Post Fire Voluntary Environmental Safeguards - Update to Rationale North Coast

Issue

Harvesting operations are planned to recommence in fire affected forests across the north coast during 2021 under the CIFOA with additional voluntary safeguards. This paper builds on the previous Rationale documents to set out the context for operating in fire affected forests across the coastal hardwood forests and outlines the specific conditions for the north coast voluntary safeguards.

Background

In the immediate aftermath of the 2019-2020 wildfires Forestry Corporation suspended harvesting operations in burnt forests and sought Site Specific Operating Conditions (SSOC) from the Environment Protection Authority (EPA) for any harvesting in these forests, while further assessments were carried out to determine the type and scale of harvesting that would be undertaken. The current proposal is based on the best available information including review of relevant literature, surveys undertaken since the time of the fires and assessments of forest recovery across the state.

On the basis of this information Forestry Corporation now proposes to apply the standard CIFOA requirements with additional voluntary safeguards in forests that were affected by wildfire as outlined below. The conditions applied by Forestry Corporation are incorporated into Forestry Corporation's Forest Management System (FMS) as well as individual harvesting plans.

Broader considerations around the options and issues related to undertaking harvesting in fire affected landscapes is outlined in the Rationale and Rationale Addendum adopted by the Forestry Corporation in February and July 2021.

Application of Post Fire Safeguards

Fire extent and severity across State forests was highly variable during the 2019/2020 fire season. Following these fires significant recovery has occurred with wetter than average conditions, with many State forests containing large extents of well recovered forests.

There has been no harvesting in fire affected forests on the north coast since 2019 except under limited SSOC provided by the EPA since the fires with just two operations undertaken from 11 SSOC approvals. Harvesting of all native forests has been heavily supplemented by hardwood plantations, which were increased to around 60% of total production in the 18 months following the fires. These highly precautionary strategies have allowed significant time for forest recovery and assessment of fire impacted landscapes. It is now reasonable to recommence harvesting in fire affected forests with additional safeguards.

Assessment of fire Impacts

Using the NSW State Government Fire Extent and Severity Mapping (FESM), a review of the 2019/2020 fire season wildfire extents and severities within Forestry Corporation Management Zones demonstrates significant variability of scale and intensity of wildfire experienced across NSW. This data was examined for two extents:

- gross forest extent (all tenures) impacted by High or Extreme fire
- public forest reserve system extent (CAR) being impacted by High or Extreme fire extents.

These two criteria set a reasonable benchmark for approximating the landscape disturbance to forest values from severe wildfire considering the total extent of forest and those areas that provide for the protection of significant biodiversity values (CAR reserve areas). These figures provided an initial understanding of the impacts of the fires across NSW. However, further consideration of forest recovery is warranted to better understand the current recovering state of much of the coastal forest estate.

Forest Recovery

Recovery of forests across the landscape has been significant in the time since the wildfires, which is now approaching two years on the north coast. Recovery, while evident in most forests, is also not uniform and is not simply described.

Widely observed recovery of the forests on the north coast includes significant areas where scorched or fire-consumed canopies on mature trees have re-established through epicormic budding systems. Although there have been some losses of older hollow bearing trees at the time of the fire, generally the level of mortality in mature trees has not been high. In most forests mature tree death is limited, although there are some observed areas where significant proportions of extant mature tree death has occurred, typically recovery in these circumstances has been accompanied by recruitment of a new cohort of through either seedling or coppice re-establishment. This is particularly observed in some young regenerating blackbutt stands that had already gone through successional re-establishment following timber harvesting in the previous 10 years, but also in less resilient species, such as leptospermum species occurring in typically wetter micro-environments that do not frequently experience fires.

In the majority of sites across the north coast ground cover recovery and response to fires has been prolific, with most observed sites expressing vegetative ground cover significantly more abundant than in drought affected state prior to the fires. In many respects it is possible to conclude that recovery of the forests has followed expectations with fire adapted species (Heath et al 2016, Bradstock 2008). However, it is certainly welcome to observe the level of recover following the particularly widespread and severe fire season of 2019.

Due to the mosaic of forests types, recovery is expressed in many seral stages, and is different depending on the fire severity and the forest type affected. As such it is not possible to assess the entire forest in the field to determine recovery across the 2 million hectare state forests estate using traditional ground based sampling methods. However, the availability of remote sensing data across from across the forest estate can provides a reliable proxy indicator of recovery.

Recovery Data

Similar to FESM modelling, remote sensing quantifying forest recovery has been undertaken by the Department of Planning, Industry and Environment's Environment, Energy and Science division using satellite data captured in December 2020. This data provides an understanding of the level of residual effect from the fires on forest biodiversity and productive capacity. This recovery modelling data will continue to be examined to determine the continuation of additional post-fire safeguards.

From an ecological perspective it is reasonable to make a broad assumption that the re-greening of the forest (as rendered by the remote sensing model) represents a meaningful recovery of forest ecological values. This assumption is supported by observations of FCNSW field planners and ecologists'

observations made during survey work and other field assessments. It has been broadly observed that the recovery indicated by remote sensing indicates a recovery of vegetation in multiple strata (ground, mid-story, canopy) and thus the recovery of important shelter and feed resources that are used by forest fauna, as well as the recovery of the vegetation itself.

The relationship between fire, forest recovery (or more broadly forest disturbance dynamics) and forest biodiversity is complex to describe in a simple summary, however, the remote sensing layer provides a reasonable proxy for recovery and is suitable for use to determine the relative recovery of forests across the broad geography of NSW. The concept of forest recovery in this context does not mean that the forest on any given site is the same as it was prior to the fires, but it does indicate that the kind of basic resources that the forest offers for forest fauna are broadly in a recovered / recovering state. Importantly, not all the forests were burnt in high intensity broadscale fires. Localised weather patterns provided patchiness of intensity and allowed areas to remain unburnt or burnt at low intensity providing refugia for many species. This in turn allows for recovery from source populations occurring in the refugia.

Using the recovery data at an appropriate scale, with suitably precautionary thresholds for considering measures to apply above the CIFOA, is a reasonable precautionary approach to apply at this time. Further, this approach also includes on ground surveys and planning assessment that are applied on top of the existing harvest planning process, which will ensure that relevant aspects of fire impact and recovery are taken into account.

Thresholds for additional safeguards

There are no specific thresholds within the literature that set definitive limits to inform thresholds for post fire operations. The following categories and thresholds have been selected to represent meaningful levels of landscape impact and subsequent recovery. These thresholds represent a precautionary approach that reflects both the level of initial impact and the recovery trajectory of the fire affected forests. Post-fire measures will be applied at an appropriate landscape level to reflect the local impact and recovery status.

The level of landscape offset and harvesting safeguards applied will increase with the increasing impact at the landscape scale (Management Zone). In the worst impacted landscapes, no harvesting will take place in the management zone during 2021/22 or prior to an updated recovery assessment. In heavily fire affected and less recovered landscapes additional safeguards will be applied to any harvesting in the management zone. In the less affected and greater recovered landscapes additional safeguards will be applied to Local Landscape Areas (LLAs) that were affected by fires. In Landscapes that had little initial impact and/or are significantly recovered the standard CIFOA conditions will be applied. This approach is detailed in Table 1 and its application to Management Zones is in Table 2.

Table 1: Thresholds for additional conditions

Threshold based on forest recovery recovery model data:	**Management Zone Prescription**
Either criteria above 50%	No harvesting
Either criteria between 25% and 49%	Post fire measures to be applied in all LLAs

Either criteria between 10 and 25%	Post fire measures in fire affected LLAs only (10% of a gross LLA is the threshold for 'fire affected')
Both criteria less than 10%	Standard CIFOA conditions apply

Table 2 Fire severity thresholds by MZ – North Coast Zones

Matrix of Fire Impact and Recovery across NSW forest tenures	**FESM / RAFIT**			
	Initial Severity Model (Data ~ Feb 2020)		Recovery Assessment Model (Data ~ Dec 2020)	
Management Zone	Total Forest Extent (High and Extreme)	Forest Reserves (High and Extreme)	Total Forest Extent (High and Extreme)	Forest Reserves (High and Extreme)
DORRIGO	35%	41%	11%	16%
GLEN INNES	28%	39%	9%	24%
CASINO*	24%	45%	13%	20%
GRAFTON*	22%	28%	11%	14%
STYX RIVER	19%	34%	3%	14%
TENTERFIELD*	12%	26%	9%	18%
KEMPSEY	18%	13%	4%	2%
KENDAL/WAUCHOPE/COOPERNOOK**	18%	18%	4%	6%
TAREE/WINGHAM**	15%	18%	2%	2%
MORISSET	12%	18%	3%	8%
COFFS HARBOUR	11%	14%	2%	2%
URUNGA	7%	6%	1%	1%
WALCHA-NUNDLE	7%	9%	1%	2%
URBENVILLE	2%	1%	1%	0%
BULAHDELAH	1%	1%	0%	0%
CHICHESTER	1%	1%	0%	1%

*Re-sampled with RAFIT due to Forestry Corporation concerns regarding missing data

**Management Zones Grouped due to small size.

CIFOA standard conditions

The CIFOA is a complex and robust regulatory tool that contains requirements to manage environmental values at a range of spatial and temporal scales in the landscape including:

- Limits on annual harvesting extent in each management zone to ensure operations occur across the landscape
- Permanent retention of significant areas such as old growth, rainforest, wetlands, stream network and habitat corridors, which total nearly half of the State forest estate
- Limits on harvest intensity at the local landscape scale
- Targeted survey requirements for some species
- Broad area search requirements for general habitat identification and to determine species presence and protections
- Soil and water protection measures to maintain stability, minimise erosion and protect water quality
- Protection of 10 per cent of the net harvest area in wildlife habitat and tree retention clumps focused on the best available habitat in each area
- Individual tree protections for various categories of trees with habitat value.

These measures are still fit for purpose in the post-fire environment and can provide adequate risk management for a large number of the forest values. The CIFOA operates within a broader landscape and is intended to support the effectiveness of the much larger reserve network both on state forest and other public land tenures. The CIFOA is designed to ensure that timber harvesting operations in NSW State forests are planned and managed in a manner that does not lead to significant increased threats to biodiversity values and as such, it has been determined that the normal CIFOA will be applied in those landscape that are below thresholds set out in Table 2.

Additional Safeguards – North Coast

The voluntary measures proposed are based on discussion held with the EPA towards SSOC development, Forestry Corporation's Environmental assessment review and further review of relevant literature during 2021.

The additional measures proposed for implementation in the Management Zones as outlined in Table 2 are designed to identify and protect ecosystem legacies in temporary refuges or through enhanced measures such as buffers on existing exclusion zones or enhanced retained tree measures. The measures are designed to provide reasonable flexibility in planning and implementation, as each LLA will have experienced different fire extent and severity and forests will recover differently. A summary of additional voluntary safeguards is outlined in Table 3.

Table 3 Additional Voluntary Safeguards

Element	**Detail**	**Ecological / Management Principles**

Landscape Exclusions	LLA Limit • A maximum of 50% of the Gross LLA area can be harvested.	Introduces a minimum threshold for landscape protection to allow for refugia in existing exclusion zones complimented by the best identified additional habitat opportunities including lower fire intensity areas, recovered areas and connected areas. Allows FCNSW Planning and Ecology team to target additional protections at local / regional species priorities.
Retained Trees	Minimum 8 *Habitat* trees retained per hectare Habitat trees include in order of priority: • Hollow Bearing Trees where they exist • Add up to 8 'Recruitment' trees where hollow bearing trees don't exist	This measure will ensure that existing hollow bearing resources are maintained or enhanced across the harvest area.
Feed Tree Clumps	Additional 5% BNA (at compartment scale) identified as Koala temporary tree retention clumps in LLAs with contemporary koala records.	In order to ensure that adequate feed tree resources for koalas (and also other arboreal mammals that utilise such feed resources) are maintained the rate of tree retention clumps focused on preferred koala browse trees will be doubled in fire affected landscapes.
Riparian Exclusions	10m additional buffer on riparian zones class 3+ Plus • OSA (ESA 2 rules)	This measure will consolidate existing exclusions as part of a broader network on the larger riparian zones which are most likely to have significant habitat value.
Buffers on Mapped exclusions	10m additional buffer on Mapped EZ's • OSA (ESA 2 rules) • GPS boundary identification allowed	This measure will generally consolidate existing exclusions and ensure that accidental impacts on mapped exclusions and sensitive areas are minimised or eliminated.
Surveys	Additional operational surveys Traverse: 1km/100ha Apply normal clump development methodology Additional traverse can be undertaken by drone where appropriate.	In undertaking pre-harvesting inspections to establish the LLA offset area an additional traverse will enable further identification of threatened species habitat and values to best target additional protections afforded under these measures.
Soil and Water Measures	Forestry Corporation to use ground cover assessment methodology to determine if additional conditions are required. If yes, apply additional soil and water prescriptions details in the Post-fire Planning Assessment Report.	Additional Soil and water measures will be determined based on site specific information.

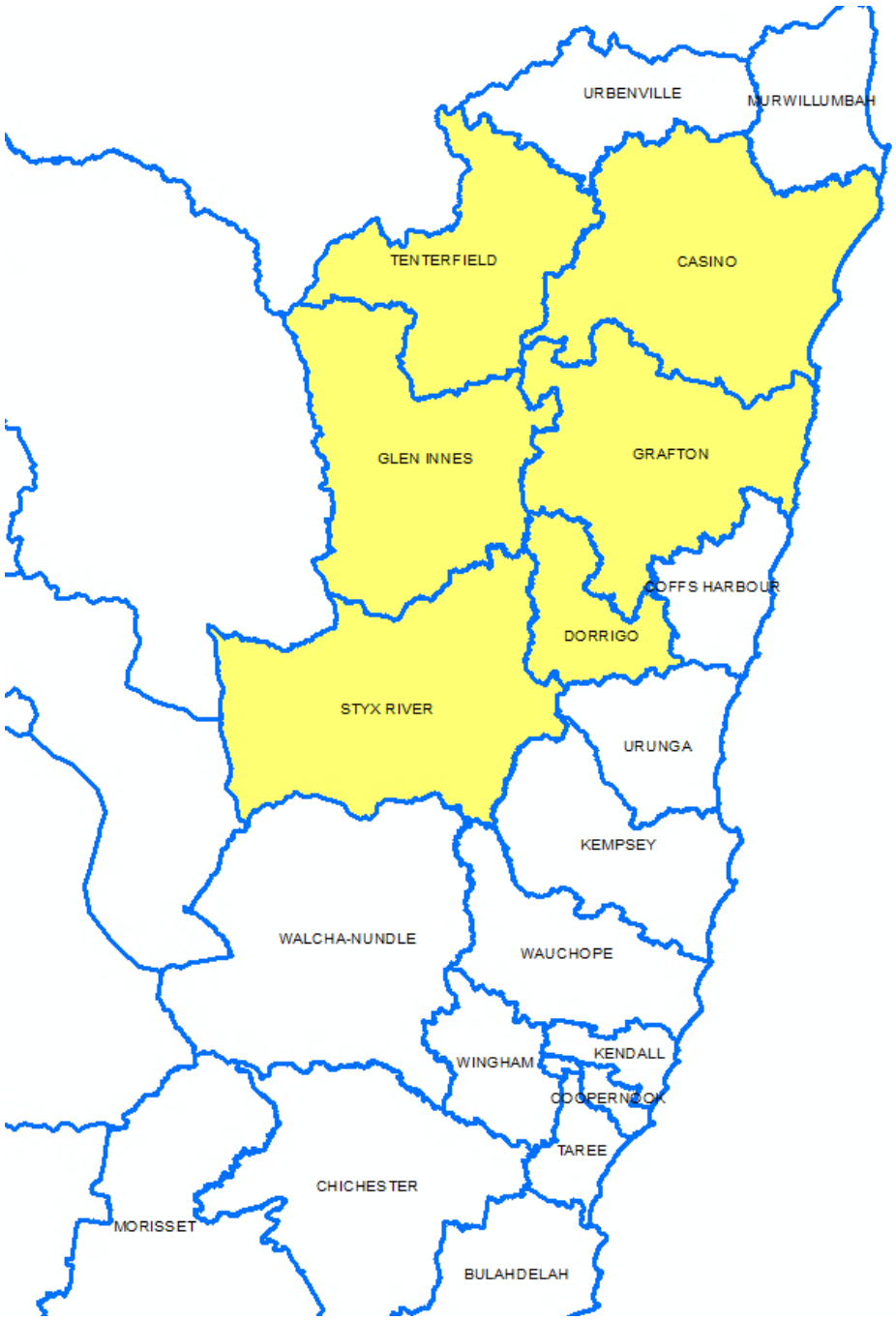
Adaptive Management

The above conditions have been determined based on the best available data and information, and in line with Forestry Corporation understanding of the precautionary principle. The conditions are to be applied under adaptive management principles and will be reviewed and adjusted as warranted when new or additional information becomes available.

Recommendation

It is recommended that harvesting is recommenced in fire affected forests on the north coast as proposed in this paper.

Attachment 1: Map of Management Zones Northern



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Refereneces:

Heath, J.T., Chafer, C.J., Bishop, T.F.A. *et al.* Post-Fire Recovery of Eucalypt-Dominated Vegetation Communities in the Sydney Basin, Australia. *fire ecol* **12,** 53–79 (2016).

Bradstock, R. A. (2008). Effects of large fires on biodiversity in south-eastern Australia: disaster or template for diversity?. International Journal of Wildland Fire, 17 809-822.