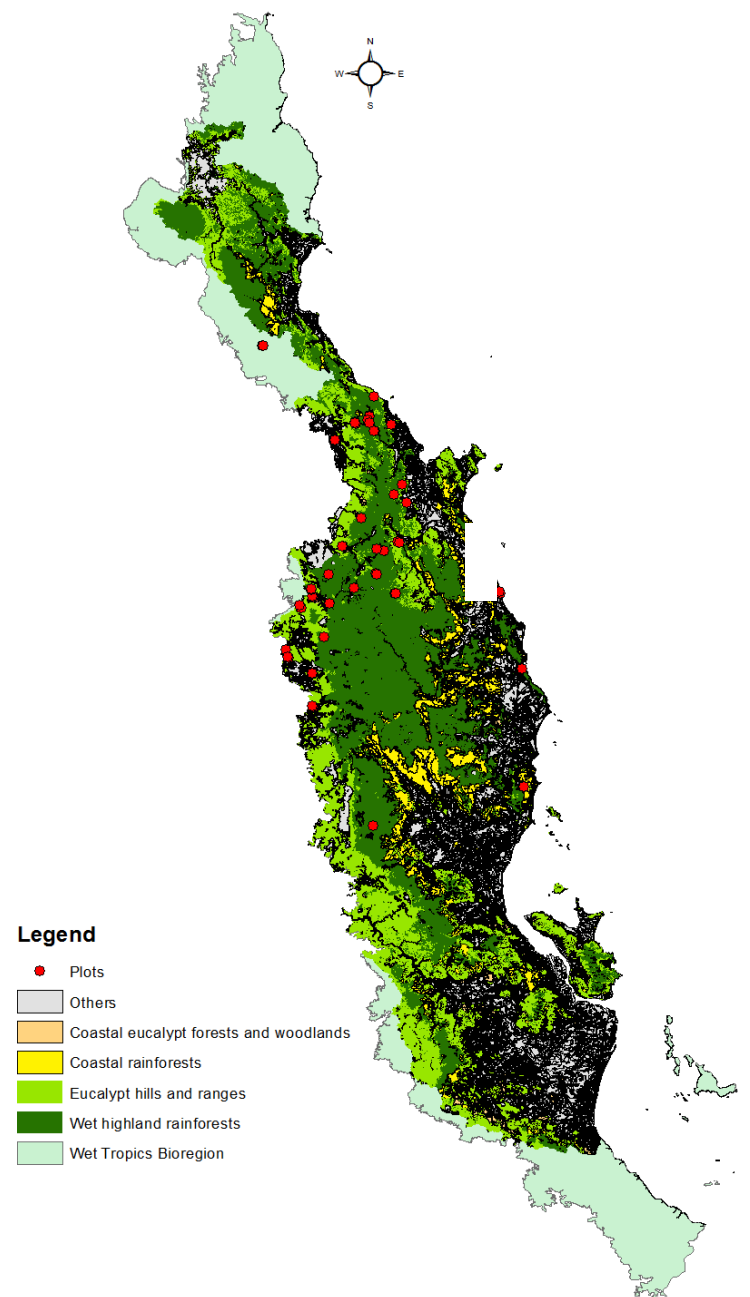
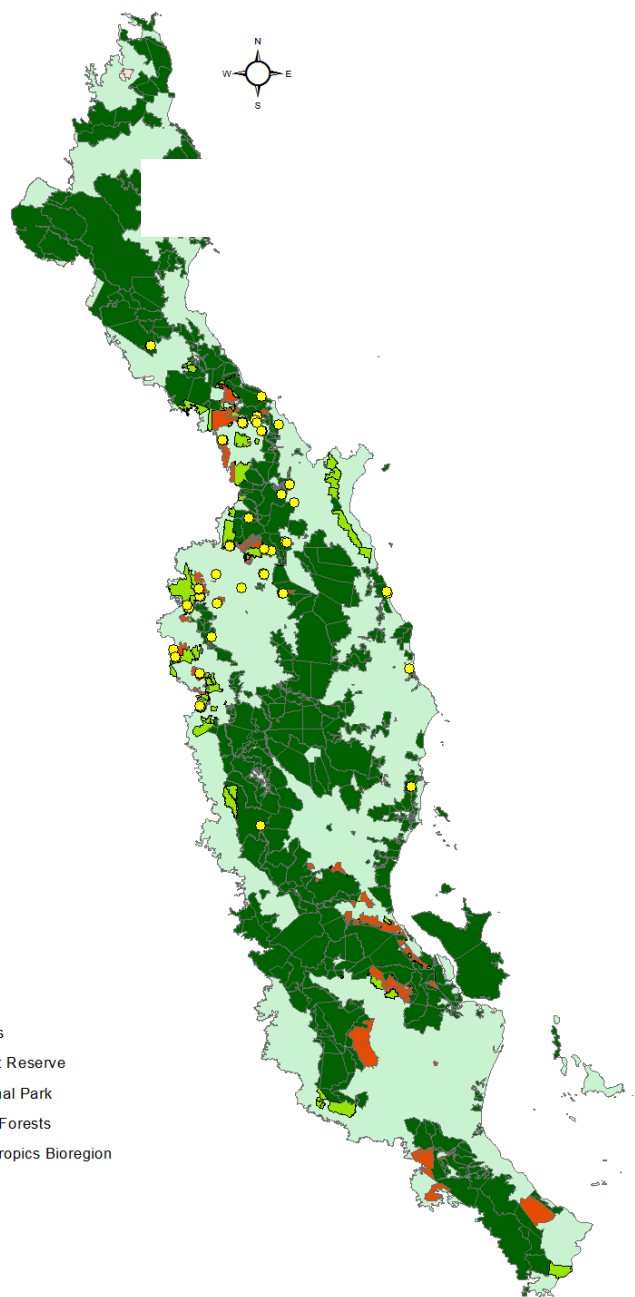
GPS reading , compass reading

Methods-----

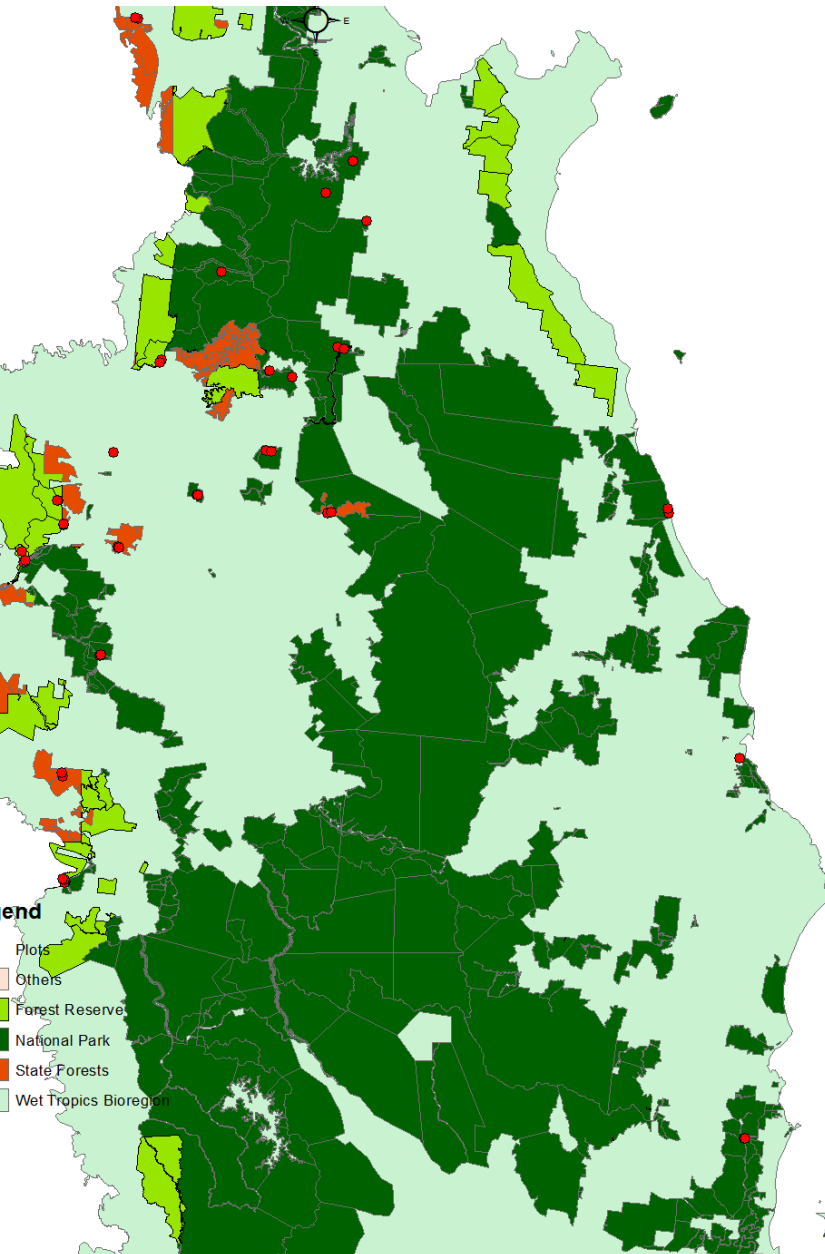
- 70 plots of 0.05 ha each



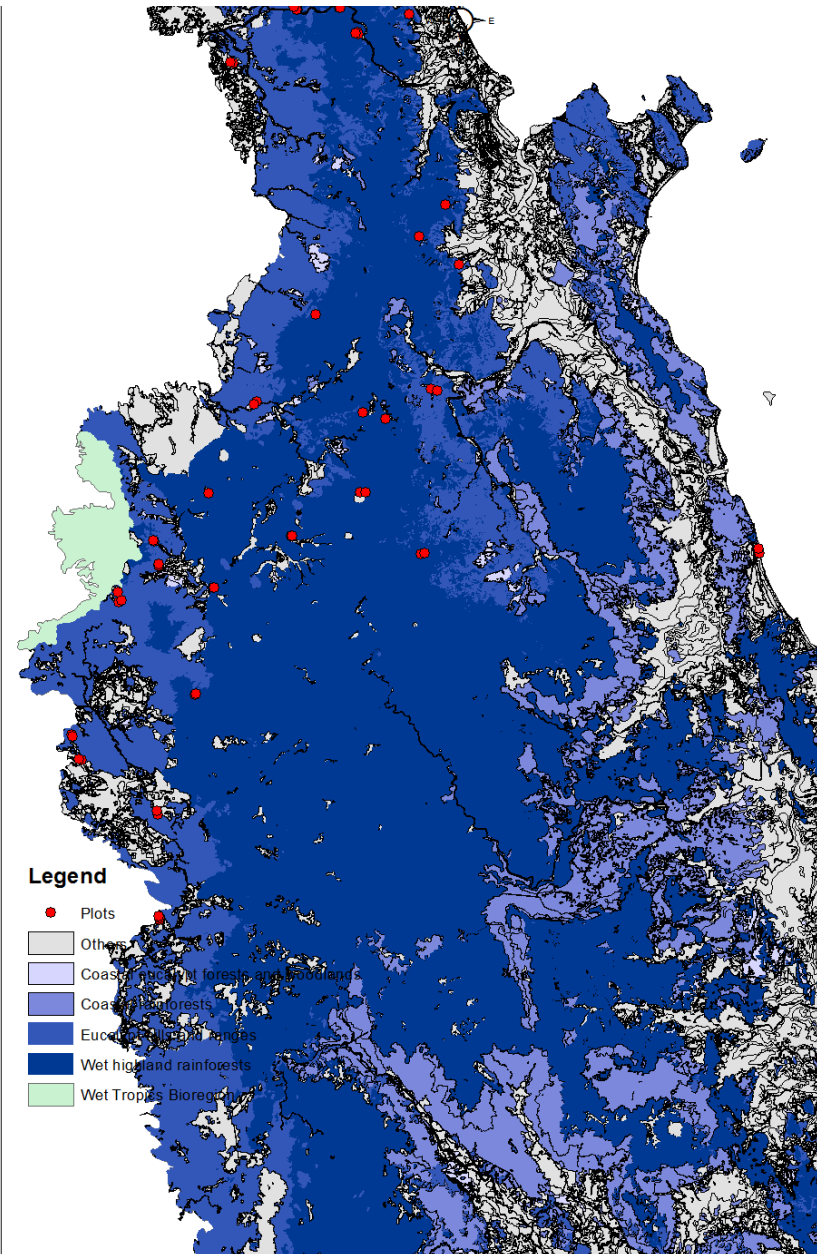
Methods--



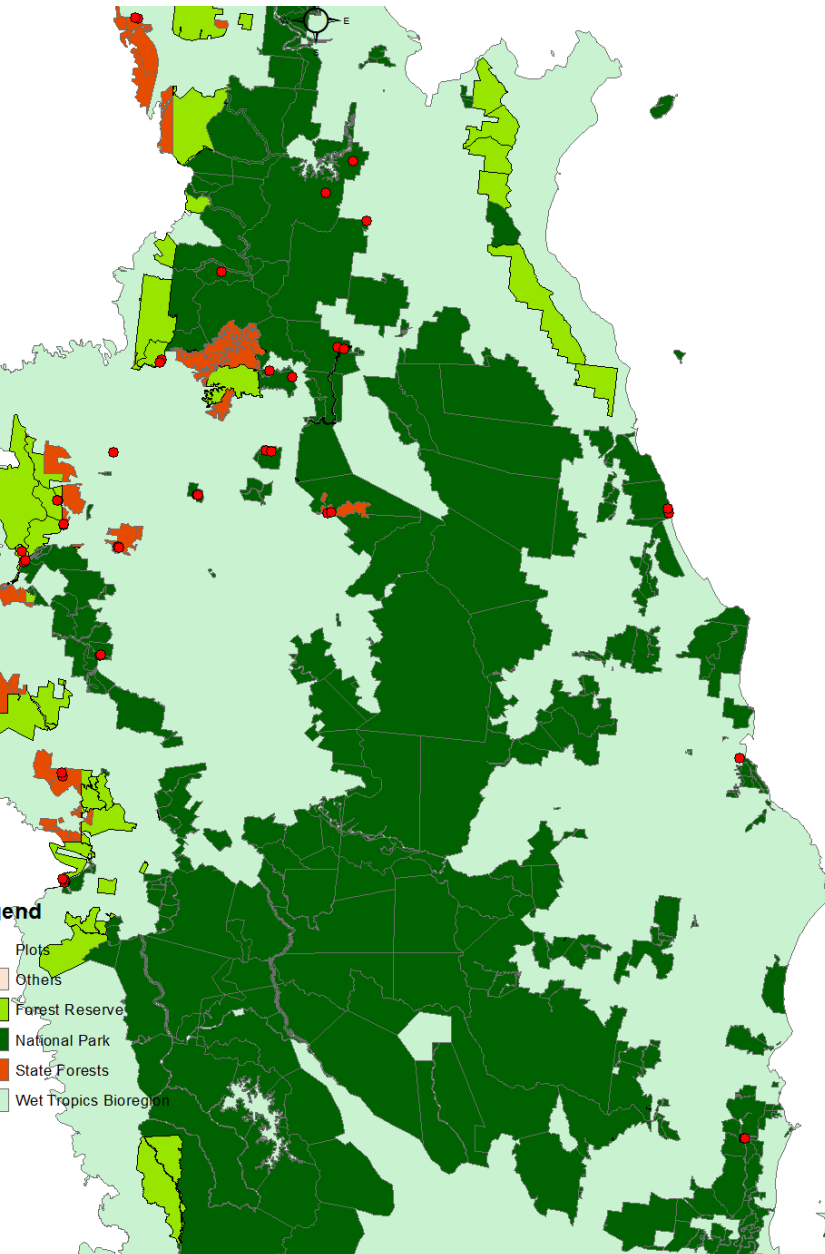
Results



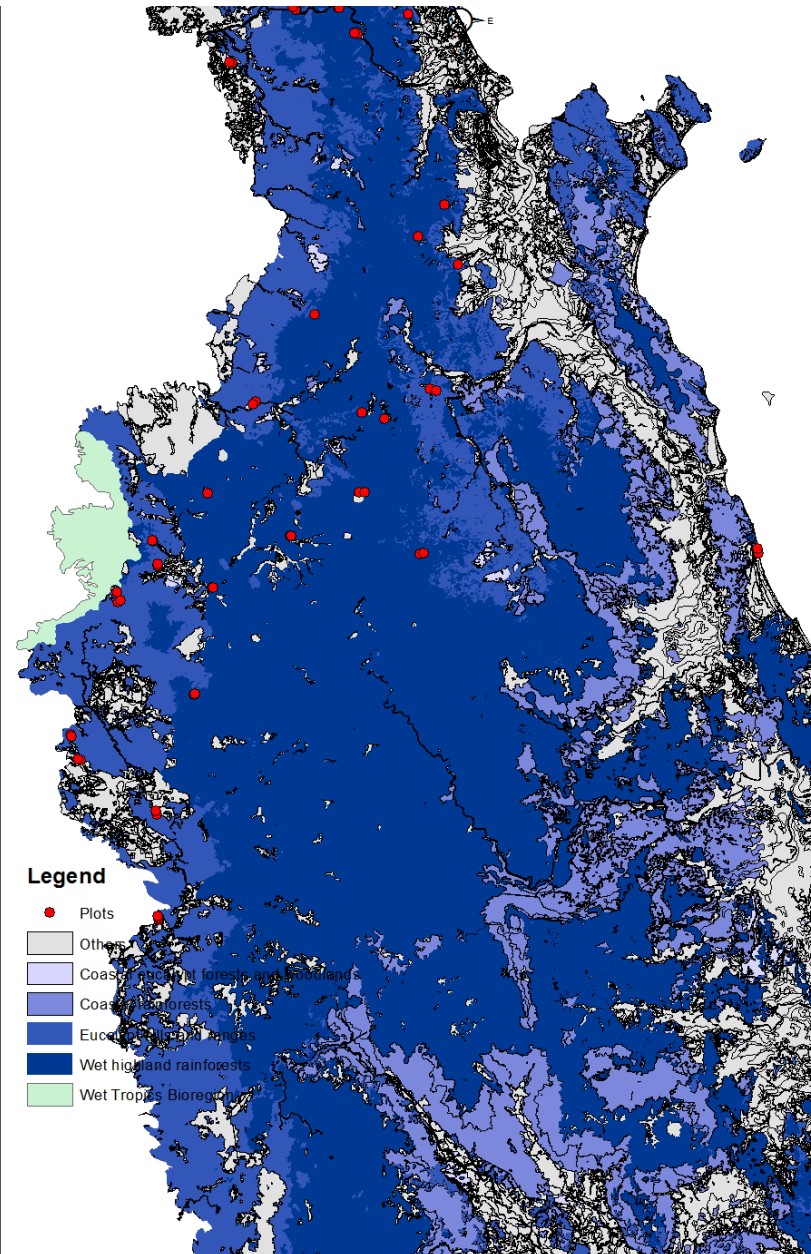
Timber Provision



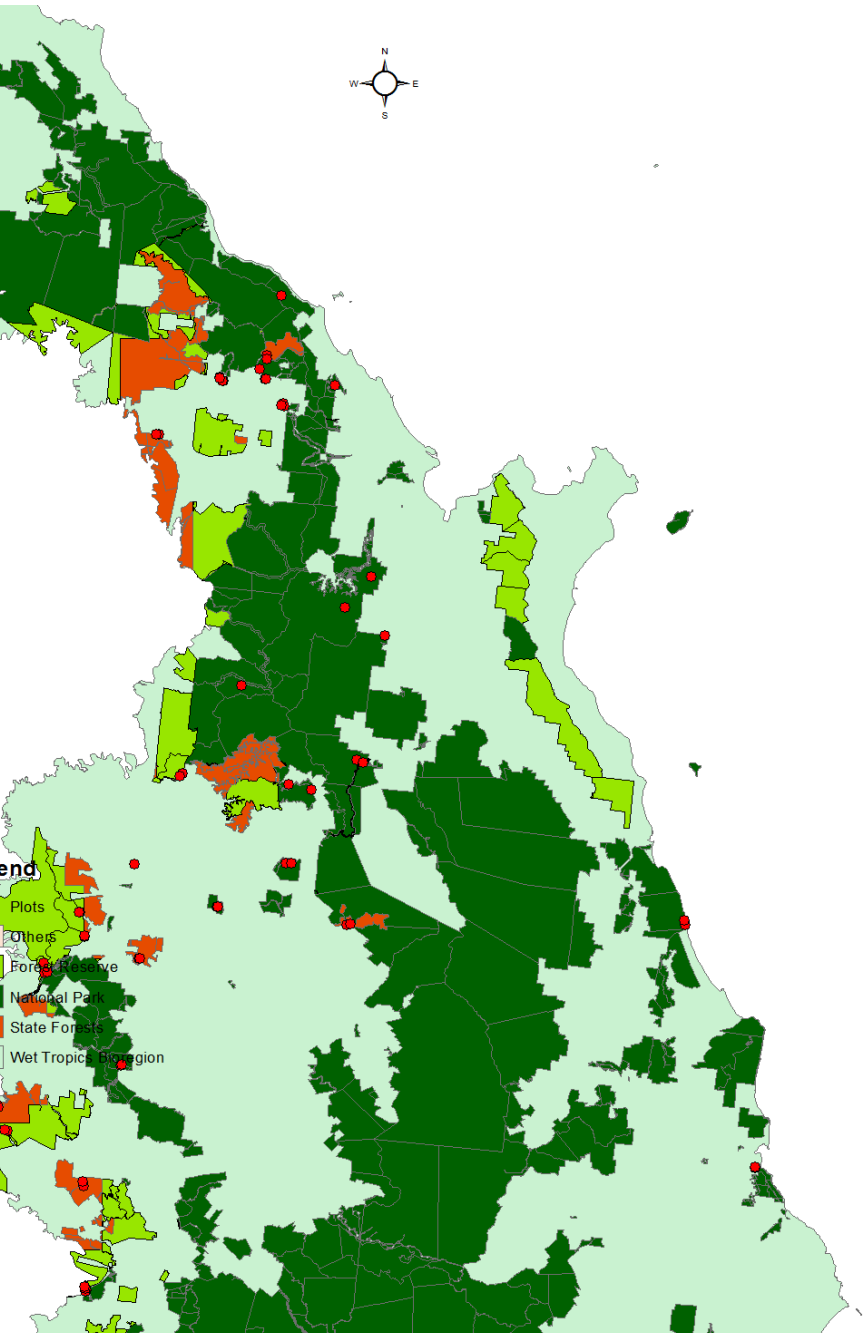
Results



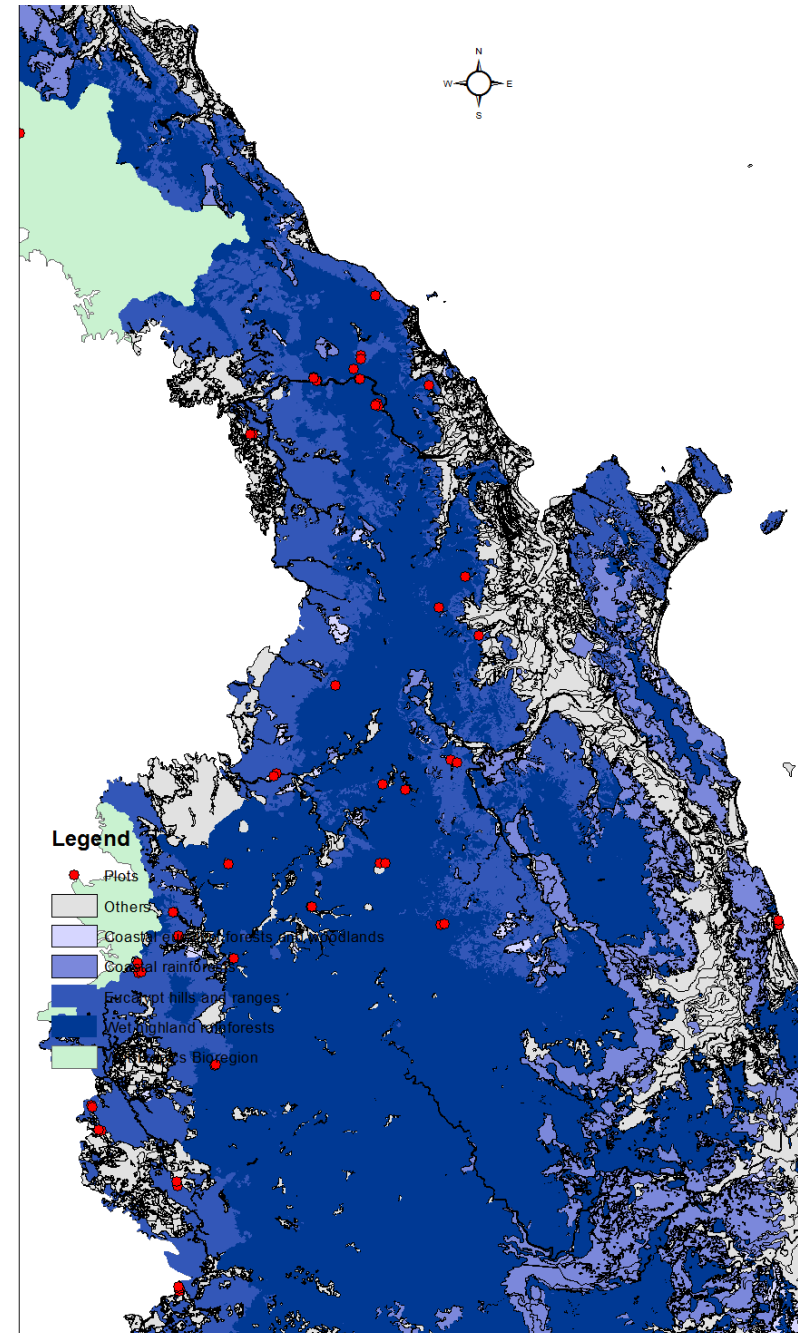
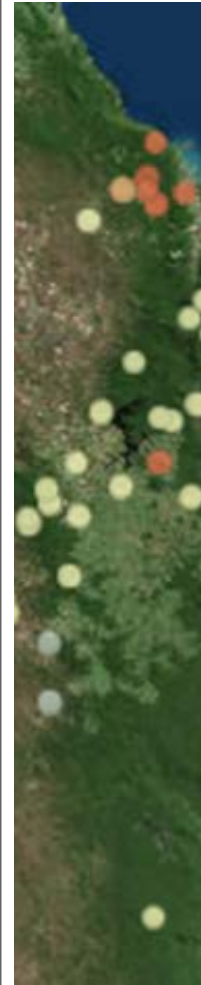
Climate Regulation



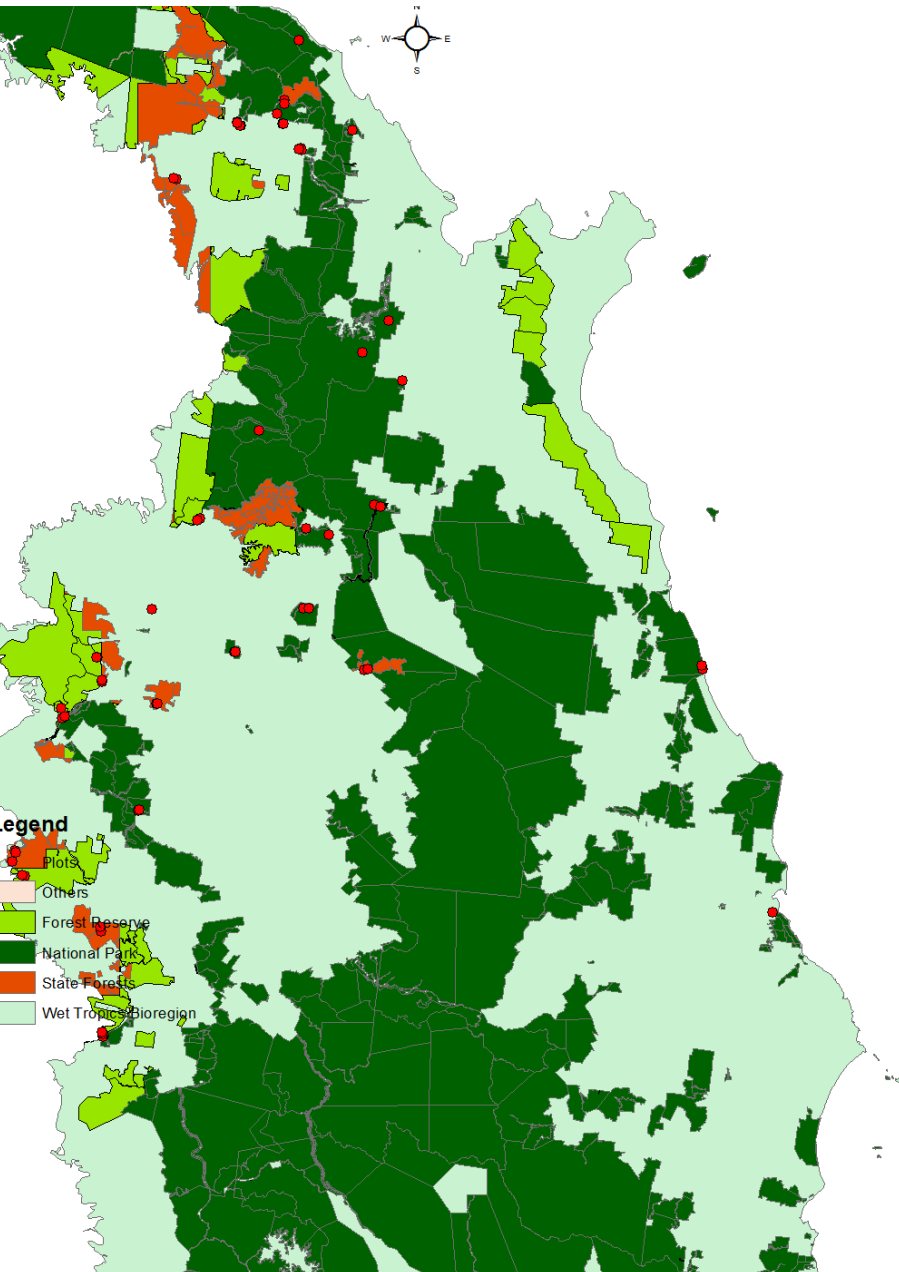
Results----



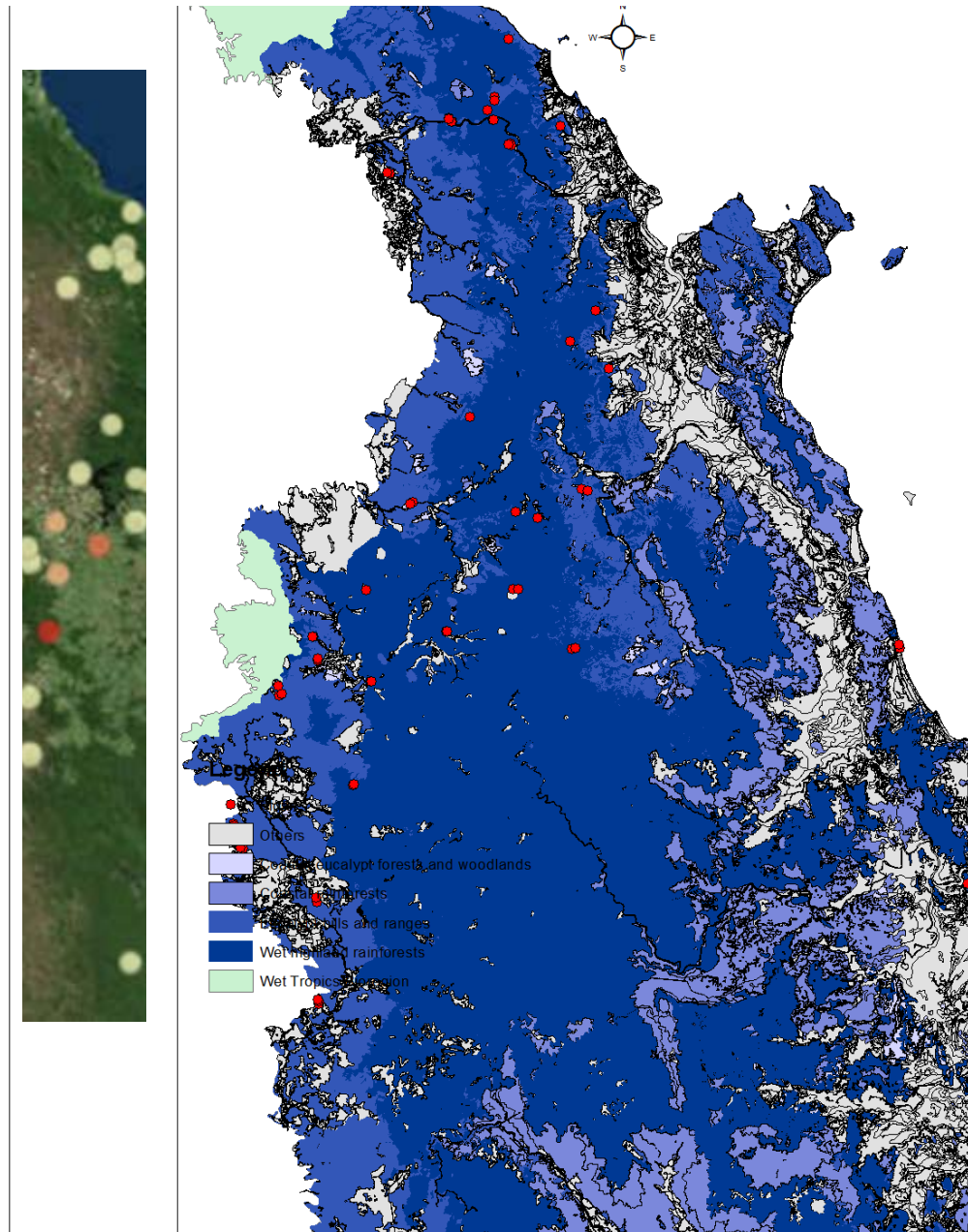
Habitat Provision (mean canopy %)



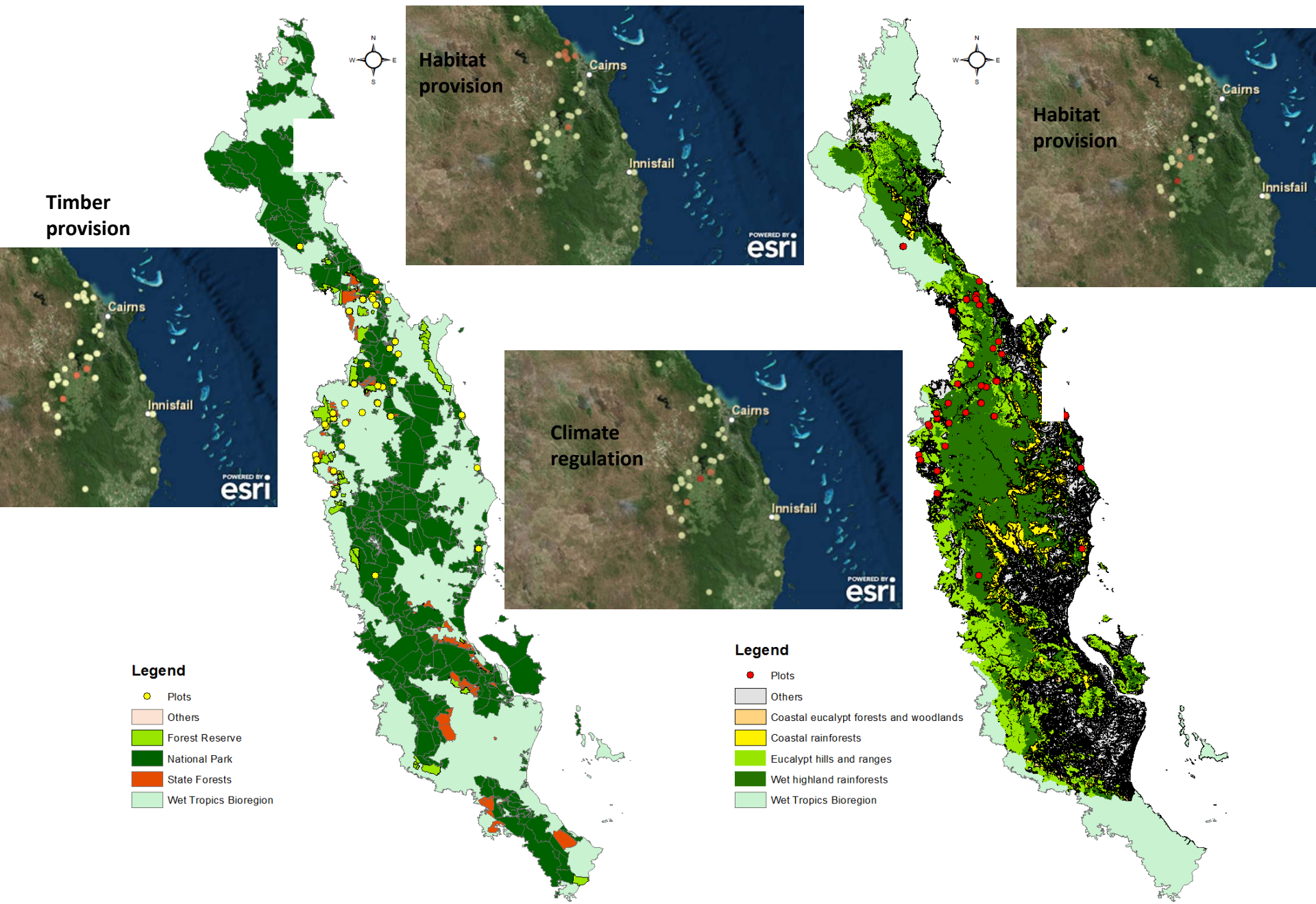
Results-----



Habitat provision (shrubs)



Results----



Conclusion

Upland rainforests are the most important ecosystem for ecosystem services production

Land tenure has an influence on the capacity of ecosystem service production of forests

Tropical cyclones reduced the capacity of forests to produce ecosystem services, particularly the capacity of the low land forests

Ongoing analysis

Landscape level

Water regulation/provision ecosystem services

Habitat complexity index for habitat provision

Net Primary Productivity (NPP) for supporting services

Community connection

Acknowledgements



Acknowledgements---



A large tree fern with a thick, brown, textured trunk and several bright green, feathery fronds is growing on a large, grey, moss-covered rock. The background shows a dense forest of trees with green leaves and a blue sky with some clouds. The lighting is bright, suggesting a sunny day.

Thank for your kind attention

Any question??