FOREST FIRE RISK MANAGEMENT GUIDELINES

NZ Forest Owners Association

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NEW ZEALAND FARM FORESTRY ASSOCIATION

FOREST OWNERS ASSOCIATION

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Managing forest fire risk through collaboration, coordination and communication

Introduction

Fire is an ever-present risk for forest owners and managers. A serious wildfire in a plantation forest has economic, social and environmental consequences.

Each forest has its own fire risk profile for which the owner or manager needs to tailor an appropriate risk management approach.

These Guidelines provide a process that any forest owner can follow to manage the risk of wildfire damaging their investment. If a wildfire does occur, these Guidelines ensure that response and recovery will be as efficient as possible.

The extent to which a forest owner adopts these Guidelines will generally depend on their risk profile, forest size and organisational resources. A large corporate forest owner may have the capacity and resources to do more in-depth planning than a small-scale farm forest owner. For some, the requirements of their insurance policies may determine the extent to which these Guidelines are adopted.

Despite this variability, the fundamental processes and steps required to reduce the risk, prepare for response and recover from fires are common to all forests. By following the processes and steps, forest owners can reduce the risk of fire loss. This will involve good planning and preparation, and effective communication with Fire and Emergency New Zealand (FENZ).

History

On 30 June 2017, the Forest and Rural Fires Act 1977 and associated Regulations were repealed and replaced by the Fire and Emergency NZ Act 2017. This ended a long history of active forestry involvement in rural fire management, which began with the first Forests Act 1874. The 2017 Act placed the legislative responsibility for prevention, response and suppression on a new organisation, Fire and Emergency NZ (FENZ).

Nevertheless, the commercial risk of losing forest assets to fire remains with the forest owner. The NZ Forest Owners Association (FOA) and the Farm Forestry Association (FFA) has taken an active interest in the policy discussion around the legislation, the formulation of the Bill, and the implementation of the Act itself.

The joint FOA/FFA Fire Committee developed and signed a Charter (Appendix 8) with FENZ to establish high-level principles and actions for their members to follow.

Some large forest owners, who have invested in fire equipment and training of personnel, have independently negotiated individual service agreements with FENZ. These agreements detail:

- The funding of fire suppression
- Training (who and to what level)
- Ownership & maintenance of equipment
- Who are to be Authorised Persons under the Fire & Emergency NZ Act 2017
- Information transfer, particularly forest boundaries
- Incident control; and
- The linkages between FENZ Fire Plans and forest owner/manager risk management and fire response plans.

The document *Operational Guidelines for Fire Management* was first published by the FOA in 2001. Since then, new research findings, operational improvements and technological changes have influenced rural fire management. After the legislation changed, a review of that document became imperative. The FOA/FFA Fire Committee commissioned a review and

established a small management committee to work with the reviewer. These Guidelines are the result.

Purpose

These Guidelines give forest owners, large and small, the opportunity to assist FENZ in meeting its obligations under the Fire and Emergency NZ Act 2017. FENZ is responsible for the management of fire risk.

Under the Act, FENZ is required to:

- Document a FENZ Fire Plan
- Prevent fires
- Suppress and extinguish fires
- Protect property endangered by fire
- Deliver services to protect:
  - Life
  - Injury
  - Damage to property or land
  - Damage to the environment.

These Guidelines may help FENZ assist those forest owners and managers to work with FENZ at a district or regional level by providing them with generic guidance and information, and to assist them formulate their own fire risk management plans if they wish. The aim is to promote and ensure efficient and effective fire management, including protection, on their estates or woodlots.

They will also provide FENZ and other interested parties with sufficient information to understand the actions and reactions of forest owners and managers faced with maintaining a business within a challenging fire environment.

These Guidelines complement the:

- Plantation Forestry Rural Fire Control Charter (Appendix 8)
- FENZ Act and Regulations
- Individual service agreements between FENZ and large forest owners/managers
- NZS 4781:1973 Code of Practice for Safety in Welding & Cutting
- Approved Code of Practice for Safety and Health in Forest Operations
- National Environmental Standards for Plantation Forestry (MPI, 2018)
- Principles of Plantation Management
- NZ Environmental Code of Practice for Plantation Forestry
- Green Book: NRFA Rural Fire Management Handbook
- Orange Book: AIRCARE: Code of Practice for Aircraft Operators – Fire Fighting
- Manual for Predicting Fire Behaviour in New Zealand Fuels.
- Forest Practice Guides

The Guidelines are recommended for use by NZ plantation forest and woodlot owners and managers in their discussions and planning processes with FENZ Authorised Persons.

General principles

These Guidelines describe the application of the 4Rs of emergency management – Reduction, Readiness, Response & Recovery. They are specific to forest fire risk management and enable forest owners and managers to speak the same language as FENZ managers and Authorised Persons.

Fire risk management on forested lands must address the risk or threat of fire, personnel safety and the achievement of other management objectives – such as the continuity of supply of the tangible and intangible benefits of the forest and the forestry supply chain. It may also accommodate the use of fire for specific purposes.

For many years, forest managers have generally followed the risk management process through the application of best practice principles. This involved both wildfire suppression and the use of fire as a land management tool. These Guidelines reinforce that process.

These Guidelines are non-prescriptive. The level of risk acceptance will vary depending on each forest owner's circumstances, risk profile and the resources available for mitigation. They will assist forest owners and managers to work with FENZ to undertake fire risk management processes for their estate and produce fire risk management response plans to incorporate into the FENZ Fire Plans for that locality, catchment or region.

These Guidelines describe the application of the 4Rs of emergency management – Reduction, Readiness, Response & Recovery

For example, forest owners may stratify their estate into fire zones, produce a risk register for each zone and define risk treatment and mitigation plans that address those risks.

These Guidelines will also assist forest owners and managers and FENZ to work together in the consideration of Fire Season restrictions (S56) and prohibited or restricted activities (S52) – see Appendix 3 and Appendix 6.

Appendix 7 outlines the risk management process as it relates to forest owners and managers, acknowledging that this will generally be a cooperative process with FENZ managers and Authorised Persons.

At a higher level, the Guidelines are consistent with:

- *Fire Management: Voluntary Guidelines*; Fire management Working paper FM17E, prepared by the Forestry Department of the Food and Agriculture Department of the United Nations (FAO), 2006
- Risk Management Standard (AS/NZS ISO 31 000:2009)
- Using the Fire Danger Rating System (NZFDRS) to facilitate a risk management plan in liaison with FENZ.

These Guidelines will outline the process only, not the end-product. The fire risk assessment process and the fire risk management plan will be the result of close liaison with FENZ and a coordinated approach at a variety of levels – site specific, catchment and region depending on the circumstances.

Each forest, and parts of a forest estate, has a variable and dynamic risk profile. Forest managers need to ensure that FENZ managers and Authorised Persons understand this through the following process:

- Collaboration with FENZ
- Coordination between those working for and in forests on how to identify and manage risks
- Communication with key stakeholders.

In these Guidelines

Risk is the probability of something happening (a fire starting)
Catchment is the logical area for planning purposes
Forest manager is a general term for forest owner, forest manager and farm forester

Forest users – such as locals, forestry workers and tourists – need to be aware of the danger of wildfire, especially when extreme weather conditions have been forecast

The 4Rs of forest fire risk management – reduction, readiness, response & recovery

Reduction

This section describes the factors to consider when attempting to reduce the risk of fire. A more detailed approach will be needed locally.

- **Reduce the fire hazard**
  The nature and makeup of the overall fire environment – particularly the vegetation complex (fire fuels) and its condition (dry or otherwise) – determines the ease of fire ignition and spread. This needs to be assessed, especially in forests adjoining areas such as road margins. To reduce the assessed hazard or fuel level to a manageable state, a programme, formal or otherwise, needs to be developed,
- **Evaluate & assess the fire risk**
  Fire risk is the probability of a fire starting. On a broad scale, evaluation and assessment of this risk is best done in association with FENZ via a formal approach such as the ISO 31 000 Risk Assessment Process (Appendix 7). At a forest or woodlot level, this may be done in association with a larger assessment at catchment level, or by assessing internal and external risks through local knowledge.
- **Educate the public**
  Forest users – such as locals, forestry workers and tourists – need to be aware of the danger of wildfire, especially when extreme weather conditions have been forecast.
- **Fire reduction planning**
  This is based on the information gathered through evaluating and assessing the fire environment.

Reduce the fire hazard

Consider the following:

Table 1 The fire environment

HAZARD	EXAMPLE	MITIGATION
Boundary non-forest fuels	Gorse, Pampas grass Other volatile pest plants Neighbouring vegetation	Appropriate inspections & other knowledge-gaining activities Fuel modification by mowing, spraying or desiccating, grazing, over-sowing Create firebreaks Edge tree pruning NB: If using herbicide or mowing, timing of operations must be considered
Forest fuels	Thinning-to-waste material Weeds within the forest	Clear tracks Maintain roads
Logging slash piles	Slash dumps & skid sites	Consider controlled burning in autumn/winter Check using infra-red camera Control the height/depth of slash piles in accordance with the Slash Management BEP in the *Environmental Code of Practice* Education &/or training for contractors Site inspections if required

Evaluate & assess the fire risk

Under the Act, FENZ may:

- Prohibit fires in the open or other activities including Hot Work (S 52)
- Initiate a Prohibited or Restricted Fire Season (S 56)
- Require the landowner to create a firebreak (S 62).

To eliminate or reduce the need for such actions, FENZ may consult with forest managers before exercising these powers.

Forest managers should work with FENZ to understand the historic fire climate data. Both parties need to agree on the most appropriate components to use for different fire catchments. In some locations, where wind is the predominant factor, the Initial Spread Index (ISI) might be a better indicator than the Buildup Index (BUI).

Forest managers have different risk profiles but should work collaboratively with FENZ, neighbours and appropriate stakeholders to identify and mitigate risks. For example:

Table 2 Evaluating & assessing the fire risk

RISK	EXAMPLE	MITIGATION
Machinery	Belly-pan fires Sparks Exhaust system carbon	Clean equipment regularly to remove material buildup Spark arresters Exhaust screens Inbuilt engine compartment fire suppression systems Safe parking
Forest operations	Hot Works	Comply with the Code of Practice (NZS 4781: 1973)
	Chainsaw operations	Cool before refuelling Clean & maintain regularly Modify hours of work
	Cable harvesting	Block & cable location, placement & maintenance Mechanical felling & processing Modify hours of work Slash pile management Diligence by crews
External sources	Roadside mowing	FENZ/forest manager to approach and influence councils/NZTA to mow when conditions are suitable
	Vehicle arson	Police & neighbour diligence
	Escaped burns	Burn permits from FENZ Enforcement for violation
	Recreation Unauthorised activities Lightning	Education process Public education
	Access control	Signage

Public education

The forest manager may work with FENZ to develop a site-specific public education strategy. This may include fire signs, forest entry signage, radio, crew location etc.

Site specific education campaigns should try to link with:

- Any national campaign via the FOA website
- Any FENZ Fire Protection programme, both urban and rural
- School visits and forest education programmes in specific catchments
- Local media to encourage awareness of the threat of wildfire, especially when extreme weather conditions have been forecast. Target markets are forest users or neighbours such as employees and contractors, and the general public
- Social media for identified stakeholder groups.

Other:

- Where they are located on a forest estate, FENZ or the forest manager should use the 'Fire Danger Today' signs correctly (there is a need to clarify ownership)
- Communicate 'good housekeeping' rules and fire safety messages with neighbours, as well as recreational users and others who might use the forest

Fire reduction planning

Using the information gathered above, forest managers can assist FENZ in developing a FENZ Fire Plan for the catchment. It should identify the highest priority areas for fire protection, and any constraints on firefighting activities.

FENZ should ensure that appropriate and regular fire weather information is incorporated into the FENZ Fire Plan, by providing meaningful fire weather index (FWI) range parameters (for forest operations), grassland curing (for Hot Work), and wind speed (for powerlines).

FENZ can then provide weekly forecast figures on the agreed parameters to the forest manager at the start of each working week so the forestry operations can proceed with advance knowledge of any limitations that might arise.

Risk reduction activities for forest operations

When FENZ is developing fire risk management plans, the local forest managers and FENZ should consider the whole fire environment, the various risk factors and mitigation measures based on each of the six Forest Operations Fire Management Codes [Appendix 3] agreed to by FENZ and the forest manager at the fire catchment level.

Forest managers and Scion fire scientists should liaise with the local FENZ rural Authorised Persons to analyse the history of work-related fires in the catchment. This team may use historical climate data to place meaningful adjustments to local Risk Management Codes for forest operations, Hot Work, and for powerlines. (Appendix 4).

Any agreed operational measures included as part of the fire risk reduction process may be offset by the range of mitigation procedures shown in Table 2 above. These mitigation measures can be implemented during times of elevated fire risk to ensure that key operations can be continued. They need to be included in the fire risk management plan and will be part of the forest manager's weekly planning process during the fire season.

Hot Work permits

Hot Work includes but is not limited to welding, flame cutting, disc cutting, grinding, bitumen boilers, blow lamps, brazing, burning off, soldering and the use of hot air guns.

Notify powerline companies of any powerline/isolator faults, and encroaching vegetation growth

The Fire and Emergency New Zealand Act, 2017 Section 52 (1) and (2) states:

(1) FENZ may, in the circumstance described in subsection (2):

(a) prohibit the lighting of fires in open air in an area:

(b) **prohibit or restrict any other activity in an area, including access to the area, that FENZ considers may cause a fire to start or to spread.** [Bold added for emphasis]

(2) The circumstance referred to in subsection (1) is that FENZ considers that:

(a) fire risk conditions exist or are likely to exist in the area; and

(b) the prohibition or restriction is necessary or desirable for fire control.

Forest managers should consider Hot Work risk reduction measures for these and similar tasks – such as sharpening delimbing knives with a hand-held grinder and cutting wire rope.

Note that many forestry contractors carry insurance policies that require the contractor carrying out Hot Work to comply with the New Zealand Standard 4781:1973 Code of Practice for Safety in Welding and Cutting (or any amending or updated Standard). The primary requirements of this Standard are:

- A Person in Charge, who will not be undertaking the Hot Work, will issue a Hot Work permit
- The Hot Work permit will have conditions pertaining to how the work will be undertaken, including risk mitigation
- Suitable signage must be erected and indicate Hot Work is occurring at the site.

Powerlines

Wildfires associated with powerlines are often started and continued when auto-reclosers restore power to lines that may have been brought down in high winds.

Some forest managers have arrangements with local lines companies to either reduce the number of times an auto-recloser system automatically attempts to restore power or turn it off and rely on manual restoration.

FENZ will work with forestry and lines companies that have worked closely in the past, to develop fire prevention mitigation strategies for the wider industry.

Forest managers' responsibilities are to:

- Ensure there is no branch intrusion in powerline corridors
- Notify powerline companies of any powerline/isolator faults, and encroaching vegetation growth.

Table 3 Reduction	
Aim: To reduce the likelihood and consequence of wildfire	
Objectives	1. To ensure that the risks of wildfires starting have been fully evaluated
	2. To ensure an appropriate assessment of the fire hazard in an identified fire catchment
	3. To ensure that the identified hazards have been managed appropriately
Best forest fire management guidelines	A Fire Risk Management Plan has been prepared by FENZ in consultation & collaboration with forest managers and other key stakeholders. It is based on the 4Rs – Reduction, Readiness, Response and Recovery.
	Reduction strategies have been agreed to by the forest managers and FENZ
	A Risk Mitigation Plan has been communicated to all stakeholders
	An agreed set of Risk Reduction Measures has been determined & promulgated to forest staff and contractors. These define when certain operations may be curtailed and/or suitable mitigation measures put in place
	The use of fire as a land management tool is allowable with appropriate planning
	The threat from external risks (such as activities on the forest boundary, non-forest fuels, land use, roads) have been considered as part of an annual process where appropriate
	Fuel modification or reduction eg mowing, mulching, grazing, oversowing and edge pruning are considered where a fire hazard presents a potential threat to the forest
	Other risk reduction measures – such as pre-season maintenance of roads, roadsides, mowing tracks & firebreaks (where used), checking of water points and edge pruning of trees – are considered
	At agreed Code levels: Check at-risk mobile plant used in the forest to ensure the appropriate carbon screens and spark arresters are in place Check all mobile plant to ensure the appropriate current and tested fire extinguishers are on board or immediately available Check that contractors clean their equipment regularly to prevent vegetation buildup as an ignition source
	Monitor potential ignition sources: • Hot Work (welding, grinding etc) and ensure compliance with Code of Practice • Chainsaws • Friction sources eg wire ropes and blocks • Machinery – electrical fire, roadside mowing • Plan roadside herbicide, mowing and mechanical work (timing). No desiccation in high risk periods. Ensure that all potential ignition sources are checked on a regular basis, especially at the end of the day before the crews leave the site.
	Monitor other forest users. Ensure that they have knowledge of, and compliance with, the local Fire Risk Management Plan. Examples are: • Beekeepers (with smokers) • Graziers • Concession holders • Recreation operators • Hunting groups (use fire for singeing animals).
	Reinforce 'Good housekeeping' practices with all contractors.
	Note that FENZ: • Will liaise with forest managers on local requirements for national public education campaigns about wildfires • Is committed to reducing the incidence and economic consequence of wildfires, through efficient and effective fire control measures and national, regional and local risk management planning • Will maintain a permit issue and management system that considers values at risk • Will maintain signs, including 'Fire Danger Today' signs if owned and maintained by FENZ.

Readiness

This section describes the actions a forest manager can take to ensure the most effective fire suppression before any wildfire event.

FENZ is responsible for fire suppression, but a forest manager can communicate their expectations to FENZ and other key stakeholders at the beginning of each fire season. They can then liaise and coordinate with, and support FENZ to achieve those expectations.

Fire readiness is therefore an activity where there needs to be close liaison between FENZ and the forest manager at local, catchment and regional level.

This section covers:

- **Fire danger monitoring**
  Determine existing and forecasted fire danger; recognise the possibility of extreme fire conditions
- **Firefighting resources**
  Organise, train and manage firefighting resources
- **Equipment & supplies**
  Procure maintain and inspect improvements, equipment and supplies.

Fire danger monitoring

FENZ uses the NZDFRS fire weather index (FWI) as the basis for its national system of rating fire danger. The information gathered is used to calculate fire danger daily and by season. For details of the NZFDRS, see Appendix 1.

Forest managers can work with FENZ to:

- Ensure that data and alerts for specific weather data and forecasts are made available from the closest or most appropriate remote automatic weather station (RAWS) site to their forest
- Ensure more detailed weather information and forecasts are provided when requested
- Ensure that fire danger indicator signs on the forest estate are set at the appropriate level.

Firefighting resources

FENZ is responsible for all fire response, fire suppression and mopping up. FENZ is also responsible for training those likely to be involved in wildland firefighting.

Forest managers have a duty of care to ensure that people working in their forests have the appropriate skills and level of training for the tasks they are carrying out. FENZ must ensure the Health & Safety requirements of forest managers and firefighters are met.

Forest managers should:

- Work with FENZ to ensure that forestry crews likely to be used for first response are competent or under training, and have suitable personal protective equipment (PPE) and other equipment available to enable an adequate response
- Ensure that FENZ understands the forest manager's Health & Safety requirements
- Ensure that the FENZ Fire Plan for the catchment sets out an agreed Chain of Command and Control and list of key responsibilities for forest personnel. The Fire Risk Management Plan should reflect this.

Table 4 Readiness	
Aim: To ensure policies and procedures are in place for fighting a wildfire	
Objectives	1. To ensure that FENZ provides the forest manager with daily information and weekly forecasts on fire danger conditions 2. To ensure that FENZ provides training and management for forestry firefighter resources that meets appropriate standards 3. To liaise with FENZ and ensure that forestry equipment resources, the quality requirements for those resources, and time requirements for their availability are documented in the FENZ Fire Plan. 4. To support FENZ to obtain the required information for fire risk planning purposes, including detailed forest maps with access points, water points, roads and the appropriate type of vehicle for them, vegetation types and priority areas.
Best forest fire management guidelines	**Fire danger conditions** • FENZ will provide forest managers with access to daily and weekly forecasts of fire weather information (FWI) from the relevant remote automatic weather station (RAWS) during the fire season • FENZ and forest managers will assess the frequency of the delivery of such information as FWI indices change • FENZ will ensure the local fire danger indicator boards show the correct status.
	Firefighter organisation & training Forest managers who have an Agreement with FENZ will consult and confirm with FENZ the numbers to be trained and made available before the fire season. This may include members of the national Response and Incident Management Teams. FENZ will advise the numbers it agrees to train and maintain the training database and training records.
	FENZ will endeavour to organise training programmes for staff and contractors of forest managers without an Agreement if they are involved in fire management work.
	The forest manager or contractor will make sure that up-to-date firefighting personal protective equipment (PPE) which meets the FENZ Standard is provided to all forestry firefighters. The costs will be recovered in the contract rates paid by FENZ.
	FENZ will brief forest managers on the Chain of Command for any fire in the forest estate, and the role of the forest manager.
	FENZ and forest managers should establish a risk management process for managing firefighter entry onto the forest estate. This will be either: (a) Arranging for an introduction to the forest and known hazards, especially accessibility on different types of forest roads, so that FENZ staff have access to the forest estate and are aware of the hazards they are likely to encounter; or (b) Requiring that FENZ response crews wait at the forest entry gate to be then escorted into the forest by the forest company supervisor.
	Forest managers will document radio protocols for forest access and for travelling on forest roads. Forest managers will document the harvest plan, the harvest hazards and the main log cartage routes as part of the Readiness procedure. These documents will be made available to FENZ response crews if required.
	When requested as part of the Readiness procedure, forest managers will provide FENZ with maps showing: • All roads and forest entry points • Main arterial or secondary roads suitable for use by emergency vehicles • Water supplies suitable for use by aircraft and fire appliances • Firebreaks • Sites of significance or value such as cultural or heritage sites, or any areas protected by law • The location of all buildings, and • Areas where hazardous substances or materials are stored.

Equipment & supplies

Forest managers may consider keeping some equipment and other resources at hand so they can gain control of a wildfire within a pre-determined timeframe. This decision will be made by FENZ and the forest manager and will be based on a documented risk assessment.

The documented risk assessment will be used by FENZ to produce their catchment or regional Fire Risk Management Plans.

Forest managers have a duty of care to ensure that people working in their forests have the appropriate skills and level of training for the tasks they are carrying out

Table 4 Readiness (continued)

Aim: To ensure policies and procedures are in place for fighting a wildfire	
	Firefighting equipment FENZ will maintain an up to date list of compliant equipment, including bulldozers, excavators and water tankers, owned by the forest manager and/or available from local contractors. There will be agreement on deployment of that equipment and charge-out rates.
	Forest managers should ensure that FENZ is aware of local aerial operators and aircraft support facilities.
	Fire risk planning Forest managers continue to 'own' the risk of damage to the forest crop The Fire Risk Management Plan will be completed as a collaborative process between FENZ, forest managers and other key stakeholders.
	If firebreaks are used on the forest, forest managers should ensure they are well-maintained and fit for purpose.
	Ensure water points are cleared, mapped and GPS coordinates are logged: • All accessible water points should be sign posted • All water supply points should be maintained in a usable condition with access levels defined • Those suitable for helicopter use must have the flight paths in and out agreed with local operators and cleared • Fire maps should show the location of all water supplies, include the supply size/volume and access points into rivers, lakes etc • Note that culverted waterways may be dammed by the use of heavy plywood or corrugated iron to create a temporary water storage/supply area.

FENZ is responsible, but forest managers may work with FENZ to ensure:

- The location, availability and contract arrangements for firefighting resources are documented in the FENZ Fire Plan, and copies made available to relevant staff and agencies
- The FENZ Fire Plan includes a list of forestry equipment and agencies able to assist local FENZ brigades, and the best forestry people to manage those resources.

Response

FENZ is legally responsible for the detection and suppression of forest fires. This section describes how a forest manager can assist FENZ control and extinguish a forest fire following its detection and reporting. It covers:

- Response planning
- Fire response organisation
- Health and safety
- Minimising environmental impacts.

Response planning

The initial response to a fire needs to be swift and determined. Forest managers should work with FENZ to:

- Agree on standard operating procedures for the forest – particularly access points, safety awareness and resource priorities
- Agree on pre-determined actions for resource dispatch on a fire catchment basis – particularly for helicopters and knowledgeable aerial observers
- Establish an agreed fire management structure that makes efficient use of forestry staff and contractors
- Ensure that the senior forest manager's role and responsibilities are clearly understood when assisting an incident management team.

Fire response organisation

The command structure and build-up of resources must follow the NZ Co-ordinated Incident Management System (CIMS) model.

Attendance

When notified through the 111-call system, FENZ will dispatch the appropriate resources in accordance with sections 38 to 48 of the Act and FENZ's policies.

Where a forestry services agreement has been signed, FENZ will make its notification systems available to forest managers.

FENZ response to a fire

FENZ will control the activities of forestry crews or equipment made available to FENZ through the incident controller.

If a forestry services agreement has been signed, FENZ will expect the responding crews to have:

- The correct personal protective equipment (PPE)
- Met the relevant FENZ Minimum Standards.

Forestry crews will be deployed under the control of the incident controller but remain under the command of the crew leader. They will report to the incident control point (ICP) or staging area to be assigned tasks by the incident controller.

The incident controller

The incident controller (IC) will be the most competent person on site. The process for transferring control at various times is defined in the Agreement.

RESPONSE CONTINUED

Firefighter and stakeholder safety must take priority over all other fire response considerations

Photo: Veronica Clifford, Scion

The forest manager may fulfil a liaison role and provide the incident management team with relevant local forest knowledge.

Health & Safety

Firefighter and stakeholder safety must take priority over all other fire response considerations.

All forestry parties at a fire, including FENZ, are PCBUs (Persons conducting a business or undertaking). They must comply with the duties imposed under the Health and Safety at Work Act 2015. They must, as far as reasonably practicable, consult, co-operate, and co-ordinate activities with each other.

All parties will, as soon as is reasonably practicable, notify the other parties of any hazards.

FENZ and the forestry parties involved will share information and work together during any investigation into a health and safety incident.

To reinforce this point, before each Fire Season, forest managers should liaise with local FENZ managers to:

- Ensure that the local FENZ rural fire manager and Authorised Persons understand landowner legal requirements and responsibilities
- Ensure that the local FENZ rural fire manager and Authorised Persons understand and accept the forest manager's health & safety policy and are familiar with the procedures for identifying and managing risks and hazards
- Document discussions about responsibilities when there are multiple PCBUs at an incident in the forest
- Agree on the best method/process then arrange for any new FENZ staff who are unfamiliar with the forests to have an introductory visit
- Ensure the documented competence, to agreed levels, of likely first responders.

Table 5: Response	
Objectives	1. To minimise the impact of wildfire on forest lands
	2. To undertake fast, determined, safe and thorough suppression actions
	3. To ensure all firefighting personnel are appropriately trained and equipped
	4. To ensure fire response organisations comply with forest manager's health & safety policy and procedures.
Best forest fire management guidelines	All fires are reported through the FENZ 111-system, with first response teams using the FENZ notification system Pre-determined dispatch procedures have been agreed with FENZ to achieve a 'Controlled over-reaction' to a forest fire Forest managers should receive early notification of a fire in their forest.
	Initial response to be swift and determined, and geared to the fire weather index (FWI) at the time of the 111 call and report: • Aerial response as soon as practical • Ground crews activated rapidly • Other resources deployed.
	Health and safety for all personnel in the forest is paramount: • Appropriate PPE must be worn at all times • Agreed Standard Operating Procedures (SOPs), developed at the local level, are in place for forestry involvement in wildfires • Only experienced and competent personnel are to be used in firefighting • Personnel under training, who are deemed not-yet-experienced and/or competent, may be used under constant supervision • Working hours in accordance with Guidelines.

Minimising environmental impacts

Firefighters need to be aware of the environmental priorities of forest managers and other stakeholders when planning their fire response.

Forest managers should ensure that FENZ includes:

- Soil and water
- No foam or retardant in community water supply catchment or low fertility vegetation types
- Biosecurity
- Archaeological sites

in their response planning protocols.

Firefighting foam containing perfluorinated compounds (PFCs) is not to be used.

Recovery

This section describes the post-fire actions a forest manager should expect of FENZ to minimise future adverse impacts of wildfire and fire suppression on the firefighters involved, the forest estate and the environment.

Debrief during and post-suppression

- Ensure an appropriate post-fire review takes place, be it a hot debrief at the end of each shift, a debrief at the conclusion of the incident, a review or a more formal operational review
- The forest manager will be included in any post-incident review process
- Affected neighbours are fully informed of the risks to themselves and their property.

Health and safety

Forest managers should work with FENZ to ensure that:

- Firefighter and forest worker health and safety is fully covered in any debrief process
- Forestry equipment is cleaned, maintained or replaced
- Personal protective equipment (PPE) is repaired or replaced.

Table 6: Recovery	
Objectives	1. To address any health and safety issues arising from the fire control operation
	2. To salvage damaged forest assets
	3. To recover, repair or replace damaged firefighting assets
	4. To incorporate any lessons learned from the incident into planning for any future wildfire events
	5. To rehabilitate sites disturbed by fire control operations
	6. To minimise environmental impacts.
Best forest fire management guidelines	The forest manager should participate in any fire debrief and/or operational review associated with their forest undertaken by FENZ, and report on events from the forest management perspective.
	Liaise with FENZ to ensure the implementation of any fire suppression improvements recommended from the debrief
	Health and safety issues identified at a debrief are acted on in a timely manner Review the forest manager's health and safety policy and procedures as required
	Assess and report on damage to assets or other values: • Note and rectify any damage to bridges, roads, tracks and other installations • Note damage to young growing stock and the need for replanting or changes to asset valuations • Repair & replace as needed any equipment lost or damaged during the fire
	Note any on-going biosecurity issues
	Work with insurers to salvage damaged forest assets
	Develop a plan to rehabilitate sites damaged by wildfire itself or suppression operations

Environment

Stakeholder environmental concerns need to be balanced with all other fire response considerations.

Forest managers should work with FENZ to:

- Consider soil and water guidelines and community issues
- Ensure that no foam or retardant is used in community water supply catchments
- Consider biosecurity risks; invasive aquatic organisms
- Be aware of and take care not to disturb archaeological sites.

These issues will be addressed in the FENZ risk management planning process.

Organisation

FENZ and forest managers will ensure that all equipment and resources are returned and maintained ready for the next incident.

FENZ will advise forest managers of how improvements and corrective actions arising from debrief discussions will be remedied, along with the timeframes for action.

New Zealand, like many other fire-prone countries, has developed a fire danger rating system

Appendices

Appendix 1 describes the development of the NZ Fire Danger Rating System (NZFDRS) and its use

Appendix 2 describes the six Fire Danger classes, based on fire intensity, that can be calculated or inferred from the NZFDRS. These Fire Danger classes translate into six Fire Risk Management Code levels – green, blue, yellow, orange, red and purple

Appendix 3 describes the Fire Risk Management Codes, and the specific work requirements and mitigation options available to address the increased risk at each Code level. Additional risk management features are progressively added to each Code to address the increasing fire risk.

Appendix 4 describes how these Code levels may be used for work planning

Appendix 5 describes basic firefighting safety considerations for forestry crews

Appendix 6 describes proposed mitigation measures for Hot Work as a specific example

Appendix 7 describes the formal risk management process of ISO 31 000 as it relates to forestry

Appendix 8 Plantation Forestry Rural Fire Control Charter

Appendix 1:

The NZ Fire Danger Rating System

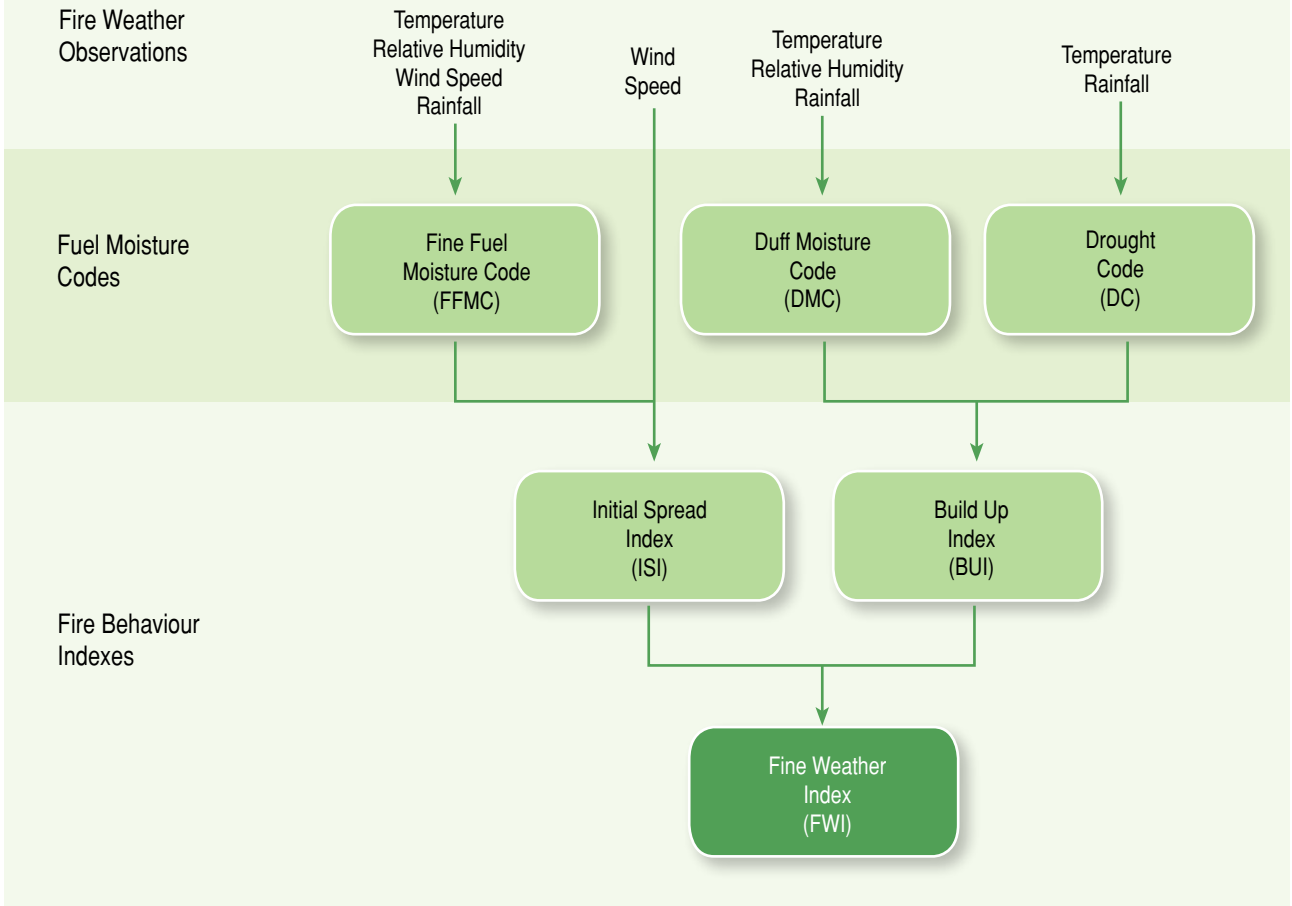
'Fire Danger' refers to an assessment of the various factors of the fire environment that determine the ease of ignition, the rate of spread, the difficulty of control and the impact of wildfire.

New Zealand, like many other fire-prone countries, has developed a fire danger rating system that is used to aid decision-making around daily operational activities, and if necessary, wildfire control.

The NZ Fire Danger Rating System (NZFDRS) is developed in two stages. The first stage – the development of the Fire Weather Index (FWI) – underpins the second stage by being combined with other factors to produce the NZFDRS.

The five components that make up the FWI are calculated from weather data gathered by a national system of weather stations (see Stage 1). The data is available for analysis.

Stage 1: Fire Weather Index (FWI) development



APPENDIX 1 CONTINTUED

The Fuel Moisture Codes represent:

i. The moisture content of the fine surface litter (FFMC). This indicates the relative ease of a fire starting

ii. The loosely compacted duff layer (DMC). This gives an indication of fuel consumption, particularly medium-size woody material

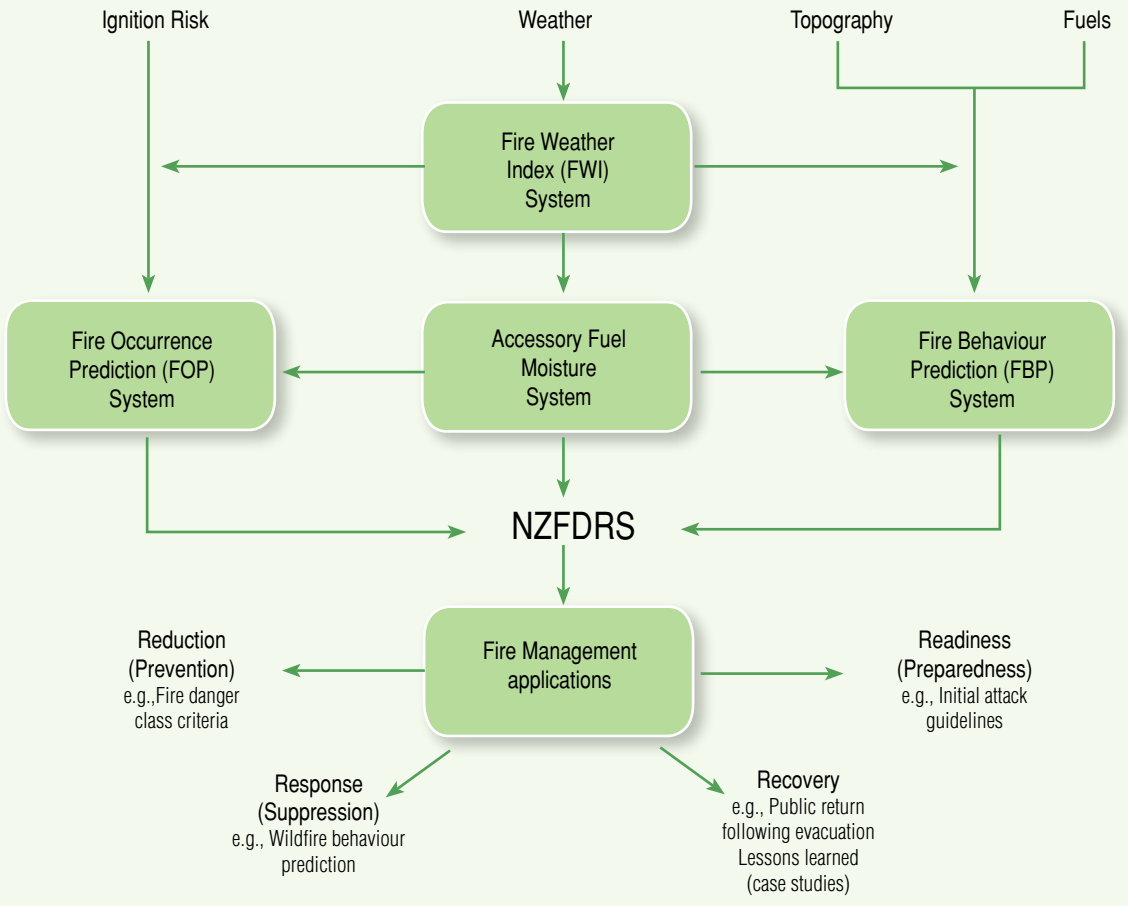
iii. The deep compact organic matter (DC). This is a useful indicator of the drought effects on forest fuels and also indicates the difficulty of mopping up.

The three moisture codes link with wind to generate the rate of fire spread (ISI), and the amount of fuel available for combustion (BUI).

The resulting FWI is then combined with other factors to produce the NZFDRS (see Stage 2).

The NZFDRS factors are used by fire management specialists when predicting fire behaviour.

Stage 2: Fire Danger Rating System development



Appendix 2:

New Zealand Fire Danger Classes & Codes

NZ's fire scientists have devised a Fire Danger class system that uses fire intensity as an indicator of fire suppression difficulty. These Fire Danger classes translate into six Fire Risk Management Code levels – green, blue, yellow, orange, red and purple (see Tables 1 & 2).

Table 1: Fire Danger Class system

Fire Danger Class	Fire Intensity (kW/m)	Control Requirements
L	>10	Ground crews with hand tools
M	10-500	Ground crews with back-pack pumps
H	500-2000	Water under pressure and/or heavy machinery
VH	2000-4000	Aircraft using chemical fire suppressants/retardants
E	**4000-10,000**	**Difficult to contain head, can suppress flanks and back of fire**
VE	**>10,000**	**Difficult if not impossible to control around most of fire perimeter**

This data can be translated into a Forest Operations Fire Risk Management Code, depending on the fire environment features in each catchment, as shown below:

Table 2: Fire Risk Management Code levels

Code Level	BUI Range	Fire Weather Index (FWI) Code Calibration of the BUI Range
Green	< 40 or other code	If FWI > 25 – Elevate to Code Blue
Blue	40.1 – 60	If FWI 25 > – Elevate to Code Yellow
Yellow	60.1 – 80	If FWI > 25 – Elevate to Code Orange
Orange	80.1 – 100	If FWI > 25 – Elevate to Code Red
Red	100.1 – 120	If FWI > 25 – Elevate to Code Purple
Purple	> 120	

Notes

- These Codes potentially apply all year round. Risk must be managed all year
- These indicators are generic guidelines. Forest managers and FENZ are encouraged to discuss local triggers based on local climate data and fire statistics

Appendix 3:

Forest Operations Fire Risk Management Codes

The Buildup Index (BUI) and Fire Weather Index (FWI) levels for each Code in this Appendix are indicative only and are presented as an example of what is possible.

These figures are used for the Nelson/Marlborough region and were provided by the former Waimea and Marlborough/Kaikoura Rural Fire Districts (RFDs).

These Codes are for use during the official Fire Season. They may potentially apply all year round.

The Forest Managers' Fire Committee recommends that:

- At an appropriate regional or district level, forest managers jointly approach FENZ and Scion fire scientists with regards to using the same scientific, climate-based approach to setting the Code levels they are comfortable with for their fire environment and risk profile
- Forest managers more closely define the actual and practical mitigation measures most suited to their area/district/region. Note that some forests may have unique risk profiles and have Code levels of their own
- These Code levels are included in the FENZ Fire Plans so that FENZ understands the basis of their compilation and the science behind them.

FENZ can make a weekly forecast of fire weather conditions from selected Remote Automatic Weather Stations (RAWS) available to forest managers. Forest managers can then plan weekly operations based on the best available information and arrange mitigation measures to suit.

The same Fire Weather System (FWSYS) can provide alerts, so that forest managers can be made instantly aware if a particular fire weather component exceeds a level previously indicated.

EXAMPLES ONLY

Fire Risk Management Code levels: Green, blue, yellow, orange, red and purple

Note that additional risk management features are progressively added to each Code in BOLD type

Code Green: BUI < 40 ISI: Use appropriate figures depending on local conditions FWI < 25	
Activity	**Recommended mitigation measures**
Welding/gas cutting/abrasive wheel cutting	Work only on bare earth Have a minimum of 20 litres of water, along with an appropriate method of applying that water, within 5 metres of the work area Patrol for 30 minutes after completion Comply with Code of Practice (NZS 4781:1973)
Smoking	Only in appropriate designated areas

Code Blue: BUI = 40.1 – 60 ISI = FWI < 25	
Activity	**Recommended mitigation**
Welding/gas cutting/abrasive wheel cutting	As for Code Green **Wet down work area with soapy water**
Smoking	As for Code Green **No smoking in cutover**
Inspections & maintenance requirements	**Contractors to consider:** • **Check chainsaws and machinery for debris build up near hot working parts such as belly pans and radiators** • **Check engine bay hydraulic hoses for leaks** • **Inspect hauler blocks for heat, and ropes for binds, rock strikes** • **Backline blocks cleared of surrounding vegetation to mineral earth 1.5 m radius. Keep shovel on site for this purpose** **Inspections should be noted in diary**
Chainsaw thinning	**Review site hazards (undergrowth fuels, aspect, and escape routes)** **Move chainsaw thinning to areas with lower hazard where possible**
Fire starts	**Notify 111 of any fire start regardless of size**
Emergency planning	**Notify FENZ of any road closures or weekend work** **Inform the workforce about Code Blue requirements and preparation for future elevation to Code Yellow at, for example, tailgate meetings**
Forest access	**Review public access to forest. Alert recreation permit holders, hunters, bikers etc**

Code Yellow: BUI = 60 – 80 ISI = FWI < 25	
Activity	**Recommended mitigation measures**
Welding/gas cutting/abrasive wheel cutting	As for Code Blue **No Hot Work unless on a 20 metre radius of bare ground**
Smoking	As for Code Blue
Inspections & maintenance requirements	As for Code Blue
Chainsaw thinning	As for Code Blue
Fire starts	As for Code Blue
Emergency planning	As for Code Blue **Inform the workforce at tailgate meetings about Code Yellow requirements and preparation for future elevation to Code Orange** **Escape plans: Consider covering in tailgate meetings**
Forest access	As for Code Blue
Mowing and slashing (roadside and ground)	**Stop road side mowing and slashing**

APPENDIX 3 CONTINTUED

Code Orange: BUI = 80.1 – 100 ISI = FWI < 25	
Activity	**Recommended mitigation measures**
Welding/gas cutting/abrasive wheel cutting	As for Code Yellow
Smoking	As for Code Yellow
Inspections and maintenance	**Daily** **Assess daily weather at 1300 hours by forest to determine need for elevation of readiness level** **Weekly** **Inspection of all fire equipment (including extinguishers)** **Regular cleaning for all machines and especially chainsaws**
Chainsaw thinning	As for Code Yellow
Fire starts	As for Code Yellow
Emergency planning	As for Code Yellow **Inform the workforce about Code Orange requirements and preparation for future elevation to Code Red at tailgate meetings** **Consider covering in tailgate meetings: Escape plans, initial response actions, check fire competencies** **Identify suitable water points (for ground and helicopter) around work areas**
Forest access	As for Code Yellow **Consider putting up signage at access points warning of fire danger** **Restrict all hunting and firewood gathering**
Mowing and slashing (roadside and ground)	As for Code Yellow
Machines	**List all machines that do not have working inbuilt engine compartment fire suppression systems. You may choose to cease work in cutover at 1300 hours** **Check mobile tail holds are clear of vegetation** **Ensure suitable water supplies are located on work sites**

Code Red: BUI = 100.1 – 120 ISI = FWI < 25	
Activity	**Recommended mitigation measures**
Welding/gas cutting/abrasive wheel cutting	As for Code Orange **No Hot Work unless on a 20 metre radius of bare ground**
Smoking	As for Code Orange
Inspections and maintenance	Daily – As for Code Orange Weekly – As for Code Orange
Chainsaw thinning	**Consider no chainsaw thinning after 1200 hours**
Fire starts	As for Code Orange
Emergency planning	As for Code Orange **Inform the workforce about Code Red requirements and preparation for future elevation to Code Purple at tailgate meetings** **Consider covering in tailgate meetings: Escape plans, initial response actions, check fire competencies** **Identify suitable water points (for ground and helicopter) around work areas and maintain as appropriate** **Patrol sites for at least one hour after machine shutdown** **Consider having a 3-person quick response crew with smoke chaser based at a central location.** **Liaise with FENZ to determine FENZ initial response plans in case of fire**
Forest access	As for Code Orange
Mowing and slashing (roadside and ground)	As for Code Orange
Harvesting – Chainsaws	**Stop all chainsaw operations in cut over after 1200 hours, except on landings and when log-making**
Machines	As for Code Orange

APPENDIX 3 CONTINTUED

Code Purple	**BUI = 120.1 +**	**ISI =**	**FWI>25**
Activity		**Recommended mitigation measures**	
Welding/gas cutting/abrasive wheel cutting		As for Code Red **Consider stopping all Hot Works for a defined period unless a smoke chaser plus crew can be located nearby, OR** **Work before 1000 hours and after 1600 hours; OR wet the area before and after the Hot Works; maintain 1000 litres of water plus pump on site for two hours following the final wet-down** **Maintain observation presence for two hours afterwards**	
Smoking		As for Code Red	
Inspections and maintenance		Daily – As for Code Red Weekly – As for Code Red	
Chainsaw thinning		**Stop all chainsaw thinning operations**	
Fire starts		As for Code Red	
Emergency planning		As for Code Red **Consider short response standby helicopter** **Extensions to working hours on bare earth or processing sites are subject to appropriate readiness and emergency response planning**	
Forest access		As for Code Red	
Mowing and slashing (roadside and ground)		As for Code Red	
Harvesting – chainsaws		As for Code Red	
Machines		**Consider a Stop for all machines working in vegetation or cutover from 1200 hours** **Stop all machines working on bare earth or processing sites at 1300 hours, unless 1000 litres of water plus pump are on site, or a smoke chaser is nearby**	
Cable harvesting		**Consider a Stop on moving ropes between 1200 and 1700 hours**	
Slash raking & fire breaking		**Inspect pulleys etc to ensure that friction has not left smouldering vegetation** **Stop all slash raking and fire breaking**	

Appendix 4:

Work planning and the Forest Operations Fire Risk Management Codes

Forest managers should arrange with FENZ to be informed of forecasted fire weather conditions and Code levels at the beginning of each week.

This enables forest managers and contractors to consider and manage potential activity restrictions. Work flow can be planned to minimise business disruptions.

FENZ may also use the Fire Weather System (FWSYS) to alert forest managers to unforecasted daily spikes in fire weather conditions. Forest managers may then consider alerting operational crews to increased risk levels, independent of the formal Code notification process.

All concerned in the forest business cycle need to clearly understand the risks to all the fire risk management objectives, evaluate them clearly, and respond after due consideration of all those risks and how they may be mitigated.

Examples of risk mitigation conducted to reduce fire risk include:

- Modify hours of work, such as start and finish earlier, or take a long break in the heat of the day and finish later to offset lost time
- Stop and allow engines to cool before refuelling (pumps, chainsaws)
- Move away more than three metres from the refuel site to restart
- Clean & maintain equipment, especially chainsaws, regularly
- Locate some fire suppression resources, such as a smoke chaser with crew, closer to operations at higher Code levels. Locate a central refuel site on bare ground with 5 kg extinguisher and several shovels onsite
- Locate observers in areas/with equipment likely to cause sparks eg Hot Work
- Allocate observers to stay behind and patrol for a given period after work ceases
- Soak area around site of intended Hot Works activity
- Use foam in that water
- Re-soak after Hot Work is completed
- Monitor with water and pump onsite
- For activities away from usual work eg gate repairs, plan work outside heat of the day and saturate vegetation nearby.

All concerned in the forest business cycle need to clearly understand the risks to all the fire risk management objectives

Appendix 5:

Firefighter safety: Basic fire safety considerations for forestry crews

Large-scale managers

The managers of large forest estates are likely to have, or be aware of, individual service agreements with FENZ.

The forest managers will provide FENZ with a list of trained and competent personnel able to be used in firefighting on the estate, those in any Rural Fire Response Teams, and those involved in national or regional Incident Management Teams.

The individual service agreements will define the ownership and maintenance responsibilities of fire equipment and other assets to comply with FENZ Minimum Standards.

If FENZ responds to a fire in that forest, FENZ may request that such resources be made available. The forest manager has the discretion to place those resources under FENZ control. The forest manager may anticipate being involved at a regional level if that has been the history of involvement.

Both parties are PCBUs (Persons conducting a business or undertaking) under the Health and Safety at Work Act 2015. They must consult, cooperate with each other and coordinate activities when suppressing a fire on the forest manager's estate.

The forest manager may consider liaising with FENZ to prepare a standard Letter of Expectations to people who are likely to be in or using the forest during the Fire Season. This may include a summary of the legal obligations of all parties.

The forest managers will provide FENZ with a list of trained and competent personnel able to be used in firefighting

Small-scale managers

The managers of smaller forest blocks should liaise with FENZ for training of crews likely to respond to forest fire events or be used for Rural Fire Response Team programmes.

Safety rules for firefighters

Forestry firefighters will not enter the fire ground unless:

1. They have met minimum training requirements, or are undergoing training and documentary evidence can be provided to the forest manager
2. They are wearing the approved firefighting personal protection equipment (PPE)
3. They have received a full operational briefing, including LACES (Lookouts, Awareness or anchor points, Escape routes, Safety zones) before working on a fire line
4. The crew leader knows:
   - Who to contact
   - Who they are supervising
   - What their tasks are
   - What resources they have, including time
   - Where radio/cellphone coverage is
   - The exact location (GPS/RAPID/map reference) of the incident.

Forestry firefighters are expected to have the following equipment:

Equipment type	Example
Hand tools	Shovel, Polaski, axe, slasher. One hand tool per person.
Water capability	Chemical container (20 or 1000 litre), large bladder on trailer. Sufficient to maximise the efficiency of the crew.
Water delivery system	Back packs (Rega or Scotty), hand pumps, small motorised high-pressure pumps with 25 mm hose. Sufficient to maximise the efficiency of the crew.
Fire extinguishers	As required by HASNO Regulations when carrying fuel, and machine regulations.

Also refer to the National Rural Fire Authority (NRFA) Green Book for safety information, size-up, shift routines etc.

Appendix 6:

Activity mitigation

Hot Work operations

Hot Works carried out in the forest, such as welding, gas cutting or grinding, must be carried out in accordance with NZ Standard 4781:1973 Code of Practice for Safety in Welding and Cutting (or any amending or updated Standard). The main requirements of this Standard are:

- The Person in Charge, who will not be undertaking the Hot Work, will issue a Hot Work Permit
- The Hot Work Permit will have conditions pertaining to how the work will be undertaken
- Suitable signage indicating that Hot Work is occurring at the site must be erected at the most appropriate location
- Usual conditions are that the work will be carried out on an area cleared to mineral earth.

Under normal conditions **(Code Green)** during the fire season:

- A contractor's usual fire suppression equipment – hand tools, a supply of water and a method of delivering that water – must be on site
- On completion of the work, the area must be patrolled for 30 minutes to ensure no fire has been started.

The basic mitigation requirements for Hot Work during the Fire Season are set out in Appendix 3: Forest Operations Fire Risk Management Codes. However, for additional mitigation in this work, different components of the Fire Danger Rating System are used – in this case the Fine Fuel Moisture Code (FFMC), which indicates the ease of ignition, and grass curing (the percentage of grass that is dead or dying). See Table 7 below for the relationship.

A Special Fire Permit may be required for any Hot Work if the local FENZ rural manager or Authorised Person has declared a Restricted Fire Season.

Code Yellow: Wetting down vegetation surrounding the location of hot work after completion of the work.

Code Orange: Restricted hours – for example consider completion of the Hot Work by 1300 hours, or anticipate not working between 1230 and 1430 hours on a sunny day.

Code Red and above: When FFMC reaches 92, and grassland curing is greater than 80%, consider stopping all Hot Work between 1200 and 1900 hours unless able to clear and wet-down 20 metres of bare ground around the work site and maintain a good water supply on site.

Table 7: Curing (%)

FFMC	Grass curing		
	<40	40-80	>80
<76			
76-83			
84-87			
88-91			
92-95			
>96			

Code Green – no controls (basic firefighting tools required)
Code Yellow – firefighting equipment/wetting down required
Code Orange – restricted operations/hours of work
Code Red – total shutdown of activities

Appendix 7:

The risk management process

This section provides forest managers, large and small, with a relatively formal process through which to identify the risks (in this case from fire, but other factors may be considered) to their assets, and actively think about whether or how to mitigate those risks. The process is based on the ISO 31 000 Risk management process.

This process could be used when contributing to, or reviewing, FENZ Fire Plans and their relevance to forest estates.

The details of the process are scalable, but the process itself is the important aspect.

Stage 1 – Establish the context

- Describe the relevant area by map. Include areas where there may have been fires in the past. Also include small communities where appropriate
- Define the period over which the Risk Management Plan is operative eg annual or for a longer period
- Ensure the risk management approach is appropriate to the area, circumstances and organisation involved
- Understand the Local Authority plan and zoning. Be aware of land managership and governance, as well as the objectives of the land manager(s) involved in the area
- Identify the key stakeholders and their perceptions and requirements. Understand relationships with FENZ in the area
- Identify key issues and trends which may affect or influence risk management of forest fire in the area. Examples include fire history (particularly the use of forest roads for burning cars), land uses and trends (eg recreational uses such as motor bikes, or increased harvesting in an area)
- Detail the risk management objectives, an overview of the risks in achieving these objectives and the agreed treatments being applied to mitigate these risks. What is the risk tolerance of the forest owner ie how risk-averse or risk-taking are they? This will determine their level of expenditure on risk mitigation
- What is the level of knowledge and understanding about the data and information required for the process, fuel types, key climatic data (eg predominant wind direction, current or predicted soil moisture deficiency), potential fire behaviour, visitor numbers and timing, values at risk
- Develop a 'baseline' for future fire and risk management planning; enable decisions or processes to be audited or reviewed
- Consider the existing situation – fire climate, fire history, fire behaviour at past fires, response capabilities – to understand how the risk management plan could be implemented
- Include in this process, the identification of existing fire management infrastructure, such as ponds, firebreaks, weather stations, fire depots, proximity of trained fire suppression resources
- Ensure that the methods used, and the approach adopted, is appropriate to the area and the circumstances.

Stage 2: Communicate and consult

The aim is for key stakeholders, particularly neighbours and contractors, to participate in the development, delivery and monitoring of the forest's Risk Management Plan. Try to engage with stakeholders before beginning the planning cycle, to ensure that the level, method and timing of stakeholder involvement is identified and scheduled.

APPENDIX 7 CONTINTUED

It is important to note:

- Who will be affected by the plan
- Who needs to be involved.

Stage 3 – Risk identification

The forest manager needs to identify the sources of risk, the areas of greatest impact and the potential consequences. This process includes the following:

- Identify and more closely define the precise nature of the risk using a range of sources – local knowledge, fire history data, stakeholder input. How fires start is important, and identifying the causes of fires in the defined area is a key step
- Assess potential consequences. This will be at a level of detail appropriate to the size of the forest estate
- Use the most relevant and up to date information
- Involve key stakeholders – people with appropriate knowledge can usefully be involved in the risk identification process
- A list of risks, or Risk Register that may be used to capture this information. These are events that would affect the achievement of the forest or land management objectives.

Stage 4 – Risk analysis

An understanding of risk is an essential component of the risk management process and allows forest managers to form a view as to whether all the identified risks need to be treated.

- Risks should be analysed by considering the causes and sources of risk, the consequences if that risk is not treated, and the likelihood that those consequences occur. In other words, determine the likelihood and then the consequences of an event
- Analyse each risk factor by working through the causes and likely sources of that risk. In this case, analyse the consequences of fire through considering fire growth scenarios (a fire growth model may be appropriate), analysis of weather data for key periods such as holiday times or when specific work is programmed to start (eg harvesting in a new area), and the particular values at risk. Use fire history data, if it exists, to consider the likelihood of fire events
- Risk analysis should clarify the assumptions made in the risk identification, and various opinions about the nature of the risk being described
- The analysis stage should also consider how the organisational capabilities of stakeholders affect the treatment options being considered
- Risks may be analysed in varying detail, depending on the size and scale of the forests and other circumstances.

Stage 5 – Risk evaluation

The purpose of risk evaluation is to assist in making decisions, based on the outcomes from risk analysis, about which risks need to be treated and the priority for doing so.

- The evaluation involves comparing the level of risk analysed against risk management objectives established in Stage 1
- The evaluation of risk requires an understanding of likelihood and consequence which determines the acceptability level of risk
- The need for treatment will be dependent on the forest owner's risk attitude and risk tolerance.

Stage 6 – Risk treatment

Risk treatment involves selecting one or more options for eliminating, isolating or managing (modifying) the risks, and implementing those options. It is a cyclical process of:

- Identify, characterise, and assess the vulnerability of critical assets to threats
- Determine the risk (ie the expected consequences of specific types of fire events on those assets)
- Assessing a particular risk treatment and prioritise risk reduction measures
- Deciding whether the resulting risk levels are acceptable
- If not, generating a new risk treatment
- Assessing the effectiveness of that treatment.

Risk treatment options are not mutually exclusive. They can include the standard options of Eliminate, Isolate, Manage:

  - Avoiding (Eliminate) the risk by not starting the risky activity
  - Removing the risk source
  - Changing the likelihood and/or consequences
  - Sharing the risk with another party.

Selection of appropriate risk treatments involves balancing cost and effort against benefits derived. Treatments may be considered individually or in combination. Any secondary risks need to be assessed and discussed with stakeholders.

Appendix 8:

PLANTATION FORESTRY RURAL FIRE CONTROL CHARTER

August 2017

Fire and Emergency New Zealand was established on 1 July 2017 with the principal objectives to reduce unwanted fires; and in relation to its main and additional functions to protect and preserve life, prevent or limit injury, and prevent or limit damage to property, land and the environment.

This is the first time New Zealand has a single, unified fire services organisation that combines urban and rural fire services, with expanded functions that reflect the range of services firefighters provide to communities. Fire and Emergency New Zealand is committed to working co-operatively and collaboratively with other organisations to achieve these objectives.

The plantation forestry sector (the sector) covers over 1.7 million hectares of land in New Zealand. The NZ Forest Owners Association (NZFOA) and the NZ Farm Forestry Association (NZFFA) are voluntary membership organisations that provide leadership, support and services to the sector.

It is acknowledged that there will be a long transition period before Fire and Emergency New Zealand functions as a fully unified, national organisation. This Charter provides clarity during this transition. The sector and Fire and Emergency New Zealand are committed to working together to maintain, and enhance the existing arrangements used to deliver effective rural fire control. The parties will review this Charter at least three yearly.

Both Fire and Emergency New Zealand and the sector, as represented by the signatories of this Charter, will work together to:

- develop and promote principles and actions with our members and personnel to improve fire management, and to support Fire and Emergency New Zealand over the coming years.
- communicate the contents of this Charter to our respective members and personnel.

NZFOA and NZFFA will also recommend to their members that they adopt those elements that can only be acted on by individual forest owners, rather than by the signatory Associations.

We will also be guided by the following statements: -

- Fire and Emergency New Zealand and the sector each have duties under health and safety legislation, and will co-operate with each other where they have a duty in relation to the same matter, to promote a safety-first culture within their organisations.
- The sector will make representations to, and seek support from, Fire and Emergency New Zealand at national, regional and local level.
- Fire and Emergency New Zealand and the sector acknowledge the role of fire as a land management tool.
- The sector is committed to investing at appropriate levels, in people, equipment and specialist knowledge, to support Fire and Emergency New Zealand in its objectives and fire control functions.
- Fire and Emergency New Zealand and the sector are committed to reducing the incidence and economic consequence of wildfires, through efficient and effective fire control measures and national, regional and local risk planning.
- Fire and Emergency New Zealand and the sector support the philosophy of managing wildfires by fire risk reduction, and early and controlled response.
- Fire and Emergency New Zealand and the sector support fire research including that of the SCION Fire Research Program and the utilisation or adoption of this research.
- Fire and Emergency New Zealand and the sector support the NZFOA Fire Management Guidelines which provide operational guidance and information to promote and ensure efficient and effective fire management, including protection, on plantation forests.
- The sector will be engaged and consulted on the development of national standards and forestry related fire management policies.
- Fire and Emergency New Zealand will engage with the sector on the development and publication of forestry fire related materials, distribution of fire control information, and the promotion of good fire management practices.

SIGNATORIES

Rhys Jones, Chief Executive

Fire and Emergency New Zealand

David Rhodes, Chief Executive

New Zealand Forest Owners Association

Neil Cullen, President

New Zealand Farm Forestry Association

Glossary

4Rs: Components of emergency management
- **Risk reduction**: Identifying and analysing long-term risks, taking steps to eliminate or reduce the impact of these risks if practicable
- **Readiness:** Developing operational systems and capabilities before an emergency happens
- **Response:** Actions taken immediately before, during, or directly after an emergency
- **Recovery:** Efforts and processes used to bring about the regeneration of a community following an emergency.

ACOP: Approved Code of Practice for Safety and Health in Forest Operations
BUI: Build Up Index. See bullet below (under FWI)
Catchment: The logical area for planning purposes
CIMS: NZ Co-ordinated Incident Management System model. Systematically manages incidents regardless of size, hazard and complexity
DC: Drought Code. See bullet below (under FWI)
DMC: Duff Moisture Code. See bullet below (under FWI)
FENZ: Fire and Emergency New Zealand
FFMC: Fine Fuel Moisture Code. See bullet below (under FWI)
Firebreak: A natural or artificial physical barrier against the spread of fire from or into any area of continuous flammable material or other potential risk
Fire Danger Classes and Codes: Fire intensity is used as an indicator of fire suppression difficulty
Fire Seasons: Check FENZ website for season status in the location of the planned burn
http://checkitsalright.nz/check-fire-season-status

- **Open Fire Season**: You can light a fire in open air without a permit – as long as you do so safely, have permission from the relevant land owner or occupier, and Fire and Emergency New Zealand hasn't prohibited the lighting of fires in open air in the location of your proposed fire
- **Restricted Fire Season**: Lighting a fire is riskier than normal during a restricted fire season and you need to get a fire permit from Fire and Emergency before you light a fire in open air
- **Prohibited Fire Season**: Lighting a fire would be extremely risky so there is a ban on lighting any fires in open air.

FOA: The New Zealand Forest Owners Association Incorporated
FOA/FFA Fire Committee: Joint New Zealand Forest Owners Association and NZ Farm Forestry Association Fire Committee
Foam or retardant: A substance that is used to slow or stop the spread of fire or reduce its intensity
Forest manager: A general term for forest owner, forest manager and farm forester. A person with responsibility for managing and protecting an area of forest
FWI: Fire Weather Index. A numerical rating of fire intensity. The five components that make up the FWI system provide numerical ratings of relative vegetation fire potential. The first three components are fuel moisture codes, the final two components are fire behaviour indices.

- **FFMC**: Fine Fuel Moisture Code. A numerical rating of the moisture content of litter and other cured fuels. This Code is an indicator of the relative ease of ignition and flammability of fine fuel
- **DMC**: Duff Moisture Code. A numerical rating of the average moisture content of loosely compacted organic layers of moderate depth. This Code gives an indication of fuel consumption in moderate duff layers and medium sized woody material
- **DC**: Drought Code. A numerical rating of the average moisture content of deep, compact, organic layers. This Code is a useful indicator of seasonal drought effects on forest fuels, and the amount of smouldering in deep duff layers and large logs
- **ISI**: Initial Spread Index. A numerical rating of the expected rate of fire spread. It combines the effects of wind and FFMC on rate of spread without the influence of variable quantities of fuel.
- **BUI**: Build Up Index. A numerical rating of the total amount of fuel available for combustion that combines DMC and DC.

GPS: Geographic Positioning System. A set of numbers defining a unique geographic location
Hot Works: Includes but is not limited to, welding, flame cutting, disc cutting, grinding, blow lamps, brazing, burning off, soldering and the use of hot air guns
Incident Controller: The most competent person on site. Takes charge of the management of the incident
ISI: Initial Spread Index. See bullet above (under FWI)
NZFDRS: NZ Fire Danger Rating System
NZFFA: NZ Farm Forestry Association
PCBU: Person(s) conducting a business or undertaking. Defined under the H&S at Work Act 2015
Plantation Forestry Rural Fire Control Charter: A charter signed by the NZ Forest Owners Association (NZFOA), the NZ Farm Forestry Association (NZFFA) and Fire and Emergency New Zealand (FENZ) to ensure clarity throughout the integration period as Fire and Emergency moves to become a fully unified, national organisation
RAWS: Remote Automatic Weather Stations
Risk: Is the probability of something happening (a fire starting).

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