NATIONAL RURAL FIRE AUTHORITY
Te mana ahi manaha o te motu

FireSmart

Partners in Protection

Protecting Our Communities from Interface Fires

ACKNOWLEDGMENTS

The National Rural Fire Authority wishes to acknowledge the contributions of the following individuals and agencies in helping to produce this manual:

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Under the sponsorship of the National Rural Fire Officer, Murray Dudfield, and with the commitment of these agencies and individuals, we have achieved the publication of this *FireSmart: Protecting our Communities from Interface Fires* manual. The manual will be a valuable tool for helping interface communities keep safe from interface fire.

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FOREWORD

We all want to reduce the likelihood and consequence of fire and create a safer community. This is essential for our long-term prosperity. New Zealand fire services are investing in New Zealand's future by developing integrated fire management solutions that deliver pro-active fire prevention and fire mitigation programmes as well as an effective response to fire and other emergencies.

In the interface where property is built among flammable vegetation, the consequences of fire can be disastrous. Property, individual livelihoods and local economies can be heavily affected. The threat of fire in this interface area is increasing because of urban sprawl and the desire of individuals to live closer to nature.

This property/vegetation interface presents a unique set of challenges and obstacles. These challenges cannot be overcome by simply loading the issues of interface fire onto the shoulders of fire-fighting agencies. A new approach is needed. Organisations, agencies, and all members of the community must work together and share the responsibility for fire prevention and fire protection. To succeed, all stakeholders must band together to become 'partners in protection' and put in place appropriate solutions at the local level.

FireSmart: Protecting our Communities from Interface Fires will help individuals and communities recognise and reduce fire threats to existing property. This manual will also help communities lessen the consequences of vegetation fire through better planning and show communities how to work together to reduce interface fire risks.

Photo courtesy of The Marlborough Express

INTRODUCTION

Wherever residential, industrial or agricultural property is located in or next to vegetation, whether it is forest, scrubland, or in a rural setting, it may be at risk from fire. Such areas are called a property/vegetation interface, or interface for short. Fires in these areas have the potential to involve property and vegetation and are called interface fires. An interface fire can ignite from within a structure and spread to vegetation or vice versa.

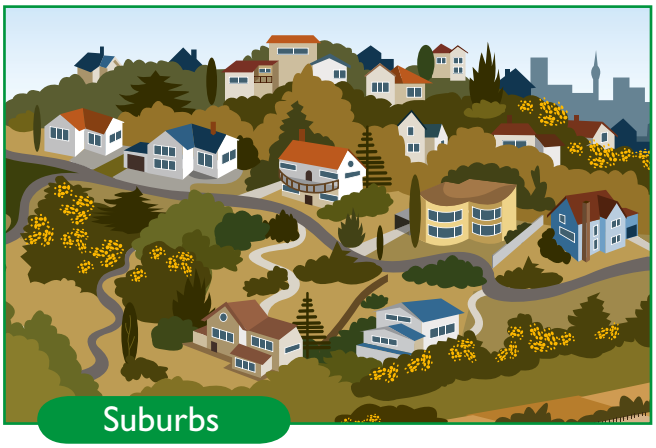
Forested or vegetative areas can be highly desirable places to live. However, the vegetation that makes them so attractive and is considered an amenity, can also make them hazardous. The prevention and control of interface fires present many and unique challenges. These challenges demand that individuals and communities develop new attitudes towards fire prevention and take responsibility for the problem.

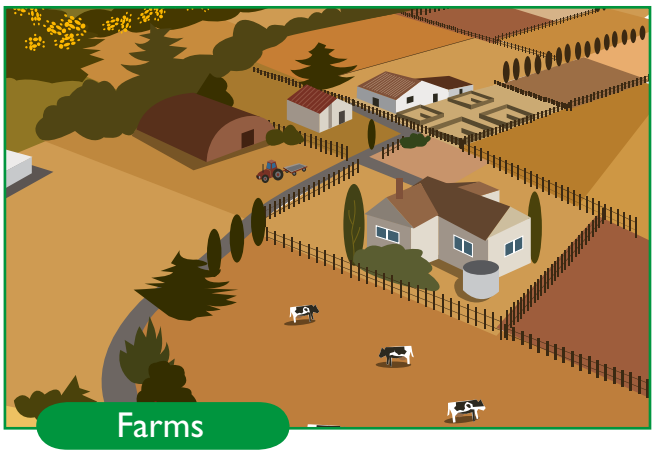
To motivate residents to create less fire-prone environments, fire managers must help them to understand the effect the fire hazard has on fire behaviour and subsequent fire intensity, and how this, in turn, affects the probability of their house or property surviving an interface wildfire.

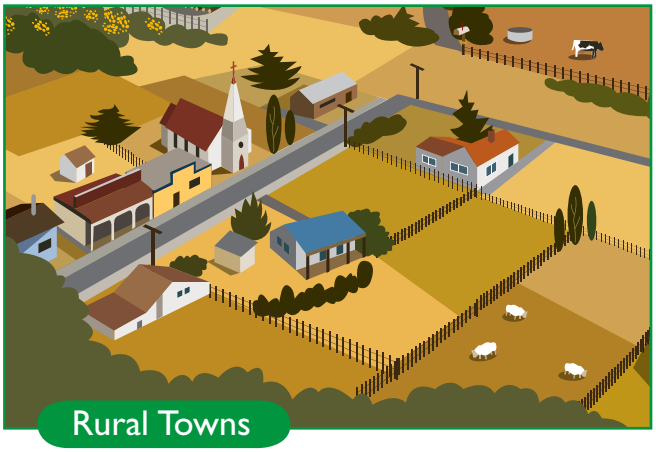
The danger of interface fires has been known for a number of years and the risk of property interface fires continues to grow for a number of reasons:

- Residents and others on the interface may not fully appreciate the hazard and any possible consequences of interface fire.
- They may have a false sense of security about fire protection and think the responsibility is that of fire-fighting agencies.
- Others may be concerned but don't know how to reduce the risk effectively.
- The number of properties in the interface area is increasing.
- Vegetation fuel loadings are increasing and the climate is warming.

To reduce the potential of interface fire loss, we must all be more aware of the potential consequences of interface fire and share the responsibility for putting in place practical solutions. *FireSmart: Protecting our Communities from Interface Fires* is a manual that gives individuals and communities the tools needed to confront the interface fire issues.







About this manual

People want to know they are safe in their own homes. Those who live in an interface area need to understand the unique fire risks that come with living in that environment. Understanding these fire risks will help communities to prepare and protect against them.

This manual tells you the four well-known strategies to do this. They are:

- Risk reduction
- Readiness
- Response
- Recovery.

Through the manual we tell you how to lessen the consequences of interface fire. The key elements for doing this are:

- Identify hazards and the elements that create a high fire risk.
- Develop priority areas for action.
- Understand the range of solutions that are possible.
- Manage vegetation and other fuels to reduce the hazard.
- Create defensible spaces.
- Protect buildings by using less fire-prone materials and designs.
- Control hazardous activities that create a fire risk.

The most effective way of preventing and controlling interface fires is for communities to work together on a plan of action. We tell you how you can develop a fire prevention plan through a five-step process that can be tailored to meet the specific needs of your community:

1. Make initial assessment.
2. Do environmental scan and identify risk.
3. Consult community and develop strategy.
4. Develop plan and get approval.
5. Put plan in place.

This process is developed throughout this manual and is fully explained in Appendix B.

We show you how everyone benefits when communities work together on fire awareness and fire prevention solutions. The benefits include:

- Increased safety for people, homes and businesses.
- Increased public awareness of fire organisations' roles.
- Cost effective fire fighting.
- Improved protection for natural resources.

This manual is your tool for preventing and controlling interface fires. It gives you the information you need to understand the interface fire issues in the initial chapters, and the practical checklists and guidelines to help you prepare and protect against interface fire in the appendices.

Who is the FireSmart manual for?

- Property owners and residents
- New Zealand Fire Service
- Rural fire authorities
- Territorial authorities and district planners
- Designers, developers and builders
- Elected officials and councillors
- Insurance industry
- Utility companies.

GLOSSARY

CIMS	Co-ordinated Incident Management System
Convection	Transfer of heat by movement of masses of hot air
Defensible space	Safety zone around homes and buildings to protect from fire which is managed or modified to reduce the effect of fire
Fire break	Natural or artificial physical barrier against the spread of fire
Fire danger	General term used to express fixed or variable factors of the fire environment that determine the ease of ignition, rate of spread, difficulty of control and fire impact
Fire detection	System for or act of discovering, locating and reporting wildfire
Fire environment	Topography, fuel and weather
Fire hazard	Potential fire behaviour based on physical fuel characteristics
Fire prevention	Activities directed at reducing fire occurrence
Fire protection	Activities designed to protect an area from fire damage
Fire risk	Probability or chance of a fire starting by the presence of activities or agents that could cause a fire
Fire services	Collective term for urban, rural, industrial or defence fire services
Firebrands	Pieces of burning material carried by the wind capable of starting a fire
Fuel	Any material, including vegetation, that can burn
Interface	Where vegetative fuels meet homes or buildings
Intermix	Where vegetation and development intermingle with no clearly defined boundary
Radiation	Transfer of heat in straight lines
RMA	Resource Management Act 1991
Rural addressing	Rural addressing and numbering system
TA	Territorial Authority
Topography	Slope, aspect and land features

CONTENTS

Photo courtesy of The Marlborough Express

1 INTERFACE FIRE ISSUES

This chapter tells you about fire risk in the interface and what is at stake for communities. It also looks at who is responsible for resolving the issues.

Community impacts

Property/vegetation interface fires can do tremendous damage, result in economic losses, and have significant social impacts. Even the best case scenario involves fire-fighting costs, the loss of adjacent vegetation cover, and some level of inconvenience. The worst case scenario may involve the loss of life and property, and community evacuation.

Fire behaviour

Fire environment elements

Fire behaviour is the way fire ignites and spreads. Fire behaviour is controlled by the three elements of the fire environment: fuel, weather and topography. Of these factors fuel is the only one that can be managed.

Fuel

Several characteristics of fuel (or vegetation) contribute to fire ignition and spread. Fuel moisture content is the most important of these. Drier fuels ignite more easily and burn more intensely. The size, arrangement, continuity, and the overall amount of fuel also affect fire behaviour.

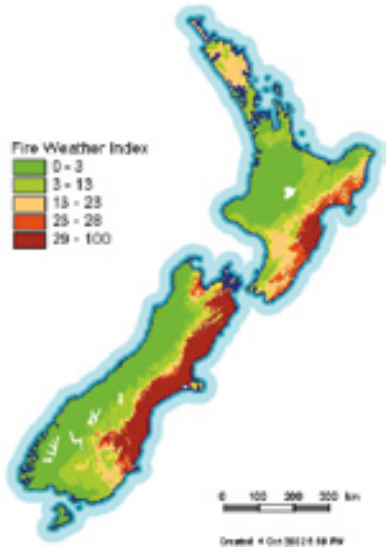
We classify fire according to the fuels it is burning in – ground, surface and crown.

Weather

Weather elements such as wind, rain, relative humidity, and temperature can cause fire to spread quickly and burn intensely. Weather cannot be regulated. However, fire protection authorities can monitor weather conditions and be more aware of the changing fire danger. They can bring into action prevention measures and increase the levels of preparedness.

Topography

Topography refers to 'the lay of the land'. The steepness of the slope, the direction it is facing (its aspect), and terrain features such as gullies or chimneys influence how the fire spreads. Topography also affects fire spread by channelling wind. Although we cannot modify topography very much, we can minimise its effect by good planning and placing buildings carefully.



How fires start

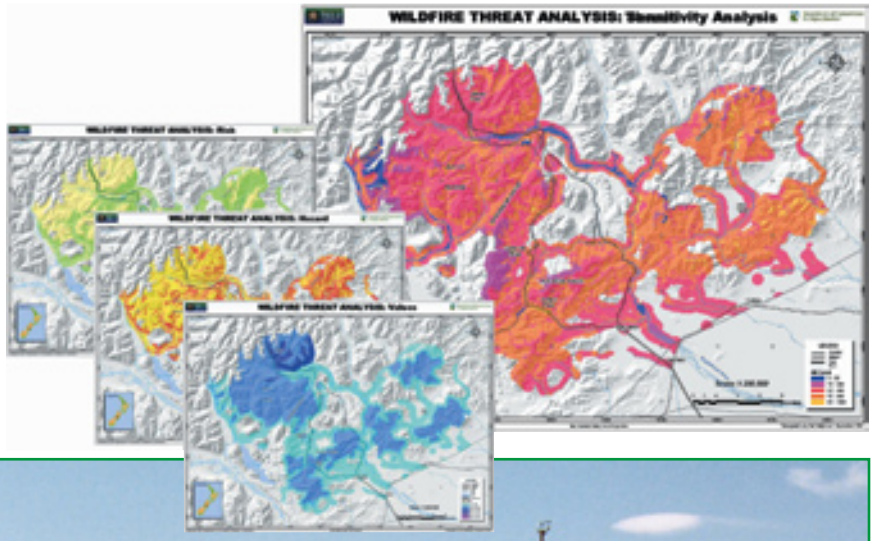
How fires start is important. In New Zealand, fires are started mainly through some human activity – carelessness, recreation, industrial activity, power lines, burning activities and deliberate actions. These are all potential ignition causes. Even though lightning can cause fires, it doesn't happen often in New Zealand.

Interface fire challenges

The New Zealand landscape is varied with some interface areas being high risk during the summer and others having little potential for interface fire. The New Zealand wildfire threat analysis model helps rural fire organisations to identify potential high-risk interface areas. Each location may have its own set of unique challenges that individuals, communities and fire organisations need to recognise. Interface areas may occur in grassland, scrubland or forested areas.

Fire behavioural specialists

Rural fire behavioural specialists can calculate fire spread, fire intensity, perimeter growth and suppression difficulty for a given set of fire environment conditions. Rural fire authorities monitor the weather throughout the year to determine the fire danger and set the 'fire season status' for their district (ie open, restricted or prohibited).



Fire suppression challenges

How structures ignite

The ignition of structures from vegetation fires can occur in two ways. First, vegetation fires produce firebrands that are lofted into the air and can travel some distance (aerial transfer) starting spot fires ahead. Second, direct flame contact or radiant heat can ignite vulnerable structures.

Challenges to firefighters

Interface fires are complex incidents that may involve both property and vegetation. They demand a response from both urban and rural fire-fighting agencies with specialised operational procedures, equipment and strategies.

Often putting out vegetation fires is sacrificed at the expense of protecting property. Even with the total fire-fighting focus being on protecting property, unless interface stakeholders have applied FireSmart principles and standards the fires may overwhelm the fire-fighting resources in extreme conditions and properties will be lost.

Who is responsible?

Solutions to the interface fire protection challenges facing New Zealanders are beyond the mandate or capabilities of any one agency or group. Ownership of the interface fire issues rests with the interface community members. We are all responsible. The key to resolving the problem is working together.

Communities working together

For the successful control of property/vegetation interface fires, people must work with emergency response agencies to manage fuels, make buildings fire resistant and develop the appropriate infrastructure and planning.

Officials are responsible for land-use policies. Municipal planners and developers are responsible for designing and developing plans.

Home owners and residents are responsible for providing defensible spaces around their properties and introducing FireSmart strategies.

Rural fire management agencies are responsible for fire control in areas of vegetation: the prevention, detection, control, restriction, suppression, and extinction of fire.

Legal responsibilities

These fall under a number of Government Acts:

- Forest and Rural Fires Act 1977
- Fire Service Act 1975
- Resource Management Act 1991
- Health and Safety in Employment Act 1992
- Civil Defence Emergency Management Act 2002
- Local Government Act 2002.

Appendix A describes the legal responsibilities of fire authorities and others with a duty of care.

Officials	Homeowners
• provide safe land-use policies • design and develop plans • build fire-safe buildings • assess weather conditions • regulate fire-risk activity	• provide defensible spaces around homes • make homes fire-safe • do not cause fires • reduce hazards • develop an appropriate infrastructure, eg driveways, water supply, domestic home sprinkler systems
Fire services	**Media/schools**
• provide rapid responses to fires • promote and carry out fire control measures • provide information and fire-safety education • monitor fire danger and the fire environment	• inform the public

Hazard assessment, fire awareness, and preparedness are responsibilities shared by all.

CASE STUDY

In New Zealand, a number of interface fires have threatened communities and ultimately put lives at risk. Experts consider it only a matter of time before we have a fatality from an interface fire.

22 February 1989, Point Howard, Gracefield, Lower Hutt

During extended dry periods, native bush sometimes does burn as was experienced at Point Howard in 1989.

At 4.20pm on Wednesday 22 February 1989, fire service crews responded to a fire that had started in vegetation at the bottom of a steep bush-clad cliff. Towards the top of the slope there were many homes that had been built in the middle of the mature native bush growing on the cliff face. The houses were directly above the developing fire.

When they arrived, the fire service crews found the properties located on the cliff face were already well alight, and the main fire front was endangering several more structures. A decision was made to abandon the houses on fire and to concentrate all resources on preventing more buildings from being involved. The fire spread across the access road below those first-arriving fire crews, effectively isolating them. Visibility was less than 3 meters in places, creating a dangerous situation.

Police were directed to evacuate all non-emergency personnel from the endangered area. Over 100 residences were searched and the affected people relocated to a safe place.

A hose/pump relay from the sea, up steep and windy smoke-logged roads to the fire, had to be set up because of the limited reticulated water supply. Six large pumping appliances were used with crews running out some 2 kilometres of hose.

It took 4 hours of determined effort by fire crews from both the New Zealand Fire Service and rural agencies to bring the fire under control.

Two houses were totally destroyed and many more damaged. Building homes in native bush is not always as safe as many people think.

The cause of the fire was suspicious but unknown.

2 REDUCING RISK

This chapter tells you how to reduce the risk of interface fire in building structures and in vegetation, as well as other factors that can create hazards.

Hazard assessment system

It is best to do a hazard assessment before development, during the design and planning stages, so property owners are aware of the inherent dangers in a selected site or in the building plans.

However, assessing interface fire risks on existing communities is just as important. This can be done by fire officials or by the residents themselves.

Photo courtesy of Greg Wilson. www.gregwilson.co.nz

See Appendix D for a FireSmart fire hazards and risks assessment checklist for work you can do to minimise the consequences of interface fire.

Structure hazards

The building materials, design and location, and the fuels in the area all contribute to whether a structure will survive an interface fire.

Structure location

When choosing a site, consider the topography, surrounding vegetation, potential for a safety zone, aspect, and exposure to wind and turbulence.

If you are building a new home, you need to choose a FireSmart location on your property. In a fire-prone environment, build away from ridge tops, valleys, and areas between high points on a ridge.

If you have moved into an existing home, making FireSmart alterations and adopting other FireSmart principles can help you protect your home from interface fire.

Building materials and design

By considering the following structural hazards, you can build a new structure with a greater chance of it surviving an interface fire and owners of existing structures can reduce their fire risks.

Roof

The roof is a vulnerable part of a building and susceptible to ignition by firebrands. Roofs that catch fire can lead to building losses. Once a flammable roof ignites, fire usually moves quickly to the rest of the structure.

Building codes have long recognised the role of roofing in the spread of fires.

Recommended guidelines for roofing

- Remove branches overhanging your roof.
- Remove any branches within 3 metres of your chimney.
- Clean all dead leaves and needles from your roof and gutters.
- Consider installing spark-arrestor mesh in chimneys.

Walls

The intense heat of interface fires along with sparks and embers threaten the walls of a building or a home. Walls are susceptible to ignition from radiation, convection and firebrands.

Fire-resistant walls will make a difference to whether a building survives. Residents of wood-sided buildings can increase their fire-resistance by getting rid of areas on the surface where sparks and embers can lodge.

Recommended guidelines for walls

- Use fire-resistant materials for walls, such as stucco, metal siding, brick, cement shingles, concrete block, poured concrete and rock.
- Maintain wood-clad walls by stopping them from cracking or drying out. Dry, cracked walls can ignite if firebrands lodge in them. Material should be at least 12mm thick and extend from ground level to the roof line.

Windows

Single plate glass offers less fire protection and can break with the rapid changes in temperature. Once the window collapses, it leaves an opening for flames or firebrands to get inside your house, reducing the probability it can be saved.

Double-glazed windows not only offer protection from fires but also provide greater insulation for homes in winter.

Recommended guidelines for windows

- Clear thick vegetation within 10 metres of windows.
- Consider double-glazing in windows that face large areas of vegetation.
- Limit the size and number of windows in your home that face large areas of vegetation.
- Consider solid shutters made of non-flammable material to provide increased fire protection.

Eaves, vents and openings

Eaves and overhanging features like room push-outs, bay windows and extensions over slopes, are very vulnerable to convective exposures and have a design that can sustain ignition. Vents should be screened to prevent firebrands entering.

Eaves and vents are ready-made openings that can let heat and embers into a building, and start a fire from inside.

Recommended guidelines for eaves, vents, and openings

- Cover the outside attic and under-floor vents with corrosion-resistant, 3mm wire mesh.
- If possible, cover eaves, attic and under-floor openings with solid, non-flammable, protective shutters.
- Have inside access to attics and crawlspaces to put out spot fires that may occur.

Attachments

Attachments include any structure connected to the residence, such as decks, porches and fences.

Outdoor living areas are important to the interface lifestyle. Although decks and balconies can be fire hazards, there are ways to reduce the risk.

Recommended guidelines for balconies, decks and porches

- Build balconies and deck surfaces with non-combustible materials.
- Enclose eaves, balconies, and undersides of overhangs with 12mm non-flammable sheathing.
- Build stilts from non-combustible material – heavy timbers are best.
- Remove debris such as needles from below slotted decks.
- Build features, such as fences, with less flammable materials.
- Don't attach the fence to your home, or consider adding a stone or concrete pillar at the end closest to the house.
- Try a non-flammable metal trellis.
- Consider terraces in lieu of elevated decks.

See Appendix E for the FireSmart construction checklist.

Inside the house

You can lessen the interface fire risk of a structure by following FireSmart principles inside your home.

Recommended guidelines for fire safety inside the house

- If your property is in a rural location, install an internal domestic home sprinkler system to protect you from an internal fire threat.
- Install multipurpose dry powder extinguishers in the house and outbuildings.
- Install smoke alarms and make sure they are active.
- Establish escape plans and practise using them.

Vegetation hazards

The type and amount of vegetation surrounding a structure plays an important role in determining the interface hazard. Properly-managed vegetation not only protects homes and buildings from vegetation fires, but also reduces the chance of house or building fires spreading to the neighbouring countryside. The vegetation or fuels surrounding your property are potential fire hazards if not managed properly.

This section will give you three strategies for managing the vegetation around your home and property to create a defensible space to make sure you live in a safety zone. These are:

- Fuel removal
- Fuel reduction
- Fuel conversion.

Note: *In this section, the words 'vegetation' and 'fuel' have the same meaning.*

Photo courtesy of Rachael Thorp, Wellington City Council.

Establishing priority zones

When planning your fuel management activities, you need to consider one or more of three priority zones. Each of these zones has their unique vegetation management requirements.

Priority Zone 1

The goal of vegetation management here is to create a defensible space or safety zone where you get rid of flammable vegetation or convert it to less flammable species.

Recommended guidelines for Priority Zone 1

- Establish lawns, paths, drives and cultivated soil between buildings and flammable vegetation.
- Saw or prune all dead or cured (dried up) branches, twigs and leaves from existing vegetation, and remove.
- Compost, mulch or remove any section or yard waste materials.

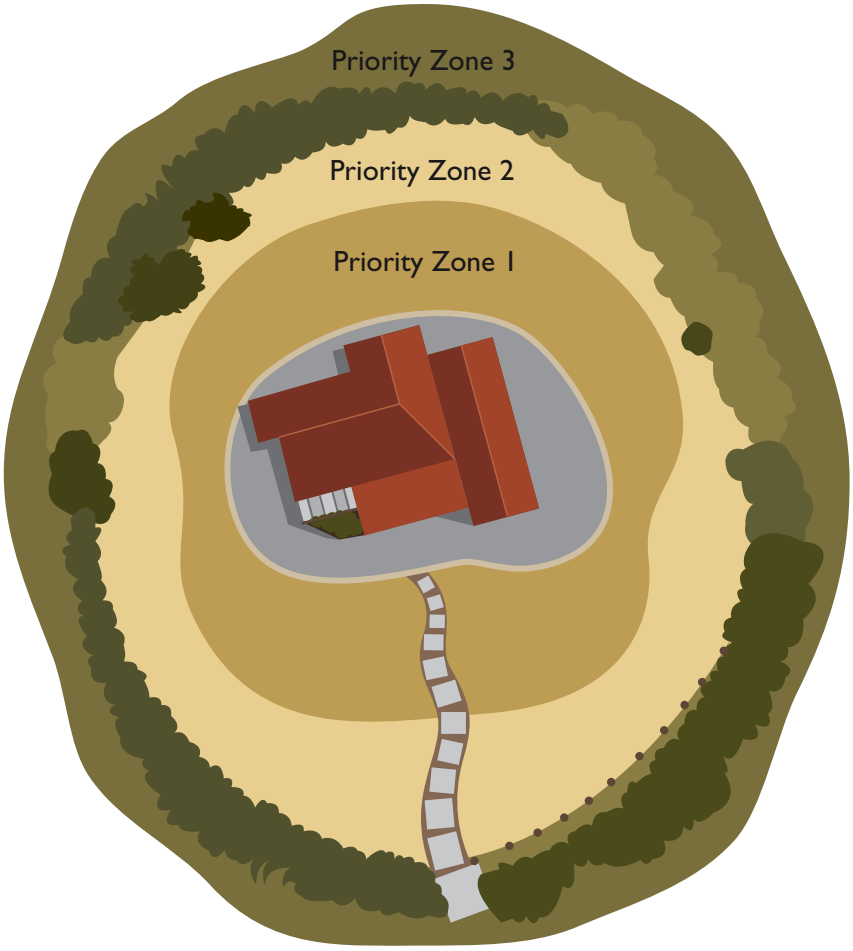
- Convert remaining vegetation to less fire-prone species. For example, plant hardwoods such as mahoe, five finger and karaka, along the edge of gorse. See Appendix C for the flammability classes of our native species.
- Thin and prune vegetation away from the immediate area of your home. Where the slope and aspect increase the hazard to your home, provide greenbelts, artificial barriers or fire breaks. When properly chosen and placed, they can shield your home from strong winds, radiant heat and flying embers. If your home is at the top of a slope, you will need a defensible space of up to 30 metres.
- Store firewood, building material or other combustible debris piles away from your home. During the fire season they should be at least 10 metres away.

Priority Zones 2 and 3

These zones should be environments that will not support high-intensity crown fires.

Recommended guidelines for Priority Zones 2 and 3

- Thin the forest canopy by removing whole trees so that those remaining are widely spaced and the crowns don't touch.
- Remove over-mature, dead or dying trees.
- Thin the understory trees to reduce the chances of surface fires climbing into the canopy.
- Prune all large trees. Remove all branches at least 2 metres from the ground.
- Remove trees and overhanging limbs that are close to power lines.
- Get rid of slash from the pruning promptly to avoid the build-up of a fire hazard.
- If the removal of trees and scrubs is restricted by council bylaws or a bush setting is preferred, replace highly flammable fuels with plantings of less flammable species. See Appendix C for the flammability classes of our native species.



High risk vegetation

In many parts of New Zealand, there are a number of types of vegetation that are very flammable. These include:

- Gorse
- Tussock
- Rank grass
- Bracken
- Tauhinu
- Manuka
- Young pines, especially those with gorse and slash
- Dry coastal vegetation, including mingimingi, spinefex and marram grass.

Solutions

You can reduce the high hazard imposed by the above vegetation types if you:

- Inter-plant selected native trees in scrub to reduce the fire hazard and speed up natural succession.
- Clear the vegetation by mowing or spraying, to reduce the fuel loading. Remember to remove the dead material, especially in the dry part of the year from September to April.
- Use controlled grazing to reduce fuel loadings.
- In gorse, don't burn to reduce the fuel as it hastens rather than prevents the gorse invasion and inhibits the growth of less flammable vegetation.

See Appendix F for the FireSmart landscaping checklist.

Community infrastructure

A network of roadways, open spaces, water supply and utilities make up the infrastructure of an interface community. Infrastructure problems within the interface community are potentially hazardous for both residents and firefighters.

Having a FireSmart infrastructure increases resident and firefighter safety and helps to prevent costly losses. Having signposted roads and water supplies, as well as a rural addressing and numbering system to the standard AS/NZ 4819, helps emergency services find your property.

Access routes

During an interface fire, roads:

- provide access to fire services and others to fight fires, and simultaneously
- provide escape routes for residents during a fire
- serve as fire breaks and help fire-fighting efforts in the interface.

Narrow driveways or dead-end roads without cul-de-sac turnarounds are a particular problem for fire trucks that need to turn around.

Wherever possible, access routes should also act as perimeter fire breaks. All roadsides are high risk for ignition during an interface fire. It is a good idea to plant roadsides with low flammable vegetation.

Street signs and house numbers that are hard to see in dark or smoky conditions can delay firefighters getting access.

See Appendix G for recommended guidelines for roadways.

Water

Make sure you have an adequate and accessible water supply from either reticulated or static sources, eg tanks, swimming pools, ponds etc.

See Appendix G for recommended guidelines for water supply.

Slope

Homes or structures on a slope need to treat vegetation at an increased distance from the structure as the steepness of the slope increases.

Fire danger

Fire seasons are determined by the rural fire authority. Fire restrictions are guided by the fire danger determined from the New Zealand fire weather index, and by the hazards in a particular locality.

One of three fire seasons operates at any time:

OPEN FIRE SEASON
– means you don't need a fire permit to light a fire in the open air.

RESTRICTED FIRE SEASON
– means you need a fire permit from the relevant rural fire authority to light a fire in the open air.

PROHIBITED FIRE SEASON
– means there is a total fire ban and you are not allowed to light fires in the open air.

Fire occurrence

History can provide a valuable dimension for assessments. There is an increase in the probability of a fire occurring in environments where they have occurred in the past. Knowing the severity and frequency of fires helps the authorities to determine when and what resources will be required if another fire occurs, and where to target community mitigation efforts.

Knowing your environment

As well, you will need to consider these elements in your local situation:

Fire suppression	Access/egress (exit), bridges, building construction, density and spacing, fire prevention plan, resources, response time, utilities, water supply.
Slope	Aspect, dangerous terrain, position on slope, degrees of slope.
Fuel	Building construction, defensible space, fuel breaks, fuel continuity, fuel loading, fuel type.
Weather	Drought factor/index, historic climatic data, national fire danger rating system.
Environmental	Endangered species, endangered plants, environmental impact, visual impact.

CASE STUDY

In New Zealand, a number of interface fires have threatened communities and ultimately put lives at risk. Experts consider it only a matter of time before we have a fatality from an interface fire.

28 February 1999, Central Otago (Alexandra)

Safety zones save houses in the path of major fires.

A number of fires occurred on the afternoon of Sunday 28 February 1999 within a 16-kilometre radius of Alexandra in Central Otago. Two of the fires became major incidents. One was adjacent to Alexandra at 'Springvale', and the other was at 'Fruitlands' between Roxburgh and Alexandra. The fires occurred after 1.00pm in the afternoon when forecast gale force winds arrived. Firefighters were hampered by extreme fire behaviour including rapid spread rates.

The region had been suffering a prolonged drought. The drought code (using the New Zealand fire weather index system) was over 1000 at the time of the fires. Other factors affecting fire behaviour were low relative humidity (below 30 percent) and extremely strong north-westerly winds, over 75 kilometres per hour on occasions. Grass and other fine fuels were tinder dry and100 percent cured.

The two main fires resulted in 8200 hectares being burnt (2600 hectares at Springvale and 5600 hectares at Fruitlands). The fire perimeter for both fires was approximately 71 kilometres (31 kilometres for Springvale and 40 kilometres for Fruitlands).

Two houses were destroyed along with a significant number of implement sheds, outbuildings, fences and infrastructure.

Assistance came from many regions in the South Island, from Canterbury through to Southland. An incident management team was put in place and managed the incidents under the Co-ordinated Incident Management System (CIMS).

The multi-agency response included:

- Over 25 New Zealand Fire Service appliances
- Numerous rural fire authority tankers and appliances
- Four defence Hino 4 x 4 appliances
- Ten helicopters
- Three Cresco fixed-wing water bombers (2000 litre capacity)
- Approximately 200 firefighters, made up of rural fire authority staff and volunteers, defence firefighters and foot soldiers, New Zealand Fire Service volunteer and permanent firefighters and local volunteers including support agencies.

The fires were brought under control after 15 hours of fire-fighting activity but only a weather change, which included a shower of rain, helped stop the fire. The sheer size of the perimeter of the Alexandra fires meant the job of mopping up and extinguishing was an enormous, long drawn out and tedious process. The cost of suppressing these fires was over $900,000.

The probable cause of three of the fires was trees or tree limbs being blown into power lines causing them to part and short on the ground. Properties in the path of the fire that survived had sufficient safety zones around their houses to stop them catching fire.

3 READINESS

This chapter identifies the actions different groups need to take to be ready to deal with an interface fire.

Being ready for an emergency

In readiness for an interface fire emergency, fire authorities and the community have to know what to do and how their actions help themselves and the community as a whole.

Many communities may not have a clear understanding of the consequences and impact of fire. Involving the community shares the responsibility for managing the fire risk and being ready for an emergency.

Who does what?

Firefighters' role

- Prepare for an interface fire emergency, through training and drills.
- Identify areas of low and high fire hazard.
- Monitor the fire danger and set the fire season status.
- Operate to the Co-ordinated Incident Management System (CIMS).
- Identify vulnerable communities (eg homes for the elderly).
- Identify safe and unsafe access roads.
- Develop and practise local fire emergency plans.

Elected officials' role

- Provide public awareness and preparedness programmes.
- Identify natural hazards and plan to reduce their effect.
- Identify vulnerable communities.
- Identify welfare facilities and services, and transport resources.
- Develop local fire emergency plans.
- Arrange for effective public warning systems and communications.

Media role

- Help risk reduction and readiness efforts through stories, bulletins and announcements.
- Keep communities regularly informed about the weather, fire danger and fire season status.

Other emergency services' role

- Operate to the CIMS.
- Identify joint strategies and provide for community welfare.
- Identify vulnerable communities.
- Develop local fire emergency plans.
- Identify safe and unsafe access roads.

Homeowners' role

- Establish and maintain a FireSmart property.
- Understand the role of emergency services.
- Develop local fire emergency plans.
- Understand fire hazards, fire danger information and fire season status.
- Predetermine whether to stay or to go in an interface fire emergency.

Photo courtesy of The Marlborough Express

CASE STUDY

In New Zealand, a number of interface fires have threatened communities and ultimately put lives at risk. Experts consider it only a matter of time before we have a fatality from an interface fire.

26–28 December 2000, Wither Hills, South Blenheim

This is an example of a fire that started as a small grass fire on the edge of a country road, and exploded in just a few hours into a major vegetation and interface fire that destroyed buildings, property and livestock. It took 3 days to suppress the fire, but most of the destruction happened in the first 10 hours of the fire. By the time the fire was brought under control:

- Several buildings were either completely destroyed or badly damaged
- 6159 hectares of land were burned
- Several thousand head of livestock were killed
- A large number of homes were evacuated
- Lives were at risk
- Several vineyards were destroyed.

When the fire was first spotted, a local drove to the scene in a loader. He found a small fire slowly burning through grass. The flames were 30 to 60cm high, and the fire had spread about 9 to 12 metres. Just then the first fire engine arrived.

In the time it took to cut the fence to get access to the paddock, the wind got hold of the fire and pushed it out 150 metres. For the next few hours the fire spread at a speed of 3 to 8 kilometres per hour. When it was stopped, the fire had travelled more than 16 kilometres, was up to 5 kilometres wide and had a perimeter of approximately 60 kilometres.

Extreme drought conditions made the fire impossible to control, and the fire burnt right up to the town interface of Blenheim.

The cause of the fire was never established.

4 RESPONSE AND RECOVERY

This chapter looks at response strategies, emergency services response protocols and what residents need to do before, during and after an interface fire emergency; and recovery strategies to help restore communities and environments to prefire conditions.

Again, a number of groups need to work together if emergency measures are to be effective.

Response strategy

Emergency services

- Put in place local fire emergency plans.
- Rural and urban fire services to adapt their standard procedures to the new interface fire challenge.
- Evacuate residents, where necessary.
- Prioritise which buildings to save.
- Follow the CIMS procedures.
- Communicate fire incident status through the media and immediate community.
- Investigate fire cause.

Homeowners

- Report the fire to the Fire Service by dialling 111.
- Put in place local fire emergency plans.
- Decide to stay or to go.
- If evacuating leave early.
- Contact family.
- Prepare for the fire, if staying.
- If staying, do checks immediately after the fire has passed.

Elected officials

- Put in place local fire emergency plans.
- Provide overall leadership and continuity of governance.
- Communicate the welfare situations through the media.
- Activate the warning system.

Media

- Report the news.
- Help response efforts by telling the public what's happening and the current risk.

Emergency services response protocols

CIMS

When faced with an interface fire incident, whether big or small, emergency services use the Co-ordinated Incident Management System (CIMS). This helps make the response efficient and effective. If properly implemented, CIMS saves time and money, limits damage to property and, most importantly, can help to save lives.

The CIMS helps different agencies in an emergency work together towards a common goal.

CIMS principles

The CIMS operates under the following principles:

- Common terminology – terminology is standard and consistent among all agencies involved.
- Modular organisation – develops from the top-down where the control function is established by the first arriving officer.
- Integrated communications – a common communications plan, standard operating procedures, clear text, common frequencies, and common terminology.
- Consolidated incident action plans – describe response goals, operational objectives, and support activities.
- Manageable span of control – defined as the number of individuals or functions one person can manage effectively.
- Designated incident facilities – with clearly defined functions.
- Comprehensive resource management – a means of organising the total resource across all organisations attending an incident.

CIMS organisational structure

Because fires require a response from a number of agencies, the CIMS system provides a formal management structure that lends consistency, fosters efficiency, and provides direction so effective use is made of all available resources.

It is important each agency understands the strategy involved beforehand so it will be prepared to work with organised independence.

The CIMS organisational structure is built around four major components:

- CONTROL – the management of the incident.
- PLANNING/INTELLIGENCE – the collection and analysis of incident information and the planning of response activities.
- OPERATIONS – the direction of an agency's resources to fight the fire.
- LOGISTICS – the provision of the facilities, services and materials needed to fight the fire.

Fire emergency plans

Emergency management agencies and local governments, in consultation with the community, should actively seek to develop and put in place local fire emergency plans and strategies for all those areas with a high wildfire threat.

Such local fire emergency plans should:

- Identify areas of low and high fire hazard.
- Identify vulnerable communities (eg homes for the aged and infirm).
- Identify fire refuges, and safe and unsafe access roads.
- Identify welfare facilities and services, and transport resources.
- Have public awareness and preparedness programmes.
- Arrange for effective public warning systems and communications.
- Co-ordinate training exercises to test arrangements.

The local fire emergency plans should include strategies that encourage home owners, landlords and managers to prepare their properties beforehand.

They should also promote the natural desire of most people to protect their own property and to make their own decisions during emergencies. The focus of these local arrangements should be to:

- Provide adequate information to residents so they can understand the risks and consequences of staying in or leaving their homes in the event of a wildfire.
- Help those who want to leave.

- Encourage people to decide early whether they want to stay or to go to avoid last minute, panic-stricken attempts to flee.
- Develop and put in place strategies to manage 'fleeing at the last minute'.
- Provide suitable support and welfare services during and after evacuation.
- Develop and foster an effective and reliable information flow between the emergency agencies and people in the community.
- Develop and put in place strategies that support the safe return of able-bodied residents to their homes as soon as possible after the main fire has passed.

To stay or to go?

Fire services, local government, communities and individuals are jointly responsible for reducing the loss of property and, potentially, of life to wildfires. Losses can be reduced by preventing fire, limiting its spread, making preparations to protect property and responding effectively during a fire. Fire services cannot guarantee the presence of a fire-fighting vehicle and crew to protect every residence during major or multiple wildfires.

In Australia, fire authorities no longer advocate large-scale evacuations of people from areas threatened by bushfires. The modern practice, in most places, has been to evacuate people from sources of danger such as bushfires or wildfires. With some natural hazards, eg floods and cyclones, there can be a sufficient warning time to allow people to safely leave the area, but bushfires or wildfires can occur without warning and can move rapidly. Research into Australian bushfire fatalities shows that last-minute evacuations from bushfires contributed to the majority of deaths. Late evacuation is inherently dangerous and can cause greater risks than if people remain in the fire area.

Houses protect people and people protect houses. Research done during major bushfires in Australia shows that most buildings lost during bushfiress are lost as a result of the initial small fire started by sparks and embers. A building will generally survive the initial passage of a fire front if the property has been adequately prepared. People who are well prepared and take shelter in their homes have a high chance of surviving a bushfire. Also, houses will survive if people stay to put out any small fires that start in and around them.

Creating a safety zone or defensible space around houses and other buildings is the most important fire protection measure influencing the safety of people and their property. It provides a relatively safe area for firefighters and residents to control spark and ember-caused fires on or around a building.

Communities potentially at risk from wildfire should be allowed and encouraged to take responsibility for their own safety. Where adequate fire-protection measures have been put in place, able-bodied people should be encouraged to stay. Where there is adequate warning of a wildfire, people such as the very young, the old and infirm, those who feel they could not cope with the trauma of fire, and those who have not yet taken sufficient measures to protect their homes, should leave.

See Appendix I for guidelines for emergency services to evacuate or not.

Homeowners deciding to stay or to go

Your decision to stay or to go during a wildfire should only be made after you have carefully considered all the factors and the information available at the time.

Making the decision will be a difficult one if your home is threatened by interface fire. You need to think about it ahead of time and it will depend on local conditions at the time of the fire.

Consider the following:

- Are you physically and mentally able to defend your home?
- Do you have vulnerable people that need to leave?
- Are you prepared to stay with the house after the fire has passed?
- What are the fire hazards on your site or property?
- What is the state of your fire prevention work?
- Do you have an alternative water supply?
- Do you have basic fire-fighting equipment?
- Do you have suitable protective clothing?
- Do you have a means of receiving information, eg cellphone or battery-powered radio?
- Do you have a plan of action?

Homeowners planning to leave

If you decide not to stay and defend your home, you need to plan to leave as carefully as you would plan to stay. Consider the following:

- Where will you go?
- When will you leave?
- Will you have time to leave?
- How will you travel?
- What will you take with you?
- What if family members are separated?

Information and warnings

During the course of a wildfire, everyone in threatened communities must have ready access to accurate information to help them make their decisions. It is essential the Incident Controller provides timely advice to and consults closely with the police and other support agencies. The fire services have access to the necessary information and expertise to determine the level of wildfire threat and should be responsible for providing advice to residents who are likely to be threatened by wildfire.

See Appendix J for guidelines for homeowners threatened by fire.

Recovery strategy

Emergency services

- Recommission equipment and resources.
- Determine the cause, path and origin of the fire.
- Recover costs or prosecute persons responsible for causing the fire, where appropriate.
- Review operations and debrief and counsel staff, where required.
- Debrief the community, when appropriate.
- Undertake or recommend rehabilitation, when necessary.

Homeowners

- Replant or rebuild areas affected by fire.
- Review FireSmart strategy.
- Make insurance claims, where appropriate.
- Review community plans.

Elected officials

- Provide welfare assistance to the community.
- Conduct debrief of incident.
- Review emergency plans, facilities and systems.
- Review the economic impact of the fire.
- Help with temporary housing.
- Help, counsel, support and rehabilitate the community.
- Review financial considerations, eg rates deferrals.

Media

- Report the news.
- Help recovery efforts by telling the public any information from officials.

CASE STUDY

In New Zealand, a number of interface fires have threatened communities and ultimately put lives at risk. Experts consider it only a matter of time before we have a fatality from an interface fire.

14–15 December 2003, Adams Road, West Melton, Canterbury

Even if you live on the back door of a major city with a large fire response resource, it takes time to respond, travel and effect successful fire containment.

West Melton is a lifestyle area only 15 kilometres from Christchurch. Holdings are typically small with a variety of land uses including commercial flower growing, poultry farms, orchards, vineyards, and forests and livestock hobby farms.

Canterbury had experienced a particularly dry December with weather conditions on the day of the fire typical of a windy summer day. The winds were from the west and strong (44 gusting to 91 kilometres per hour), temperatures were 30 degrees Celsius and relative humidity was 14 percent.

At 11.05am on Sunday 14 December 2003, the fire was reported to emergency services. The first New Zealand Fire Service crew was on site in 19 minutes by which time the fire had taken hold and was quickly spreading through this lifestyle area, as seen by its spectacular smoke plume. A multi-agency response was initiated with urban, rural and defence fire crews quickly activated along with three helicopters At the height of the incident, 120 fire agency personnel were involved. An incident management team was called in to manage the fire and police set up cordons and evacuated property owners who lived in the path of the fire. Some 300 people were evacuated with 30 remaining away from their homes overnight.

The fire was contained to area of 130 hectares but the fire suppression effort was large, costing around $160,000. The fire created a major disruption but fortunately, it being a Sunday morning, locals were home and able to move stock away from the fire front. The fire destroyed:

- One house and a number of sheds and outbuildings
- Pasture, woodlots, vineyards, orchards and shelterbelts.

One dog died in the fire but no residents or firefighters were injured.

The cause of the fire has been established as an escape from a rubbish fire of bark and dead plant material lit by one of the lifestyle property owners several weeks before the escape. The owner did not appreciate how long his rubbish fire could burn and the potential consequences to himself and others of undertaking such an activity at this time of the year.

Photo courtesy of Neil Price, Wellington City Council

5 COMMUNICATIONS

This chapter looks at communicating effectively with the whole community to minimise the interface fire risk. A number of groups need to work together if emergency measures are to be effective.

Introduction

Effective public education is the key to preventing or minimising fire risk in the rural/urban interface. Political leaders, community planners, fire services personnel and people in the public and private sectors need to work together. But to do that, they need the knowledge to make informed decisions.

Each group within the community has much to gain from understanding, more fully, the problems associated with interface fires. They will be more motivated to becoming a part of the solution. Effective public awareness and preparedness messages to specific groups are laid out in this chapter for fire and local government agencies.

Effective communications

There are a few basic principles of effective communications that will dramatically increase your ability to reach your audience. They are:

- Begin with clear, explicit objectives.
- Don't make assumptions about what people know, think or want done. Take time to find out what people are thinking by using surveys, focus groups, or other research.
- Involve all parties that have an interest in the issue.
- Identify and address the particular interests of different groups.
- Identify with your audience. Put yourself in their place and recognise their emotions.
- Take time to co-ordinate with other organisations or groups.
- Choose your spokesperson carefully and ensure they have the training to communicate your message effectively.
- Practise and test your messages.
- Don't either minimise or exaggerate the level of risk.
- Promise only what you can do. Do what you promise.
- Plan carefully and evaluate your efforts.

Photo courtesy of Neil Price, Wellington City Council

Elements of a communications plan

Target audiences	Who are you trying to reach? (Be as specific as possible.)
Purpose statement	What are you trying to achieve?
Desired outcome	What results are you looking for? How will people's attitudes or expectations have changed when the communications programme is complete?
Current attitudes	What do you already know about current attitudes through research, public consultation, or benchmark surveys? What information can you use as a starting point for measuring the change in attitudes or expectations?
Strategy	What is your approach to the issue?
Strategic considerations	What potential pitfalls or other factors could pull you off track?
Messages	What are you going to say to your target audience?
Spokesperson	Who will deliver your important message?
Timing	When do you want it to happen? Where do you want it to happen?
Tools	Which communications tools are you going to use (media relations, print materials, audio-visual presentations, advertising, special events, internal communications, speeches, one-on-one visits etc)?
Cost	How much will it cost?
Evaluation	How are you going to evaluate whether the awareness programme is effective?

The target audience

Interface fire issues are ongoing and involve a variety of audiences. The following audiences have a role in interface fire issues:

- Urban and rural fire personnel
- Home and property owners and school-age children
- Elected officials
- Developers, building contractors, building material manufacturers, and retailers
- Insurance industry
- Media
- Municipal and provincial planners
- Natural resource companies
- Municipal emergency response agencies
- Utility companies
- Tourism-related companies.

Effective messages

Make your messages simple and appropriate to the specific groups you want to target, so the messages have the desired result of encouraging the whole community to take responsibility to share in the solution.

Rural/urban fire personnel need to:

- Have a thorough knowledge of interface fire hazards in the community.
- Give homeowners and business people the information they need.
- Lead by example by making their own homes FireSmart.
- Support each other.

Homeowners and school children need to:

- Protect the roof over their heads.
- Maintain safety zones.
- Make their homes accessible to firefighters.
- Locate a water supply.
- Have fire-risk assessments done.
- Make their homes FireSmart inside.
- Be prepared for an interface fire.
- Know what to do when fire is approaching their homes.

Elected officials need to:

- Be prepared, so the community will recover from an interface fire more easily.
- Reduce costs by developing effective prevention measures.
- Show residents they are making safety issues a priority.
- Share costs for an awareness programme with neighbouring councils.
- Do something – doing nothing is irresponsible.

Developers, builders and retailers need to:

- Promote FireSmart development and products and enhance their reputation as experts in their field.
- Show their companies are good corporate citizens.
- Offer FireSmart buildings as a selling feature.

The insurance industry needs to:

- Alert homeowners to the increase in interface fires.
- Make homeowners aware the cost of each interface fire is far greater than a typical structural fire.
- Motivate homeowners to take appropriate fire prevention action by rewarding or penalising clients through their rate structure.

Land-use planners need to:

- Minimise development in high-risk areas.
- Stage development.
- Minimise the length of cul-de-sacs.
- Build wide internal roadways.
- Build bridges strong enough to take heavy emergency vehicles.
- Ensure an adequate and available water supply for fire fighting.
- Choose FireSmart building materials.

Natural resource companies need to:

- Use prevention measures to reduce injuries, save lives, property, jobs, maintain profits and cut recovery costs.
- Show their companies are good corporate citizens.

See Appendix H for a sample interface fire communications plan.

Advice for media interviews

Newspapers, radio and television will be interested in an interface fire. Help the media to get their story because this is a good way to get positive information to the public.

If you have been asked for an interview, give yourself time to prepare your single overriding communications objective. This is the one thing you want your audience to remember, so keep it simple. Use the following checklist of dos and don'ts for any interview.

DO	Talk only about your area
DO	Distinguish fact from opinion
DO	Keep to the issue
DO	Answer questions firmly and directly
DO	Use plain language and avoid fire word slang
DON'T	Make personal comment
DON'T	Criticise individuals or organisations
DON'T	Speculate
DON'T	Say 'no comment' – if you don't know the answer, say so
DON'T	Look into the camera – look at the interviewer

Remember: Nothing is 'off the record'.

CASE STUDY

In New Zealand, a number of interface fires have threatened communities and ultimately put lives at risk. Experts consider it only a matter of time before we have a fatality from an interface fire.

31 January 1991, Tikokino, Hawkes Bay

Not only large fires can endanger life and property, as crews from Central Hawkes Bay experienced on a summer evening in 1991. A motorist reported a grass fire burning on the eastern side of Highway 50. Responding fire crews attempted to contain the grass fire by attacking and extinguishing the head and flank. An increase in wind speed and a minor change in wind direction created a blow-up in fire conditions. This resulted in one appliance and crew being overrun by the fire with one firefighter receiving minor burns, while the other fire appliance retreated down the road into a green paddock of lucerne, dragging hose and with the crew still on the back of the appliance.

The fire, although only burning in cured grass, showed extreme fire behaviour and spread under high winds at an estimated 14 kilometres per hour. The fire run was brief, spreading approximately 3 kilometres and burning 130 hectares. The fire stopped by running into natural barriers. In the fire's brief run it:

- Burnt a barn, shed, stock yards and fences
- Burnt around and threatened two farm houses whose occupants were evacuated
- Partially damaged one fire appliance and injured one firefighter.

The fire created a multi-agency response from across Hawkes Bay involving 14 appliances and approximately 100 firefighters. The Tikokino fire is a good example of an intermix fire where individual homes and buildings are surrounded by vegetation. In this case the vegetation was cured grassland or pasture.

The cause of the fire was never established but at the time there was a suspicion a cigarette butt was thrown away by a passing motorist.

Appendix A: Legal responsibilities

Fire authorities and related agencies have responsibility relating to vegetation fire under a number of Acts:

- Forest and Rural Fires Act 1977
- Fire Service Act 1975
- Resource Management Act 1991 (RMA)
- Health and Safety in Employment Act 1992
- Civil Defence Emergency Management Act 2002
- Local Government Act 2002.

These Acts impose a number of obligations. These obligations are imposed on a council both in its role as a council and in its role as a land occupier and manager.

Forest and Rural Fires Act 1977

This Act imposes obligations for rural fire authorities, which include territorial authorities, to promote and carry out fire control measures in their rural fire area. Section 10 establishes that the fire authority is the territorial authority in territorial areas.

Under section 12 of the Act, a fire authority has the duty to promote and carry out fire control measures including writing a fire plan for its district.

Section 12 gives the territorial authority the power to make bylaws for promoting and carrying out fire control measures.

Under section 27 of the Act, the fire authority may require fire breaks and the removal of combustible material from land.

Section 60 of the Act allows councils which own land to remove fire hazards and to enter arrangements to do this on land owned by others.

Section 18 of the Act gives the council, as a fire authority, the responsibility of assessing weather conditions for fire hazard, giving fire warnings and providing information as to fire hazard conditions.

The Act also imposes obligations on land owners and occupiers to comply with proper instructions and to not start fires or allow fires to spread.

Under section 43, costs and damages may be recovered from persons responsible for fire, which provides an incentive to control fire and to reduce fire hazard.

Fire Service Act 1975

This Act sets out the role and function of the New Zealand Fire Service and the National Rural Fire Authority (NRFA).

Section 28A gives the Fire Service the power to go outside the urban fire district and take action to save life and property.

Section 14A describes the functions and powers of the Fire Commission as the NRFA.

Section 17X describes the functions of the National Rural Fire Officer.

Resource Management Act 1991

Section 2 defines 'natural hazard' as:

> Any atmospheric or earth or water related occurrence (including…fire…) the action of which adversely affects or may adversely affect human life, property or other aspects of the environment.

Among the functions assigned to regional authorities is:

> The control of the use of land for the purposes of the avoidance or mitigation of natural hazards (section 30(1)(c)(iv)).

Territorial authorities (TAs) have the more directed function of:

> The control of actual or potential effects of the use and development and protection of land including for the purposes of avoidance or mitigation of natural hazards.

The difference is:

- The avoidance or mitigation of hazard effects is a territorial function.
- Regional council's also have a part to play through objectives and policies but it is the TAs that must set the 'rules' to control effects.

How can territorial authorities do this?

- Territorial authorities exert this control through district plans (as required under section 74).
- They can include rules to manage the development of subdivisions or other proposals on the rural/urban interface in light of the fire hazard.

For example:

- A district plan could require residential units not within the normal water supply area to provide a level of water storage.
- The plan could also address access issues.

Hazard information:

The RMA also requires local authorities to gather the information necessary to carry out its functions, including records of natural hazards.

Health and Safety in Employment Act 1992

This Act aims to promote the health and safety of everyone at work and of other people in and around workplaces.

Section 10(2)(c) requires the employer to monitor employees' exposure to known hazards.

Civil Defence Emergency Management Act 2002

Section 39 requires TAs to have an organisation capable of carrying out 'civil defence measures'. Civil defence measures include actions 'designed to guard against, prevent, reduce or overcome' hazards (such as bushfire).

Local Government Act 2002

This Act contains a number of provisions which are relevant to rural fire. They apply only to territorial authorities.

Section 646 empowers the council to provide fire fighting equipment and buildings.

Sections 647 and 648 relate to the provision of fire hydrants.

Section 649 provides for bylaws to prevent the spread of vegetation fires. Note: This section has been amended by the Building Act 1991 and you should check local bylaws for validity.

Section 650 gives the council additional powers, including the power to give written notice to land occupiers to cut down or get rid of vegetation and remove or destroy accumulated refuse or flammable waste. This power can only be used where a hazard exists. If the work is not completed within 14 days:

- The owner commits an offence which is punishable by a fine up to $500 and $50 for every day it continues, or
- The TA can do the work and recover the costs from the owner or as a charge on the land.

Appendix B: Community fire prevention guidelines

Creating a safer community

The ultimate objective of fire prevention planning and fire mitigation strategies is to create a safer community. Through a community risk management programme, fire authorities in New Zealand will bring new approaches and additional techniques to preventing fires in the urban/rural interface.

These guidelines don't tell you how to manage fire risk, but describe:

- A planning process that can be tailored to individual communities and take account of their specific fire risks.
- The process to identify priority high-risk environments as the basis for long, medium and short term strategy development.
- How communities can be involved in the process and plan development to ensure there is a commitment and a shared responsibility between authorities and the community.
- How the perception of the community about fire risks can be related to a technical evaluation to achieve strategies that are realistic, achievable and, most importantly, create a safer community.
- How the level of active participation by the community in planning with the authority and the consequent self-reliance will determine its ability to achieve a safe community.

The guidelines offer a systematic approach to managing the fire risk within high fire-prone communities on the urban/rural interface and provide a process by which a community Fire Prevention Plan can be prepared for use throughout the year.

For the fire management strategies to be successful, the community needs to take some responsibility. Increased community involvement leads to sharing the responsibility for fire-risk management and to developing solutions the community will accept and implement.

A FireSmart community meets or exceeds these guidelines. Having your community working towards these guidelines is a worthwhile goal.

Developing a Fire Prevention Plan

What is expected of a Fire Prevention Plan?

It is expected a Fire Prevention Plan will:

- Encourage a wider and ongoing involvement by individuals, communities and interest groups in fire prevention.
- Result in fire prevention and mitigation solutions that address the needs of the communities.
- Result in innovative fire prevention and mitigation solutions that will be accepted and implemented by the communities.
- Create a fire prevention planning partnership between fire authorities, community groups and the community.
- Increase community knowledge about prevention and safety issues.
- Encourage the development and resourcing of management plans in high-risk areas.
- Create safer communities.

The process

We have outlined a five-step process to develop a Fire Prevention Plan, which can be tailored to meet the specific needs of the community.

Step 1: Make initial assessment

Carry out an initial assessment to see if there is any urban/rural interface fire issue. Look generally at whether it is a fire-prone area, eg is there a fire threat in summer, does the area have a history of fire risk, what is the type and amount of vegetation in the interface.

Step 2: Do environmental scan and identify risk

Convene authority and experts to look at total picture. Collect information including fire history, vegetation maps, recent city changes, values, risk source, review of legislation, other authority policies. Develop a view on possible consequences.

Checklist: Do you have the facts?

- ✓ Fire history
- ✓ Topographic maps
- ✓ Vegetation maps
- ✓ Other relevant policies
- ✓ Transport routes
- ✓ Statistics
- ✓ Risk source
- ✓ Demographics
- ✓ Land status
- ✓ Communities at risk

Step 3: Consult community and develop strategy

Tell the community a plan is being prepared and they have an opportunity to participate. Convince and get commitment from all parties. Identify options in consultation and form a view of how receptive the community is, and related issues. Develop high-level strategies.

Checklist

- ✓ Are key people committed?
- ✓ Do they understand what happens and when?
- ✓ Do you know what you are trying to achieve?
- ✓ Do you have the facts?
- ✓ Is your community prepared to help?

Step 4: Develop plan and get approval

Develop the plan giving short and long term goals, the steps involved. Identify responsibilities, priorities and timeframes required to develop the plan and make funding arrangements. Put the plan out for public comment, modify as appropriate, get approved by community and authority and release for public comment and approval.

Your fire prevention plan solutions or approaches to reduce the hazard of interface fire to communities will involve looking at these areas.

Regulation	Building regulations, planning scheme zones, permit conditions, inspections.
Planning	Evacuation plans, early warning systems, signage, telephone trees, simulations, fire drills.
Education	Media training information kits, fire authority or brigade visits, curriculum development, teaching aids, targeted education programmes.
Management	Fuel clearing or fuel reduction burning, fire breaks, selected species planting, work programmes, facility provision, hydrant checks.
Community involvement	Community scheme, authority involvement, sponsorships, volunteers.
Technical	Provision of facilities, new techniques, updated equipment, new uses for equipment.

Checklist: Is it a quality plan?

- ✓ Will the proposal adequately address the targeted risks?
- ✓ What are the alternatives?
- ✓ Is the proposal the most cost effective?
- ✓ Does the proposal have other non-fire benefits?
- ✓ Are all the interested/affected parties adequately briefed?

Step 5: Put plan in place

The plan will contain programmes scheduled for completion, on some occasion, over a number of years. The responsibility for putting the plan in place rests with the authority in close liaison with the community. Base priorities on the needs of the plan. The level of implementation and the effect on community readiness and safety performance will determine the plan's success. The plan will need to be monitored and reviewed and may have to be modified, based on performance.

Checklist

- ✓ Are the programmes specific, realistic and achievable?
- ✓ Have you identified one person to co-ordinate each programme?
- ✓ Who else will be involved?
- ✓ When will each programme start?
- ✓ What are any funding implications?
- ✓ Who will contribute?
- ✓ Is sponsorship appropriate?

Appendix C: Flammability of native plant species

The following flammability classes are based on a series of surveys conducted by staff from Forest Research's rural fire research programme.

Experienced fire managers throughout New Zealand were asked to rank a list of native species in terms of flammability in the light of their observations at wildfires and prescribed burns under different fire danger conditions.

The final list of 42 species in five flammability classes is intended as a guide only. Genetic and environmental factors will affect the flammability of particular species, eg older plants carrying more dead material, drought conditions, or where a plant is situated.

Flammability class: Low

Suitable for green breaks or defensible space, but when in the immediate vicinity of structures, leave at least a 3 to 4 metre break between the crowns to reduce fuel continuity.

Low flammability species

Fuchsia excorticate	Kotukutuku
Pseudopanax crassifolius	Horoekea/Lancewood
Pseudopanax arboreus	Five finger
Coprosma robusta	Karamu
Coprosma grandifolia	Raurekau/Kanono
Geniostoma ligustrifolium	Hangehange
Coprosma australis	Raurekau
Coprosma repens	Taupata
Carpodetus serratus	Putaputaweta
Corynocarpus laevigatus	Karaka
Griselinia littoralis	Papauma/Broadleaf
Griselinia lucida	Puka
Macropiper excelsum	Kawakawa/Peppertree
Solanum aviculare	Poroporo

Flammability class: Low/moderate

Not recommended for planting in green breaks. If planted in defensible space, remove elevated dead material and litter regularly, leave greater than 4 metres between tree crowns, and don't plant trees or shrubs in this category within 10 metres of structures.

Low/moderate flammability species

Hebe salicifolia and *H. stricta*	Koromiko
Melicytus lanceolatus	Mahoe wao
Melicytus ramiflorus	Mahoe/Whiteywood
Aristotelia serrata	Mako-mako/Wineberry
Coriaria arborea	Tutu
Myoporum laetum	Ngaio
Pittosporum crassifolium	Karo
Pittosporum eugenioides	Tarata/Lemonwood
Hoheria spp.	Hoheria/Lacebark
Knightia excelsa	Rewarewa
Nothofagus menziesii	Tawhai/Silver beech
Phyllocladus glaucus	Toatoa
Plagianthus regius	Manatu/Ribbonwood
Weinmannia racemosa	Kamahi

Flammability class: Moderate	
Most of these species produce heavy accumulations of flammable litter and elevated dead material, and/or have flammable green foliage. Not recommended for green breaks or for planting in defensible space.	
Moderate flammability species	
Beilschmiedia tawa	Tawa
Cordyline australis	Ti kouka/Cabbage tree
Pittosporum tenuifolium	Kohuhu
Dacrydium cupressinum	Rimu
Metrosideros umbellata	Southern rata
Agathis australis	Kauri
Phormium spp.	Flax
Podocarpus dacrydioides	Kahikatea/White pine
Weinmannia silvicola	Tawhero/Towhai
Flammability class: Moderate/high	
Species may have flammable green foliage and/or produce high levels of litter and elevated fuel. Not recommended for green breaks or defensible space.	
Moderate/high flammability species	
Podocarpus totara	Totara
Dodonaea viscose	Ake-ake
Cyathea and Dicksonia spp.	Tree ferns
Cyathodes fasciculata	Mingimingi
Flammability class: High	
Species burn readily at low/moderate forest fire danger conditions.	
High flammability species	
Kunzea ericoides	Kanuka
Leptospermum scoparium	Manuka

Appendix D: Firesmart Fire Hazards and Risks Assessment Checklist

If you live in an interface or in a rural home, use this checklist to help you manage your fire protection and fire preparedness.

How to use the checklist

1 For each hazards and risks feature or for each mitigation credits feature (in the left-hand column), choose the option that best describes your situation from the two or three options in the centre and right-hand columns in the same line.

2 Put the score from the relevant shaded column into the 'Score' column.

3 Add your hazards and risks score and enter as Subtotal A.

4 Repeat the process for mitigation credits and enter your negative score as Subtotal B.

5 Subtract Subtotal B from Subtotal A to get your final score.

6 To see what your score means, see 'Interpreting your score' below.

7 To read more about any feature, go to the page shown in the 'Page' column.

Hazards and Risks						
	Page	*Options*				*Score*
Structure location	14	Flat to gentle slope below structures	0	Steep slope below structures	6	
		Moderate slope below structures	3			
Roof material	11	Steel or tile	0	Wooden shingles	10	
Roof cleanliness	11	Clean of leaves and needles	0	Leaf clogged gutters and roof	4	
Walls	12	Brick, tin, hardiplank	0	Wooden	2	
Windows	12	No close vegetation	0	Close flammable vegetation	2	
Eaves, underside of decks and house	12	Well enclosed	0	Open and exposed	4	
Attachments: decks, balconies, fences, trellises	13	Non flammable or not attached to house	0	Wooden and attached to structures	2	
Firewood and stacked timber	13	None within 10 metres of structures	0	Stacked against or within 10 metres of structures	4	
Lawns	14	Mown and watered	0	Rank, or mown but brown and dry in summer	4	
Trees and shrubs within the section	14	Well spaced and more than 10 metres from structures	0	Dense, unmodified and within 3 metres of structures	6	
		Dense, unmodified and more than 3 metres from structures	3			

Power lines to property	15	Underground or overhead but in the clear	0	Overhead with trees overhanging or in close contact	4	
External surrounding vegetation	14	Grazed farmland or scattered scrub or forest	2	Continuous scrub, forest or rank grass to section boundary	4	
Seasonal drought	14	Regular summer rainfall with no droughts	0	Regularly subject to drought, high temperatures and dry winds	15	
		Can be subject to drought, high temperatures and dry winds	7			
Region has history and risk of fire occurrence	16	No	0	Yes	6	
					Subtotal A	

Mitigation Credits						
	Page	*Options*				*Score*
Nearest fire response		Within 15 kilometres	-6	Greater than 15 kilometres	0	
Signposting and rural addressing and numbering system	51	Implemented	-1	Not implemented	0	
Driveway access for large fire appliances	16	Yes	-2	No	0	
Fire-fighting equipment, hose, ladder, shovel	22	Yes	-2	No	0	
Multipurpose dry powder extinguishers	13	Yes	-2	No	0	
Owner understands fire danger and fire seasons	16	Yes	-2	No	0	
Burns materials only in an approved incinerator		Yes	-2	No	0	
Safety zones prepared around structures	14	Prepared greater than 10 metres	-4	Not done	0	

Water supplies for fire fighting	16	Present, useable and adequate	-2	None	0	
Section maintenance: dead vegetation	15	All dead and cured vegetation removed or composted	-4	Dead and cured vegetation present	0	
Fire resistant native species	14	Section planted	-4	Not done	0	
Roof and guttering	11	Regularly cleaned	-2	Not done	0	
Non flammable materials next to structures	13	Yes	-2	No	0	
Smoke alarms installed and operating	13	Yes	-2	No	0	
Identified and practised escape plans	13	Yes	-2	No	0	
Domestic home sprinkler system	13	Installed	-6	No	0	
					Subtotal B (subtract from Subtotal A)	
					Final Score	

Interpreting your score

Minus to 14 Low fire hazard and risk

The chances of your home and outbuildings being damaged or destroyed by an interface fire or wildfire are remote. You don't need to do much to make your property safer.

15 to 22 Moderate fire hazard and risk

The chances of your home and outbuildings being damaged or destroyed by an interface fire or wildfire are low. Minor improvements will make your property safer.

23 to 30 High fire hazard and risk

The chances of your home and outbuildings being damaged or destroyed by an interface fire or wildfire are moderate. Have a look on the form for areas where you score low. Some sensible improvements will make your property safer.

31 + Extreme fire hazard and risk

The chances of your home and outbuildings being damaged or destroyed by an interface fire or wildfire are high and increasingly so if a fire should occur at the worst time. Have a look on the form for areas where you score low. Some sensible improvements will make your property safer. Even small changes could make a difference between losing and saving your home.

Appendix E: FireSmart Construction Checklist

When constructing, renovating, or adding to a FireSmart home, consider the following:

- [ ] Choose a FireSmart location.
- [ ] Design and build a FireSmart structure.
- [ ] Employ FireSmart landscaping and maintenance.

To select a FireSmart location, make sure you:

- [ ] Build on the most level portion of any land that slopes, since fire spreads rapidly, even on minor slopes.
- [ ] Set a single-storey structure at least 10 metres back from any ridge or cliff – increase the distance if your home will be higher than one storey.

In designing and building your FireSmart structure, remember the primary goal is to reduce your exposure to fire. To this end:

- [ ] Use construction materials that are fire-resistant or non-combustible whenever possible.
- [ ] For roof construction, consider using materials such as Class A asphalt shingles, slate or clay tile, metal, cement and concrete products, or terra-cotta tiles.
- [ ] On outside wall cladding, use fire resistant materials such as stucco or masonry rather than vinyl, which can soften and melt.
- [ ] Consider both the size of and materials for your windows – smaller panes hold up better in their frames than larger ones; double-pane glass and tempered glass are more effective than single-pane glass; plastic skylights can melt.
- [ ] To stop sparks from entering your home through vents, cover outside attic and underfloor vents with wire mesh no larger than 3mm and make sure undereave and soffit vents are closer to the roof line than the wall. Box in eaves, but provide adequate ventilation to prevent condensation.
- [ ] Include a driveway that is wide enough – 4 metres wide with a vertical clearance of 5 metres and a slope that is less than 12 percent to provide easy access for fire engines. Keep your driveway and access roads well-maintained, clearly marked, and include ample turnaround space near the house. Also consider access to a water supply, if possible.
- [ ] Provide at least two ground level doors for safety exits and at least two means of escape – either a door or a window – in each room, so that everyone has a way out.
- [ ] Keep gutters, eaves, and roof clear of leaves and other debris.
- [ ] Inspect your home occasionally, looking for deterioration such as breaks and spaces between roof tiles, warping wood, or cracks and crevices in the structure.
- [ ] In rural areas, install a domestic home sprinkler system as an internal fire safety measure.
- [ ] Install smoke alarms and test them regularly.
- [ ] Install multipurpose dry powder fire extinguishers in the house and in outbuildings.

Consider any structures attached to the house, such as decks, porches, fences, and outbuildings, as part of the house. These structures can act as fuses or fuel bridges, particularly if built from flammable materials. Therefore, consider the following:

- [ ] If you want to attach an all-wood fence to your home, use masonry or metal as a protective barrier between the fence and house.
- [ ] Use non-flammable metal when building a trellis and cover it with high moisture, non-flammable vegetation.
- [ ] Prevent combustible materials and debris from accumulating beneath patio, deck or elevated porches – screen under or box in areas below the ground line with wire mesh no larger than 3mm.
- [ ] Make sure an elevated wooden deck is not located at the top of a hill where it will be in the direct line of a fire moving up the slope – consider a terrace instead.

Appendix F: FireSmart Landscaping Checklist

When designing and installing a FireSmart landscape, consider the following:

- [ ] Local area fire history.
- [ ] Site location and overall terrain.
- [ ] Prevailing winds and seasonal weather.
- [ ] Property contours and boundaries.
- [ ] Native vegetation.
- [ ] Plant characteristics and placement (ability to hold water and salt, aromatic oils, fuel load, and fuel size).
- [ ] Irrigation requirements.

To create a FireSmart landscape, remember the primary goal is to reduce fuel and develop a defensible space. To this end, use the zone concept:

- [ ] Zone 1. This well-watered area encircles the structure for at least 10 metres on all sides, providing space for fire suppression equipment in the event of an emergency. Plantings should be limited to carefully-spaced fire resistant species.
- [ ] Zone 2. Use fire resistant plant materials here. Plants should be low-growing, and the irrigation system should extend into this section.
- [ ] Zone 3. Place low-growing plants and well-spaced trees in this area, remembering to keep the volume of vegetation (fuel) low. Where there is a natural area, thin selectively and remove highly flammable vegetation.

Also remember to:

- [ ] Leave a minimum of 10 metres around the house to put fire equipment, if necessary.
- [ ] Make the defensible space or zones larger on sloping ground.
- [ ] Carefully space the trees you plant.
- [ ] Take out the 'ladder fuels' – vegetation that links the grass and the tree tops. It can carry fire to a structure or from a structure to vegetation.
- [ ] Give yourself added protection with 'fuel breaks', like driveways and gravel walkways.

When maintaining a landscape:

- [ ] Keep trees and shrubs pruned. Prune all trees up to 2 to 3 metres from the ground.
- [ ] Remove leaf clutter and dead and overhanging branches.
- [ ] Mow your lawn regularly.
- [ ] Get rid of cuttings and debris promptly, according to local regulations.
- [ ] Store firewood away from the house.
- [ ] Keep your watering or irrigation system well maintained.
- [ ] Use care when refuelling garden equipment and maintain it regularly.
- [ ] Store and use flammable liquids properly.
- [ ] Dispose of smoking materials carefully.
- [ ] Become familiar with local regulations for vegetative clearances, disposal of debris, and fire safety requirements for equipment.
- [ ] Follow manufacturers' instructions when using and storing fertilisers and pesticides.

Appendix G: Guidelines for Infrastructure

Recommended guidelines for roadways:

- Build roads that allow two-way traffic, ie a minimum of 6 metres wide.
- Space turnouts so drivers can see from one turnout to the next.
- Design road width, grade, and curves to allow access for the large emergency vehicles.
- Design bridges to carry heavy emergency vehicles, including bulldozers carried on large trucks.
- Build driveways to allow large emergency vehicles to reach your home. If your driveway is longer than 90 metres, provide a turnaround area.
- Place gates 9 metres from the public right-of-way and do not open outwards.
- Post clear road signs to show traffic restrictions such as dead-end roads and weight and height restrictions.
- Make sure your street name and house number are not duplicated in the area.
- Post your rural addressing and numbering system number at the beginning of your driveway.
- Clear flammable vegetation at least 3 metres from roads and 1.5 metres from driveways.
- Cut back overhanging tree branches above roads.

Recommended guidelines for water supply:

- Use larger-diameter supply mains for homes in interface areas to provide higher volumes and pressure if household water supply has to be used for fighting fires.
- Clearly mark all emergency water sources.
- Keep enough garden hose to allow water to reach all outside surfaces of your home, including the roof.
- Provide access to the roof to wet it down or suppress spot fires that may ignite on the roof.
- If appropriate, consider installing alternative water supplies such as reservoirs, wells, tanks or pools.
- If water comes from a well, consider an emergency generator to run the pump during a power failure.
- Provide appropriate tank/pump couplings or adequate access for portable pumps to static water supplies, eg tanks, swimming pools, ponds etc.

Recommended guidelines for electric utilities:

- Underground power lines offer the greatest fire safety.
- Where overhead lines are established, keep a 3-metre clearance between vegetation and power lines, and remove dead or diseased standing timber within a tree length of the power line.

Appendix H: Sample Interface Fire Communications Plan

The following is a sample of how your communications plan might look. You will need to adapt it to suit your community.

In this sample, we've defined the audience as homeowners and elected officials.

Interface Fire Communications Plan

Target audiences

- Homeowners in the rural/urban interface areas.
- Elected officials.

Purpose

- Increase awareness of interface fire risk in the community.
- Give stakeholders the information they need to make informed decisions about preventing and minimising the risk from interface fire.
- Reduce the number of deaths and the severity of injuries caused by fire.
- Reduce the number of fires and the extent of property damage that results from fires.

Desired results

- All parties will know that interface fire is an issue that needs to be addressed. They will understand the problem belongs to the community and each member has a responsibility.
- Officials will approve the resources needed to put in place an interface fire awareness and risk management programme.
- Individual landowners and residents will be motivated to take preventive action.

Current attitudes in the target audience

Elected officials

- Emergency preparedness issues are not a priority right now.
- Interface fire has never been an issue for the community.
- There may be a general lack of understanding of the importance of emergency preparedness.

Homeowners

- It's not going to happen to me.
- It's not my responsibility – it's the fire services' job to save my property.
- Our firefighters are well trained and they will save my home during a fire.
- I have fire insurance to cover my losses.
- Prevention measures are time-consuming and costly.

Strategy

Elected officials

- Give them information on the potential and scope of an interface fire incident in your community.
- Develop materials to support an awareness programme.
- Take supporting material to council and ask for their approval to put in place an awareness programme. Have your facts together and give council a clear understanding of the direction you want to go and what they can do to help you get there (eg land-use planning policies, resources, and funding). Let council know the costs and resources don't have to be expensive.
- Consider approaching neighbouring communities or corporate sponsors to share the costs of putting in place an awareness programme.

Homeowners

- Involve the public in the issue through research, surveys, and public consultation.
- Appoint a spokesperson to help you deliver the message.
- Develop communications tools and methods to tell homeowners about the issues and what their responsibilities are before and during an interface fire.

Strategic consideration

Elected officials

- What money and resources are available.
- Whether members of council agree on the importance of reducing interface fire risk.
- Whether there is pressure from the public to do something about the issue.

Homeowners

- Whether they recognise the importance of reducing the risk of interface fire.
- Whether they are willing to share responsibility for what needs to be done.

Messages

See 'Effective messages' and 'Advice for media interviews' in the communications chapter.

Spokespersons

- Fire chief or principal rural fire officer.
- Fire personnel or a fire prevention officer.

Timing

- Fire season, which generally runs from 1 October to 30 April.
- For homeowners: during the spring clean-up and planting season, just before the start of the high-risk fire season.
- For elected officials: before the next year's budget is decided and well in advance of the fire season.

Tools

- One-on-one contact (fire personnel).
- Newspaper articles or newsletters.
- FireSmart fire hazards and risks assessment checklist (see Appendix D).
- Displays, eg fire agency public displays at rural community events.

Cost

- Determine your budget and choose the communications tools that will give you the greatest financial mileage.
- Initiate cost-sharing arrangements with neighbouring communities or corporate sponsors.

Evaluation

- Fire personnel to record the number of requests for the FireSmart fire hazards and risks assessment checklist.
- Fire personnel who conduct interface fire-risk assessments to keep records of the increase in FireSmart homes and landscapes.
- Get feedback from retailers, builders, developers or corporate sponsors on the increased sales of FireSmart products.
- If an interface fire happens, evaluate the incident. Determine which structures were saved because of interface fire prevention measures and use this data to drive future awareness campaigns.

Appendix I: Guidelines for Emergency Services to Evacuate

The decision to evacuate residents or not must be made in a timely manner, so those communities with predetermined local emergency plans have enough time to put their local arrangements in place.

Notify support mechanisms quickly so local arrangements can be activated for those who choose to relocate.

When making the decision whether or not to recommend relocation to a community threatened by interface fire, the Incident Controller should consider:

- The extent to which the fire poses a threat to life and property. This will depend on topography, weather conditions, fuel loadings, fire-spread rates, access and fire suppression capability.
- The availability of residents who are able-bodied, willing, appropriately dressed, sufficiently prepared and equipped to take the necessary precautions to protect the property.
- Who lives in the community, taking account of the aged, very young, infirm and handicapped persons present.
- Community awareness and preparedness programmes.
- The extent of fuel loads close to individual houses or residential communities, having regard to safety measures that may have been undertaken.
- The time available to warn the community before the arrival of the fire.
- Access to adequate numbers of trained personnel and the resources needed for warning and evacuating people.
- Access to safe exit roads and refuge areas.

Residents should not be evacuated when:

- The Incident Controller determines the fire threat to a community is low.
- Residents are able-bodied, willing and sufficiently prepared and equipped to take the necessary safety precautions to protect property.
- There is not enough time to put in place a safe evacuation or the fire has reached the area concerned.
- Exit roads are blocked or likely to be blocked by fire, severely obscured by smoke, obstructed by vehicles or blocked by fallen trees.
- Effective fuel reduction and other preventative measures have been undertaken, and where sufficient resources and water are available to fight the fire.
- No alternative safe refuge is available.
- Local relocation is a viable alternative.

The focus for local arrangements should be to:

- Provide adequate information to residents so they can understand the risks and consequences of staying in or leaving their homes in the event of a wildfire.
- Help those who want to leave.
- Encourage people to decide early whether they want to stay or to go to avoid last minute, panic-stricken attempts to flee.
- Develop and put in place strategies to manage ‘fleeing at the last minute’.
- Provide suitable support and welfare services during and after evacuation.
- Develop and foster an effective and reliable information flow between the emergency agencies and people in the community.
- Develop and put in place strategies that support the safe return of able-bodied residents to their homes as soon as possible after the main fire has passed.

These evacuation considerations should be the subject of training and regular refresher training programmes for all fire-fighting agencies, police and other emergency authorities, including local government authorities.

Appendix J: Guidelines for Homeowners Threatened by Fire

Immediate threat of interface fire

If you have no warning and an interface fire is threatening your home and you decide to stay, take the following steps:

- Report the fire immediately to the Fire Service by dialling 111.
- Contact any absent family members and tell them what is happening.
- Dress properly to prevent burn injuries. Wear only cotton or wool clothing. Wear long pants, a long-sleeved shirt or jacket and sturdy footwear. Gloves, hat, and a neck bandanna provide extra protection.
- Have fire-fighting tools and ladders propped against the house, preferably on the side opposite the fire's approach.

If there is time before the fire arrives

If you have warning of an interface fire and have time to prepare to evacuate:

- Park your car in a cleared place with windows closed and keys in the ignition.
- Close the garage door but leave it unlocked.
- Put valuable documents, family mementoes, and pets inside the car.

Outside the house

- Cover windows, skylights, attic openings, vents with metal coverings or fire-resistant material.
- Attach garden hoses to taps.
- Move lawn furniture, planters, firewood, building materials, and other combustibles away from the house or inside.
- Fill rubbish bins and buckets with water and leave them where firefighters can find them.

Inside the house

- Close all windows and doors.
- Remove curtains. Close metal blinds. Move cushions, papers and other flammable items into a closet.
- Move furniture away from windows and glass doors.
- Fill sinks, bathtubs, and buckets as extra water supplies.
- Turn on a light in each room of the house and on the porch. This will make the house more visible in heavy smoke or in darkness.

When the fire arrives

When ash or burning needles and firebrands start to fall onto your property, the fire is nearby. Your job in defending your home is to watch for and put out spot fires that land on or near your house.

Outside the house

- Watch your house rather than the approaching flames. Pay particular attention to your roof and deck surfaces, windows and areas under the house or deck. As embers land, spray water on them, or crush them with hand tools or a wet towel, sack, or mop.
- Turn on the sprinklers. Wet your lawns and the fire exposed parts of the building, but don't waste water.
- If practical, watch for and spray water over spot fires on neighbouring buildings and property.
- If conditions become too hot or smoky, go back inside the house.
- Take a hose, hand tools and a ladder inside with you.

Inside the house

- Shut off electricity at the main panel.
- Stay away from outside walls and windows.
- Put wet towels against door thresholds to keep smoke and sparks out.

- Move around the house, including the attic, watching for embers and being ready to douse them.
- Hang wet wool blankets or heavy curtains in windows, especially those with adjacent vegetation.
- Keep the entire family together and remain calm.
- Only remain inside until the main fire has passed (this could take a couple of minutes for a grass fire or up to 15 minutes for heavier fuels).
- Loosen but don't remove protective clothing.
- Drink water to avoid heat stress injury.

If the house catches fire

- Watch through your windows for fire starting on the outside of the house. Prepare a hose or some other water supply, open the window, quickly put out the flames and close the window again. Don't go outside to fight these fires until the radiant heat levels are safe.
- If you can't put out a fire on the outside of your home, the fire will spread rapidly. Leave the building quickly.
- Use common sense when you exit the building. Get low to the ground.
- Take the hose, ladder and hand tools to help you fight the fire and to mop up after the fire has passed. Close the door or window behind you to slow the fire spread inside the building.

After the fire

- Go back outside once the main fire front has passed. The building is still at risk of burning down. Check the radiant heat level outside with your bare hands. If it is bearable, the heat level is safe.
- Move around the outside of the house first, looking for sparks and spot fires and put them out. Go back into the house and move around quickly, looking for smouldering cushions, carpets, window ledges, curtains, or bedclothes.
- Move back outside and continue checking, alternating between outside and inside patrols. You should do this for at least 12 hours after the fire.