

RAINFOREST COMMUNITIES OF CENTRAL QUEENSLAND: ARE THEY A PRIORITY FOR CONSERVATION?



Shute Harbour, Whitsundays
Image: Wayne Howden



Horseshoe Bay, Bowen
Image: Bill McDonald

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Supervisor: Associate Professor Dr. Alison Shapcott

CENTRAL QLD COASTAL RAINFOREST



Birthday Creek Falls, Paluma
Image: Bill McDonald



Bottle tree scrubs Mt Inkerman
Image: Bill McDonald

- Highly fragmented, dry landscape
- Not well studied
- Geologically highly complex
- Broad climatic variation
- Rainforest types: moist tropical/subtropical to dry tropical
deciduous/semi-evergreen microphyll vine thicket to dry
sub-tropical hoop pine and bottle tree scrubs.
- Represents an interface between tropical and sub-tropical
rainforest species

THREATS



Gregory and Reedy Ranges viewed from Mount Inkerman
Image: Bill McDonald



Defoliation by Cyclone Debbie, Repulse Creek, Conway NP
Image: Bill McDonald

- Central Queensland Coast bioregion <40% preclearing remnant vegetation of dry rainforests remaining
- Likely to be significantly impacted by Climate Change
- Predicted increases in global temperatures, rainfall variability, fire, invasive species, urbanization, anthropogenic influences and frequency of severe weather events, such as cyclones.



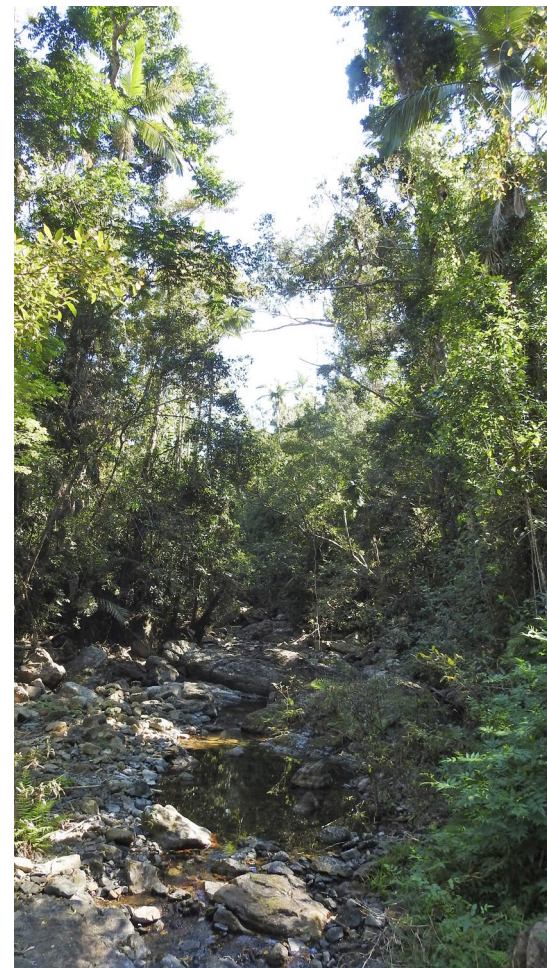
Sky Window Lookout; Eungella NP
Image: Wayne Howden



Beach Scrub, Molongole Creek.
Image: Wayne Howden

PRIMARY AIMS

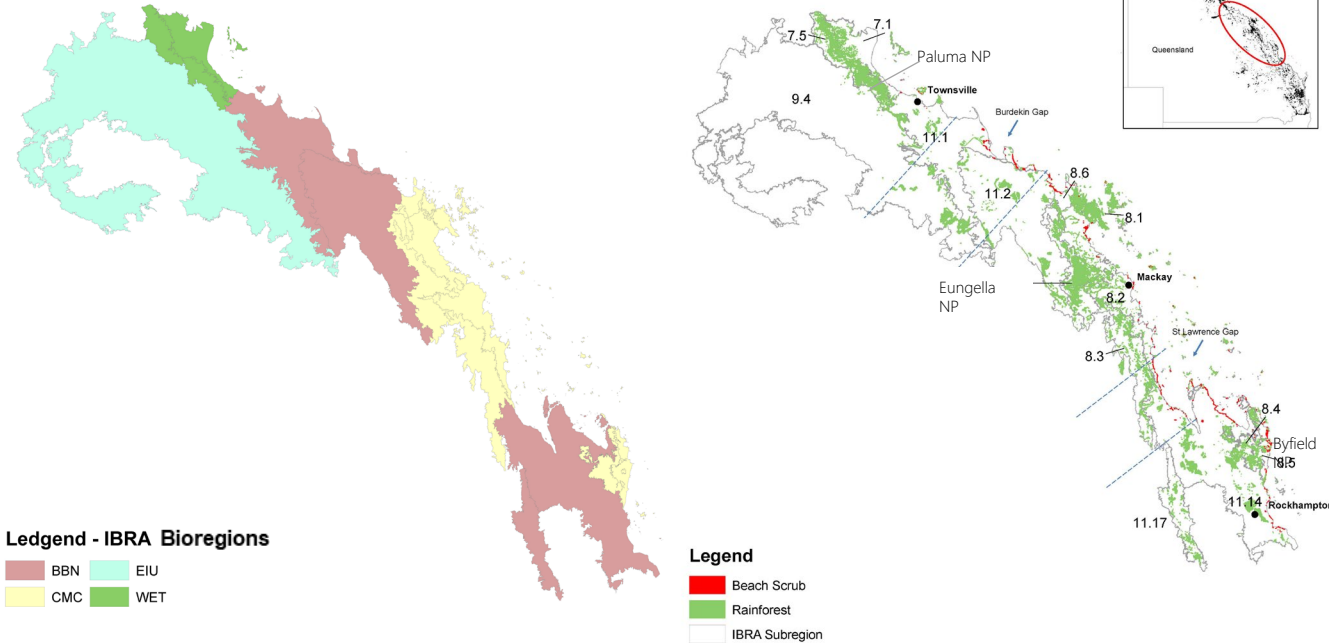
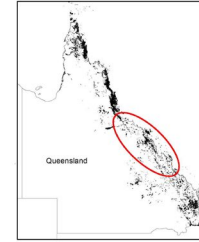
- Determine the distribution of diversity and distinctiveness of Central Queensland Coastal rainforest
- Investigate how well it is protected
- How this region might respond to potential effects of Climate Change



Repulse Creek, Conway NP
Image: Marion Howard

STUDY AREA

IBRA Bioregions and rainforest distribution
of Central Queensland coastal region



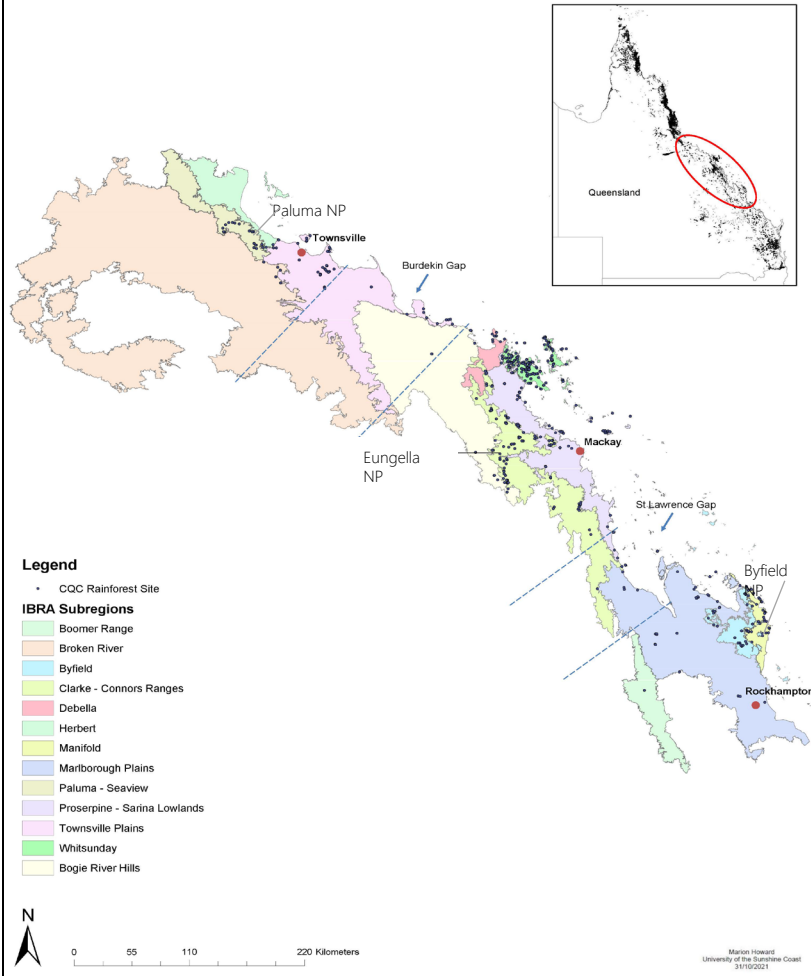
- 4 IBRA Bioregions
- 13 IBRA Subregions
- 65 Rainforest Regional Ecosystems
- 13 classified as endangered in Qld Herbarium RE mapping data



0 55 110 220 Kilometers

Marion Howard
University of the Sunshine Coast
29/10/2021

Central Queensland Coastal Rainforest Sites

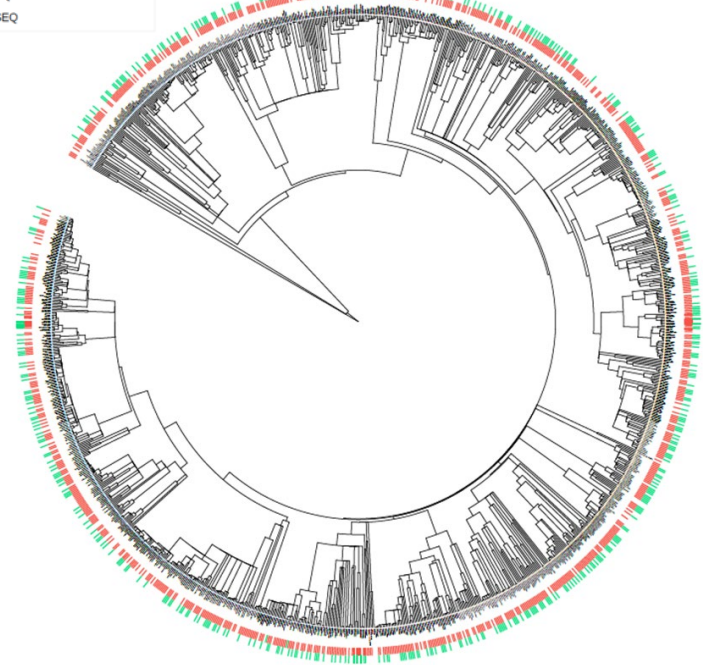


CONSTRUCT DNA BARCODE LIBRARY AND PHYLOGENETIC TREE

Tree scale: 100

CQC and SEQ Rainforest Species

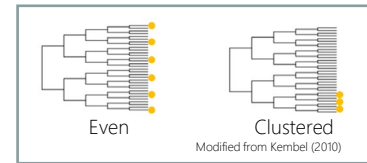
CQC
SEQ



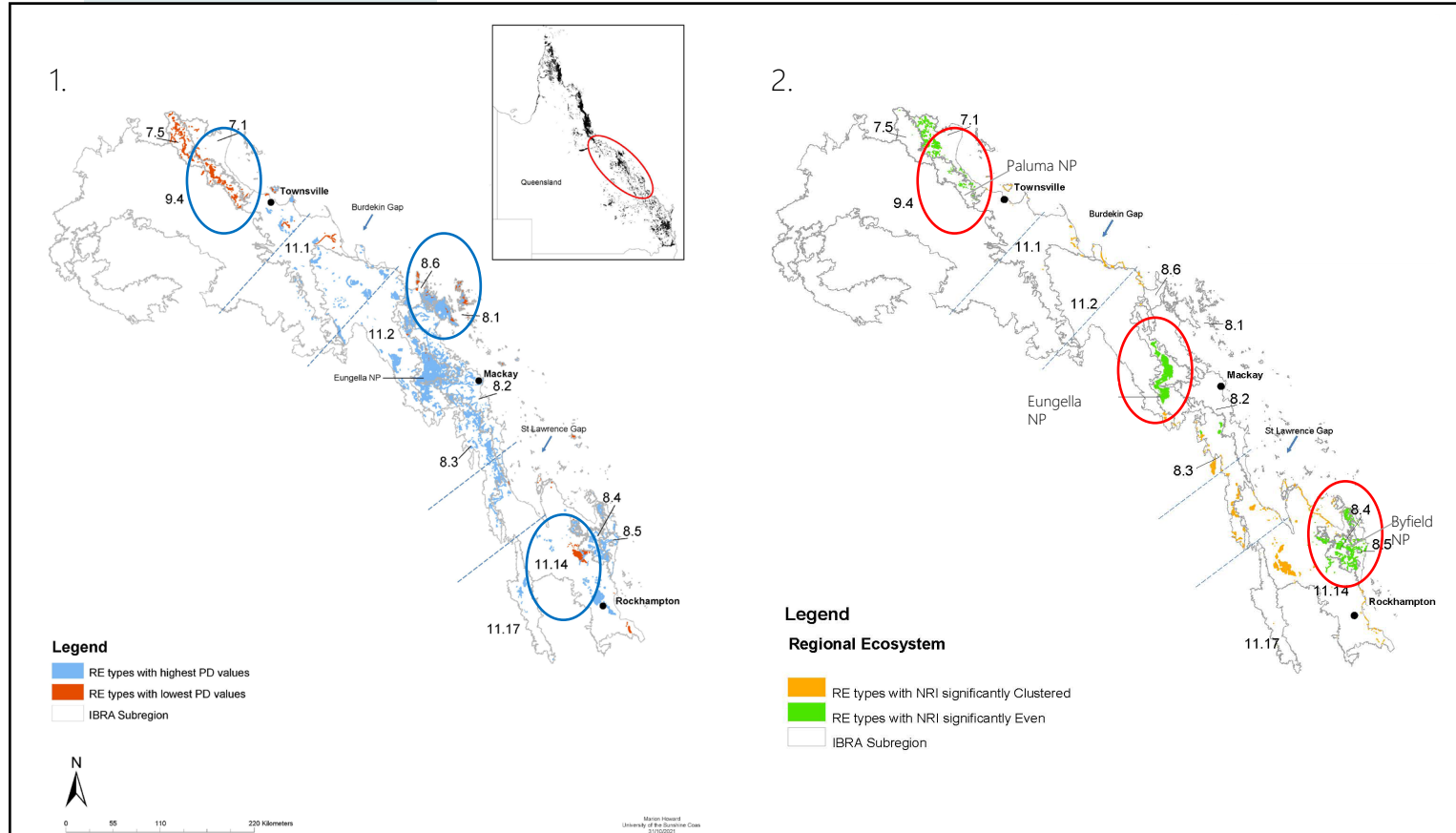
Phylogeny visualised in iTOL

MAPPING and ANALYSES

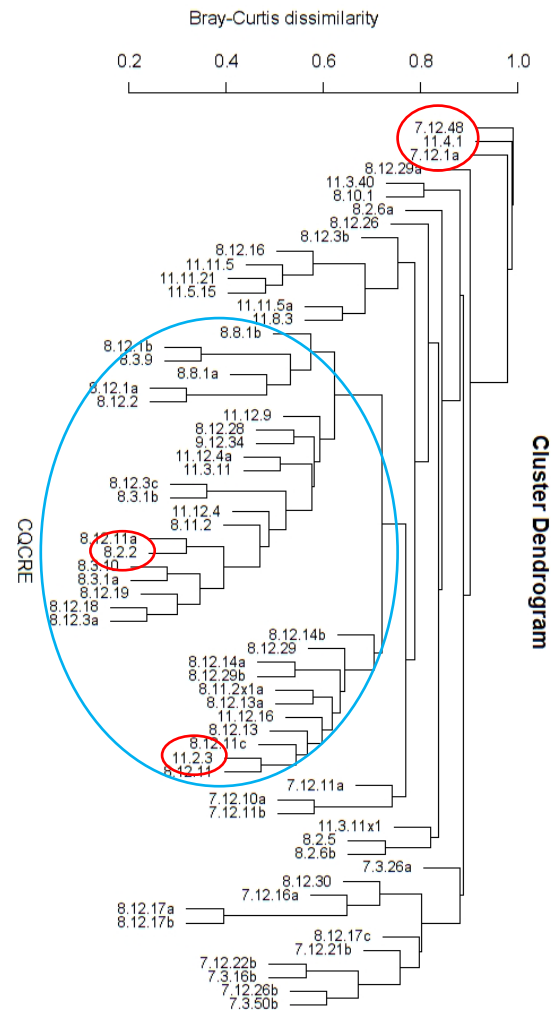
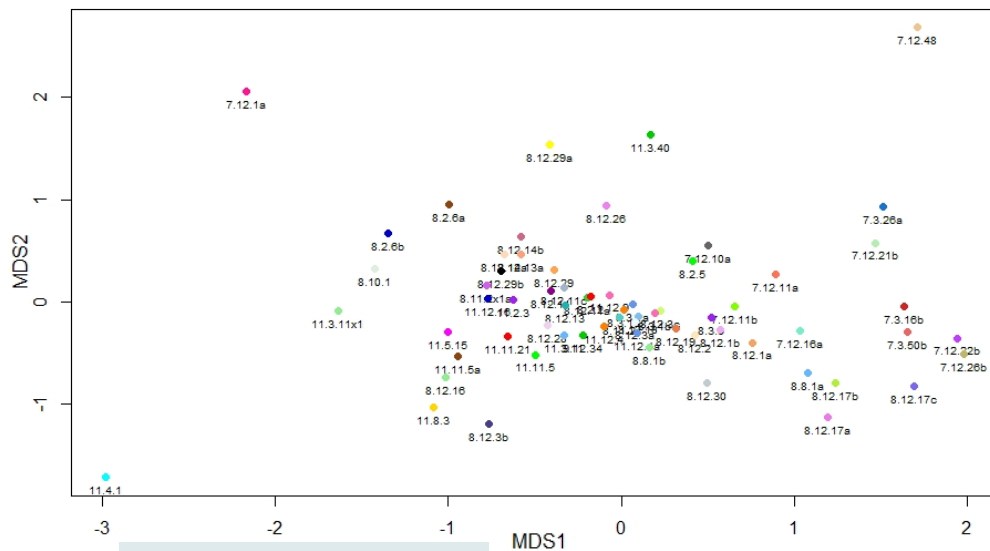
- RE pooled species data collated from the Qld Herbarium HerbreCs data base and site data
- Climatic data obtained from WorldClim and geological data from Geoscience Australia
- ArcGis was used to overlay Qld Herbarium RE mapping data and the production of all maps
- Rstudio: phylogenetic and ecological packages included Picanté, ape and vegan
- Phylogenetic tree and species files for sites and pooled regional ecosystem were used to calculate Phylogenetic Diversity, MPD and MNTD.
- MPD and MNTD tested against a randomised null model to detect significant differences (higher or lower) than expected due to chance to give: Net Relatedness Index (NRI) and Nearest Taxon Index (NTI)
- Significant positive NRI = even - Significant negative NRI = clustered
- Bray-Curtis rank order matrices used to create NMDS to investigate patterns
- Mantels test by Spearman's rank order correlation to test for correlations
- Kruskal Wallis and Dunn-Bonferroni post hoc method to test for statistically significant differences



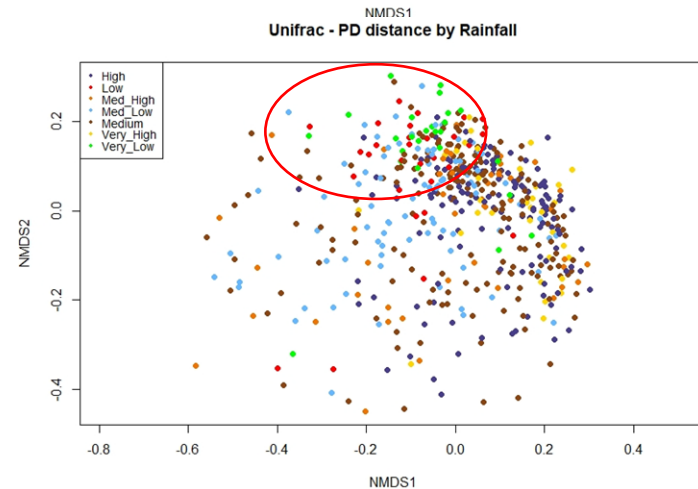
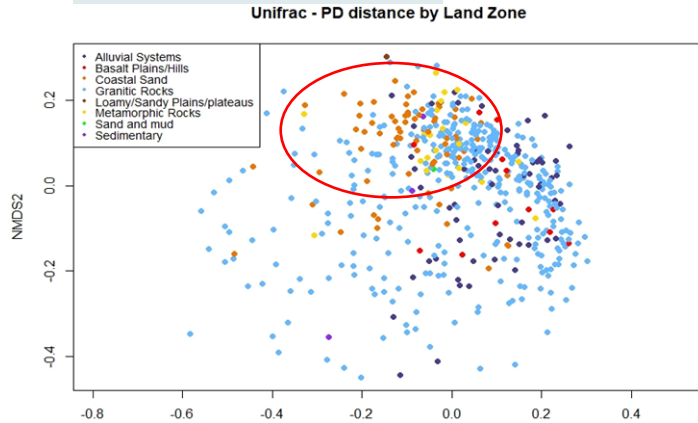
RESULTS - DIVERSITY AND DISTINCTIVENESS



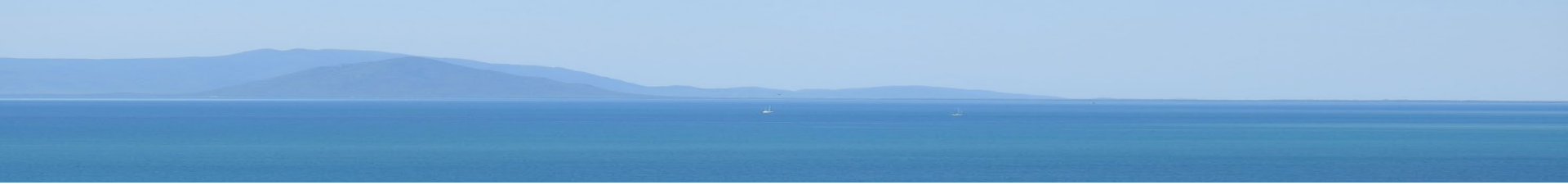
RE POOLED SPECIES DATA



SITE SPECIES DATA



- Results from 538 sites indicate rainforest communities of the Central Qld coastal region form few distinctive groupings but more resemble a corridor between tropical and subtropical regions
- NMDS of PD suggests sites on coastal sand with low rainfall are phylogenetically similar to each other
- Only 6% of 538 sites were significantly phylogenetically even (potential climatic refugia), and 17% were clustered but most were random



PRELIMINARY CONCLUSIONS

- Central Queensland Coastal Region is highly diverse
- Distinctive regions in well protected areas
- Harsh environments home to species utilising small patches of hospitable niches
- All mixed up!



Rockinghamia angustifolia; Eungella NP
Image: Wayne Howden



Brachychiton australis; Mount Inkerman
Image: Bill McDonald



Syzygium wilsonii ss. *wilsonii*; Paluma Dam.
Image: Bill McDonald



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Cochospermum gillivraei
Mount Inkerman
Image: Bill McDonald

