Littoral rainforest on High Island National Park, photo Andrew Ford.

Northern Australia Environmental Resources Hub

National Environmental Science Programme

Mapping to manage littoral rainforest

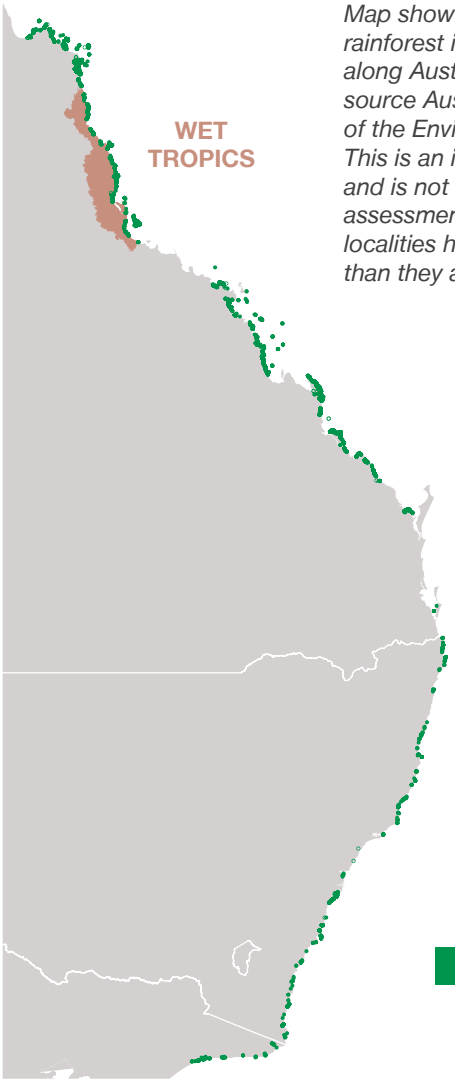
Wrap-up factsheet

New mapping and coastal risk analyses help managers

This research produced fine resolution maps of the current extent and distribution of littoral rainforest types in Queensland's Wet Tropics. The maps identify three different types of littoral rainforest – **Leading-edge, Buffer** and **Refugial** – by their risk or frequency of inundation. The reseach also documents current pressures on the forests in the region and suggests management priorities. Overall, the project has significantly improved our ability to identify, map and manage littoral rainforest. The mapping method used could be applied throughout Queensland, New South Wales and Victoria.

Management recommendations

1. Improve the resilience of **Leading-edge** rainforest to ensure it can help protect communities and assets from the effects of storm surge, sea-level rise and extreme weather events
2. Manage **Buffer** zone littoral rainforest to improve connectivity between Refugial and Leading-Edge rainforest patches
3. Identify and protect natural **Refugial** patches of littoral rainforest



Map showing where littoral rainforest is expected to occur along Australia's east coast, source Australian Department of the Environment & Energy. This is an indicative map only and is not intended for fine scale assessment. Littoral rainforest localities have been drawn larger than they are to improve visibility.

Littoral rainforests need better mapping and active management

Littoral rainforests provide a range of ecosystem services including protecting coastal settlements, infrastructure and production systems from erosion; trapping and filtering sediments, nutrients and pollutants; and providing habitat and resources for biodiversity such as the endangered cassowary. The 'Littoral Rainforest and Coastal Vine Thickets of Eastern Australia' ecological community is also listed as 'Critically Endangered' under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Littoral rainforests are vulnerable to extreme storm events and cyclones, sea-level rise and changing land use. They are highly fragmented and subject to ongoing development pressure as well as other threats such as weed invasion and feral animals.

Despite the EPBC listing advice describing the broad characteristics of the community, definitive mapping for the community is not available for the majority of the Queensland coast, putting littoral rainforest at risk from ongoing impacts despite its protected status.

This project therefore assessed 156 locations in the field to determine whether littoral rainforest was present. Many of the sites (65%) that were determined in the field to be littoral rainforest (consistent with the EPBC listing advice) are not captured by broad-scale mapping based on Queensland's Regional Ecosystems. This project produced fine-scale mapping which much more accurately represents the real extent of littoral rainforest across the study region.

Littoral rainforest, photo Helen Murphy.

Littoral rainforest...

- is rainforest that occurs within ~2km of the coast
- protects coastal settlements, infrastructure and other assets from erosion, storm-surge and wind
- provides important and specialised habitat for biodiversity, including the endangered cassowary
- is highly vulnerable to severe storms, cyclones, sea-level rise and changing land use
- in eastern Australia, is listed as Critically Endangered under the Environment Protection and Biodiversity Conservation Act 1999

Researchers survey littoral rainforest, photo Helen Murphy.

Example of some of the mapping produced from this research.

Combining inundation levels with rainforest location shows risk

Coastal LiDAR data was used to compile fine-scale terrain layers to derive inundation levels for an 80 cm sea-level rise and eight storm-surge scenarios. Spatial layers of the location of littoral rainforest and inundation were overlaid to determine the risk to the rainforest from sea-level rise and extreme weather events, and to prioritise management interventions.

Littoral rainforest type, characteristics and management actions

Rainforest type	Rainforest characteristics	Management actions
Leading-edge	Exposed to inundation frequently, can be critical in protecting human communities from the effects of storm-surge, sea-level rise and extreme weather events.	• Prioritise management in areas where Leading-edge rainforest protects communities and infrastructure • Take action to speed up vegetation recovery in these areas following inundation • Formalise planning mechanisms to allow land for vegetation 'retreat' in areas of Leading-edge rainforest not already developed
Buffer	Inundated moderately frequently and plays a very important role in connecting Refugial and Leading-edge rainforests.	• Consider formal protection status for Buffer areas critical for connecting Leading-edge and Refugial rainforest but not currently in the Protected Area Estate • Manage pressures from invasive species and access impacts • Prioritise restoration in areas where Buffer vegetation provides critical connectivity, or protects communities from the effects of storm surge, sea-level rise and extreme weather events
Refugial	Not often inundated and can persist even under extreme weather conditions.	• Consider formal protection status for Refugial areas not in the Protected Area Estate • Rehabilitate degraded areas to improve their size and connectivity • Reduce pressures from invasive species and access impacts

Littoral rainforest on Snapper Island, photo Andrew Ford

Mapping and monitoring for better management

The method for mapping littoral rainforest developed by the project could be applied beyond Queensland to provide land managers with greater clarity about the locations and roles of this critically endangered ecological community, and enable them to prioritise management.

While littoral rainforest is adapted to the extreme weather that sometimes occurs in Queensland's coastal zones, ongoing monitoring of condition and recovery following storm surge events will also be critical for understanding when and where management intervention is required to ensure rainforest persistence in the long term.

Littoral rainforest is a dynamic ecosystem, subject to impacts like cyclones, as seen here, photo Dan Metcalfe.

Littoral rainforest on Russel Island National Park, photo Andrew Ford.

Informal access tracks can degrade littoral rainforest, photo Andrew Ford.

Further information

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This factsheet and the full report, *Mapping to underpin management of tropical littoral rainforest,* are available from: www.nespnorthern.edu.au/projects/nesp/mapping-to-underpin-management-of-tropical-littoral-rainforest/

Littoral rainforest maps and inundation maps from the study are available from Dr Murphy and the CSIRO data portal at https://data.csiro.au

For further information about the EPBC listing of Littoral Rainforest and Coastal Vine Thickets of Eastern Australia visit: https://www.environment.gov.au/cgi-bin/sprat/public/publicshowcommunity.pl?id=76&status=Critically+Endangered

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