



+ Weathering the Storm

Best Practice Guide for Timber Plantations in Tropical Cyclonic Areas of Queensland

Prepared for:
Timber Queensland



By Select Carbon



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Severe tropical cyclones Larry, Ului and Yasi have had devastating effects on the timber plantations and plantation trial plots in the tropical Queensland region. Climate change projections indicating increased frequency of severe cyclones in this region in the future mean that there is a clear need to develop best practice guidelines to help inform investment decisions - particularly species selection, management practices and target products - if the timber plantation growing and processing sector in the region is to prosper into the future.

The guide reviews the impacts of tropical cyclones on the timber-growing sector of the tropical Queensland region. It aims to provide useful guidance to small and large growers on the factors that need to be considered when growing trees in this region. Variables explored in the guide include: tree species, plantation design, timber plantation age, location in the landscape and management (silvicultural) practices.

Best Practice Guide Overview

To help achieve a robust guide, a reference committee including experts in cyclones and tropical forestry was set up to offer guidance throughout the life of the project. Key components of the project included an extensive field inspection, literature review, industry and private grower surveys, plantation trial plot assessment and two community forums.

The guide was prepared for Timber Queensland by Select Carbon with input from other project partners - Queensland Government (DAFF) Horticulture and Forestry Sciences and James Cook University Cyclone Testing Station.

As part of the development of *The Best Practice Guide for Timber Plantations in Tropical Cyclonic Areas of Queensland*, an historic cyclone map was developed using information from a number of sources to map the recent history of Tropical Cyclones and inform readers of online tools that are available to explore past cyclones.

The Australian Standards relating to wind that are used by the building industry were examined to see what could be applicable to timber plantations. Wind shielding and topography were found to play an important role in wind speeds.

The Best Practice Guide for Timber Plantations in Tropical Cyclonic Areas of Queensland also includes a case study on Cyclone Yasi, with analyses of many of the sites and species that were directly impacted by the Tropical Cyclone.

Species performance in tropical cyclones was assessed by comparing performance at various sites using estimated wind speeds in TC Yasi. The importance of wood density, slenderness ratio, leaf defoliation and matching species to the right site were all factors that played an important role in the risk of wind damage. A summary table of the relative species performance has been included in the Guide, which factors in observations made by Select Carbon, DAFF researchers and available literature.

The silvicultural regime applied to plantations throughout their rotation will impact their susceptibility to strong winds.

As well as selecting species that are naturally wind resistant, decisions are required on the stocking and silvicultural treatments, such as thinning and pruning, that are conducted throughout the rotation.

The types of forest products expected from plantations in cyclonic areas, management planning and salvage operations all need to be considered carefully by forest growers. A summary of the best practice tips can be found on the following page.

More on the Best Practice Guide can be found at:

www.timberqueensland.com.au

Summary:

Best Practice Tips

1. Understand WHY you are planting trees. Develop a sound understanding of the very real risk of cyclones from information in this guide and elsewhere, and use the available tools and techniques to minimise the potential impacts on your plantation. Plantation planning needs to consider the intended market for your end product, the risk of cyclones to your target crop, and opportunities to mitigate the risk of cyclone damage throughout the rotation.
2. Rotation length is always a trade-off between risk and economic value. Fast-growing, short-rotation plantations for products such as fiber (pulpwood), biochar and/or energy will have less chance of cyclone damage than long rotation crops for products such as sawlogs.
3. Consider species and provenances that are considered to be wind resistant and will also meet your intended market. Wind resistant species tend to come from cyclonic areas, and will often include those native to the region. The species list included in the Guide gives an indication of relative performance in a Category 2 cyclone for a range of potential plantation species.
4. Focus very carefully on matching tree species to site. Trees that are growing poorly tend to be more prone to wind damage.
5. Some sites are particularly vulnerable to cyclones. Poorly drained low-lying floodplains tend to be prone to wind damage, and exposed hilltops and ridgelines are subject to higher wind speeds. These sites need particular attention to species selection and plantation management.
6. For longer rotation plantations, manage them to maximise tree diameter growth rather than height growth to improve their performance in strong winds. Consider using a "direct regime" with a low initial stocking and no thinnings to avoid opening up the crown during the rotation. Improved seed sources may be required to deliver adequate log quality. If thinning is undertaken, ensure it is done early and not delayed.
7. Avoid delaying final harvest. This will limit the exposure of the highest value crop to the risk of destructive cyclones.
8. Plantation stands with uniform height and crown cover appeared to experience reduced damage levels in cyclone Yasi. This can be achieved by planting monoculture plantations or by ensuring that selected tree species have similar growth rates in terms of height development.
9. Cyclones tend to be more intense near the coast and decay as they move across the land. Consider planting further inland at least 50km from the east coast of tropical Queensland.
10. To reduce the risk of total failure in larger plantation operations, spread your plantation estate geographically and seek to establish a broad age class distribution.
11. Prepare and maintain a salvage plan. Fallen material deteriorates very quickly in the tropical climate so time is of the essence for salvage operations. The salvage plan should identify market options for lower-grade material that could be generated throughout the rotation, as well as key operational aspects of undertaking a salvage operation.