

# Rural fire danger: Implications of climate change

Rural fires pose greater risk in the future due to the impacts of a changing climate. Rural landowners, lifestyle block owners, forestry block owners and others who live or work in rural areas need to be aware of these changing risks.

This is a brief introduction to concepts involved when considering the increased risk of fire in rural areas.

The potential for fire to be hugely damaging in rural areas is high and the risks may very well be increasing, more so in some areas of the country. Adaptation requires better understanding of both the risk and the opportunity to improve on-farm practices.

## Why is this of greater importance to rural areas?

Fire is one of the more common disasters that can happen in a community even though most people don't take this into account in their planning and preparedness. Rural communities need to recognize that they are often more at risk because of a range of factors that are specific to them. This includes the very nature of farming activities and the fuel available for fires in the type of vegetation or crop (tree and scrub blocks, large areas of pasture seed head, crop burn off). The low number of people and isolation from firefighting resources are also critical influences, and finally, rural people may not notice fire developing due to this isolation and distance.

In addition, research has shown that for most of us taking any actions to reduce fire risk has a far lower importance or urgency compared to other priorities. As well, mostly we rely on others to manage fire safety, such as the rural fire service. People are also inclined to have a less than clear understanding of fire risk in their local environment.

On top of all this, farmers use fire as a management practice – on farm activities such as controlled burn offs for land management or weed control, elimination of waste, cleaning up wind throw and other tree residue – and these can smoulder and become the start of something bigger with a change in weather conditions.

Consideration of fire risk should be included in any planning for new rural developments, new farm infrastructure and risk management.

## Definitions

There is a considerable range of terminology and definitions used in fire management:

**Fire risk:** probability of the occurrence of a fire and the potential consequences of the fire i.e. the chance that a fire might start and the impact of fire



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**Fire danger:** this is a combination of the various local factors of fuels, weather, topography and risk. It is an assessment of the daily fire potential in an area (include the initiation, spread and difficulty to control) and is described as a fire danger rating. This can also include a measure of the number of days of very high or severe fire danger.

**Fire hazard:** this term can be confusing as it can refer to both the conditions necessary to cause a fire (usually excluding the weather) or the fact that the fire itself is a hazard i.e. potential for injury or damage from a fire

**Fire climate severity:** this combines the daily fire danger risk and the number of days of severe fire danger (frequency). This integrates the drying influences of higher temperatures, decreased rainfall and increased wind speeds on potential fire intensity, and indicate the increasing amount of work and difficulty of controlling a fire as fire intensity increases.

## Understanding fire risk and weather

The key weather elements that increase fire risk and danger are temperature, humidity, wind speed and rainfall.

The interaction between increasing temperature and wind speed and decreasing rainfall and humidity in each region are the key influences on fire risk. In other words potentially hotter windier weather in future will influence your risk of fire and will vary for different regions of the country. This means that severe weather conditions as a factor in fire risk is more critical than the fuel, topography or type of fire.

## Climate change and fire risk for specific areas of NZ

Estimates of fire danger in the future have been modeled using predicted monthly changes in weather inputs (temperature, humidity, wind speed and rainfall). The results indicate that fire climate severity (i.e. the combination of climate features that increase fire risk) is likely to rise significantly in many parts of the country.

The areas with the predicted highest risk

- the east and south of the South Island, especially coastal Otago and Marlborough and south eastern South Island
  - the west of the North Island – the Wanganui area

Other regions are predicted to receive increased rainfall and therefore the estimated fire risk is lower. However localised conditions and the associated fire risk will need to be well understood by all rural communities.

## What is expected to be different?

These in turn indicate that fire managers can expect:

- Longer fire seasons in some parts of the country
- Increased drought frequency, and associated increases in fuel drying
- Easier ignition and, therefore, potentially a greater number of fires
- Drier and windier conditions, resulting in faster fire spread, greater areas burned, and increased fire suppression costs and damages
  - greater fuel availability and increased fire intensities, more prolonged mop up, increased resource requirements and more difficult fire suppression

## Other contributions to rural fire risk

**Drought:** The increased frequency and length of drought will impact on the amount of dry fuel and perfect conditions for fire ignition.

**Rainfall:** Alternately increased growthy seasons prior to drought events which creates surplus dead material on pastures which provide fuel for fires.

**Time:** A combination of factors may mean longer fire seasons in some regions.

**Fire ignition:** Increased risk of fires starting due to more dry fuel availability (drought and longer fire seasons).

**Severity:** Drier and windier conditions may therefore result in the faster spread of fires and greater areas burned.

**Fuel for fires:** Greater fuel availability may lead to greater intensity fires.

**Intensification:** Increased intensification in rural areas: more machinery and mowing, cropping, and more lifestyle blocks with trees, shelter and less intensively managed pastures.

### **The people factor:**

- Demographics – the age of residents and the number in a house, (young children and the elderly increase fire risk)
- Rural housing conditions (including staff housing and rental properties), use of open fires and naked flames
- New farmers, and others, to a region – may not understand local climate conditions and risks, poor fire practices
- Lifestyle properties – potentially less aware of rules governing fires and the associated risks
- Increased number of immigrants in rural communities – no knowledge of fire safety or fire response rules, lack of smoke alarms, different cooking practices
- Increased activity that brings a greater number of [urban] people and vehicles to an area – wine tourism, cycle trails, hunting and camping, events (adventure races)



## Adaptation and improving rural fire preparedness

### **Regionally**

Communities, local authorities and land owners require an understanding of the local issues in relation to the changing weather and fire risk. This includes factors such as local vegetation types, the risk they provide as well as how fire will behave in these fuels e.g. tussock grasslands, autumn pasture, forest pruning's, sprayed gorse blocks.

### **On the farm**

Improve understanding and be aware of the fire risk in the following areas:

- Housing
- Other buildings (workshops, hay sheds etc.)
- Other farm infrastructure such as fuel and chemical storage, pump sheds, irrigation and effluent power supply etc.

- Vehicles as a source of fire ignition – sparks, birds nest, fuel spills (motorbikes, tractors, lawnmowers etc.)
- Crop management e.g. stubble
- Controlled burn offs of crop or sprayed areas (gorse or broom)
- Forestry and scrub blocks – clear gorse and scrub weeds from forest blocks
- Shelter trees, their proximity to power lines

**Know the regulations:** fire permits, activity controls, and fire season status and fire bans – check before lighting.

**Develop appropriate infrastructure:** think about access on farm, driveways and turnarounds, water supply, visible rapid numbers.

**Developing priority zones:** these may be defensible spaces and green lawns around the house, yards etc.

**Reducing hazards:** managing fuels and high risk vegetation such as manuka and gorse, avoid mowing roadsides (or out of control pastures in dry seasons), utilizing firebreaks (harvest, hay making) and planting trees away from power lines.

**Don't burn:** change disposal practices for plastics, silage wrap or farm rubbish (see local regulations).

**Planning:** consider which farming activities increase potential fire risk e.g. harvesting cereal crops, machinery use in drought (metal-on-stone fire ignition), controlled burn off practices.

## Further information

The full technical report, *Improved estimates of the effect of climate change on NZ fire danger*, MAF Technical Paper No: 2011/13, can be downloaded from [www.climatecloud.co.nz/CloudLibrary/2011-13-improved-estimates-of-the-effect-of-climate-change-on-nz-fire-danger\[1\].pdf](http://www.climatecloud.co.nz/CloudLibrary/2011-13-improved-estimates-of-the-effect-of-climate-change-on-nz-fire-danger[1].pdf)

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