



Littoral rainforest on High Island National Park, photo Andrew Ford



**Northern Australia
Environmental
Resources
Hub**

National Environmental Science Programme

Mapping to underpin management of tropical littoral rainforest

Wrap-up factsheet

Quick facts - littoral rainforest

- Occurs where rainforest occupies a narrow zone close to the coast.
- Protects coastal settlements, infrastructure and other assets from erosion, storm-surge and wind.
- Is 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.

Key results

This research project produced fine-scale resolution maps of the current extent and distribution of littoral rainforest types in Queensland's Wet Tropics. The maps identify three different roles of littoral rainforest - Refugial, Leading-edge and Buffer - by their frequency of inundation. They also show inundation associated with sea-level rise and a range of storm-surge scenarios. The mapping methodology can be applied to defining littoral rainforest throughout Queensland. Overall, the project has significantly improved understanding of the threat to littoral rainforest from sea-level rise, storm surge and extreme weather events.

Management recommendations

1. Identify and protect natural Refugial patches of littoral rainforest.
2. 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.
3. Manage Buffer zone littoral rainforest to improve connectivity between Refugial and Leading-Edge rainforest patches.



Why is this research important?

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.

Littoral rainforests are vulnerable to extreme storm events, 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 impacts from feral animals. Additionally, in the Wet Tropics, littoral rainforests are very susceptible to severe storms and intense cyclones.



The Littoral Rainforest and Coastal Vine Thickets of Eastern Australia ecological community is listed as 'Critically Endangered' under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The EPBC Act listing advice describes the broad characteristics of the community, however 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. Dr Helen Murphy led a CSIRO and James Cook University team that produced fine-resolution maps to describe the distribution and extent of littoral rainforest in the Wet Tropics in Queensland. They also documented the current pressures on littoral rainforest in the region to inform recovery planning and prioritisation of management actions.

How did we undertake the study?

Littoral rainforest was assessed at 156 sites between Townsville and Cooktown in Queensland. 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.

Left: Researchers survey littoral rainforest, photo Helen Murphy. Above left: Littoral rainforest on Russel Island National Park, photo Andrew Ford. Above right: Littoral rainforest, photo Helen Murphy

Littoral rainforest management actions

Littoral rainforest role	Rainforest characteristics	Management actions
Refugia	Not often inundated and can persist even under extreme weather conditions.	<ul style="list-style-type: none">• 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.
Buffer	Inundated moderately frequently and plays a very important role in connecting Refugial and Leading-Edge rainforests.	<ul style="list-style-type: none">• 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.
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.	<ul style="list-style-type: none">• 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.



Littoral rainforest on Snapper Island, photo Andrew Ford



How can we extend the impact of this research?

The methodology for mapping littoral rainforest produced by the project could be applied throughout Queensland to provide land managers with greater clarity about the location 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 be critical for understanding when and where management intervention is required to ensure rainforest persistence in the long-term.



Above left: Impact to littoral rainforest from cyclone Yasi, photo Dan Metcalfe. Above right: Informal access tracks can degrade littoral rainforest, photo Andrew Ford. Left: Example of the mapping produced by the project.

Further information

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This factsheet and a full report are available from: <http://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](#) (search 'littoral rainforest').

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>

Visit: www.nespnorthern.edu.au



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