Effective communication of wildfire messages for New Zealand communities

Fire Technology Transfer Note
NUMBER 43 OCTOBER 2014

E. R. (Lisa) Langer [1] and Mary Hart [2]
[1] Scion Rural Fire Research Group, [2] Validatus Research, British Columbia, Canada

Summary

The high incidence of human-caused wildfires in New Zealand illustrates the importance of effectively communicating with communities in wildfire-prone areas to increase their awareness of fire risks, careful use of fire and preparedness for wildfires. This will ultimately lead to a reduction in the frequency and consequences of wildfires.

The Scion Rural Fire Research Group analysed communication strategies in three rural and rural-urban interface communities. The researchers were able to recommend a new way for agencies to plan and implement future communication of fire messages. This involves considering both the type of fire user, and the different messages each type of user requires.

The study concluded that a universal approach is not effective in communicating fire messages. Instead communication needs to carefully target both the audience (type of fire user) and the message (awareness, information, fire prevention and preparedness). Appropriate strategies are required to communicate different messages to selected audiences.

This Fire Technology Transfer Note summarises a report on the in-depth qualitative study by Hart and Langer (2014). The research is part of a broader Australian-based study undertaken by RMIT University, Melbourne for the Bushfire CRC's 'Effective Communication: Communities and Bushfire' project.

It is hoped that Rural Fire Authorities (RFAs) and allied agencies (such as the National Rural Fire Authority (NFA), Department of Conservation (DOC) and local councils), as well as fire and land managers, will support the recommendations outlined in this summary and follow the targeted communication methods provided. This will ensure that communication of wildfire messages to communities is effective in New Zealand.

Figure 1. *People living in and visiting rural-urban interface or rural communities require well communicated messages to ensure they use fire safely and are prepared for potential wildfires.*

Background

Worldwide, most wildfires are caused by some form of human activity (Ellis et al., 2004) and this trend is true for many countries. In addition, the pattern of wildfires has changed so that they are now burning closer to developed areas (Pyne, 2001).

In New Zealand, human activity is responsible for the vast majority of wildfires, which can be largely prevented (Hart & Langer, 2011). In total, approximately 3000 wildfires burn over 5800 ha per annum (Doherty et al., 2008). This number is expected to increase due to global climate change, an expanding rural-urban interface, and changing fuel loads within the landscape (Jakes & Langer, 2012). Doherty et al.'s (2008) study found that for wildfires with known causes, escaped land clearing burns were the most common reason for ignition, accounting for 20% of the total number of rural fires and almost half (47%) of the total area burned. Other examples of human negligence resulting in wildfires included incendiary causes (6% of the total number of fires), recreational causes (3%) and smoking (1%). Among indirect human causes, the most common was vehicles, accounting for 17% of all fires.

Evidence suggests that the majority of New Zealand communities have low awareness of the risk of rural fire, and consequently have low levels of preparedness for protection from wildfire events that impact them (Jakes & Langer, 2012).

Since human activity is responsible for the vast majority of wildfires and awareness is low, effective communication aimed at wildfire prevention is needed. At present, the level of public communication and education varies widely amongst communities and by RFAs. It ranges from the establishment of FireSmart activities in some rural areas to work directly with communities to mitigate wildfire risk, to minimal community engagement or education in other areas. In addition, few communities that have experienced wildfires and been exposed to rural fire education have been studied to date. New Zealand end users have called for more information about the most effective communication strategies to inform and educate communities.

Figure 2. *(left) Houses in the rural-urban interface community of Atawhai, Nelson, where over 70 properties were evacuated during a wildfire in February 2009. (middle) A wildfire led to the evacuation of over 100 residents in November 2005 at Closeburn, near Queenstown. (right) Over 140 ha of forest and scrub was burned, 8 buildings destroyed and around 175 residents evacuated in a wildfire on Mahia Peninsula, Hawke's Bay in February 2009.*

Research approach

The Scion Rural Fire Research Group undertook to study effective communication of wildfire messaging strategies in New Zealand communities. They adopted the RMIT University methodology to expand the relevance of the Bushfire CRC Effective Communication study across Australasia by including consideration of effective communication in less fire-prone environments. The mixed-method social research approach used in the RMIT study was adapted for the New Zealand context of smaller communities that have experienced less extensive and less frequent fires.

The core of the Scion research was a set of three carefully selected case studies that fitted well within RMIT's project criteria. All three areas had suffered from wildfires, continue to have high levels of wildfire risk, and represent different types of communities. The three New Zealand case study locations were (see Figure 3):

- Atawhai, Nelson (rural-urban interface community);
- Closeburn, Queenstown, Otago (community close to a tourism town); and
- Mahia Peninsula, Hawke's Bay (traditional farming / rural community).

Representatives of the NRFA, DOC and land managers from the forest industry and Federated Farmers of New Zealand were also interviewed to bring a national perspective to the research.

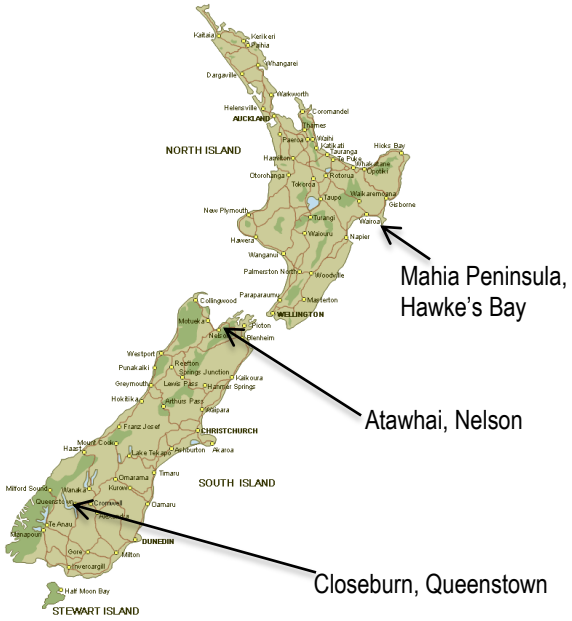

Figure 3. *Location of the three community case studies.*

What is Effective Wildfire Communication?

The study defines effective wildfire communication as a process that ensures that correct messages are delivered in the most appropriate way to individuals and communities to allow them to understand and act on the risks of wildfire, prevent wildfires from occurring and to be prepared for wildfire events.

Ethics approval was obtained from the University of Waikato Ethics Committee prior to the case study research. Field research at each site was carried out in 2012 and included semi-structured interviews and focus groups with members of the community and key agency respondents, as well as interviews with national key respondents. In total, 80 people participated in the project: 42 community members, 22 local key respondents and eight national key respondents. Each interview/focus group was recorded and fully transcribed. All the data was classified and prepared for analysis using qualitative analysis software (NVivo 10). The data was analysed thematically, keeping the predominant theme of the research ('what is effective communication?') central to the analysis.

Research findings

The research conducted highlights four distinct types of fire users (audiences):

- rural and semi-rural fire users;
- recreational users/visitors;
- cultural fire users; and
- non-fire users.

Additionally four types of messages were identified:

- awareness of fire risk;
- information about fire restrictions;
- prevention - ways to prevent fires starting; and
- preparedness - how best to be prepared for a wildfire should one occur.

The research emphasises that effectively communicating with communities is not a simple 'one size fits all' approach. It demonstrates the importance for fire managers to have a carefully considered communications policy, at both national and local levels. A communications policy needs to concentrate on which messages each audience requires and how best to disseminate these messages. Thus fire communication is most effective if relevant messages are targeted at each specific audience, rather than all messages communicated to the community as a single entity (see Table 1).

Table 1. *Types of information needed by each group of fire users and non-fire users.*

Messages required	Rural & semi-rural fire users	Recreational users	Cultural users	Non-fire users
Awareness of risk	✓	✓	✓	✓
Information on restrictions	✓	✓	✓	
Prevention	✓	✓	✓	
Preparedness	✓		✓	✓

Figure 4. *Face to face interviews and focus groups were conducted with 80 people in total.*

Principle audiences

The Scion study identified four main audiences for fire messages. Effective fire communication requires relevant messages targeted at each specific audience, with careful consideration of the mode of communication in each case.

Rural and semi-rural fire users: The largest group of fire users are those who light fires for land management purposes (e.g. vegetation clearance and rubbish removal) on their rural and semi-rural properties. Respondents in our study who had resided in rural or semi-rural areas for many years generally had good levels of awareness and knowledge around fire practice, which they termed 'common sense'. Rural and semi-rural fire users primarily wanted information about fire restrictions and permit requirements. Challenges exist for fire managers in ensuring that this audience not only remain aware of wildfire risk, but that they heed prevention messages. It is also vitally important that communication methods and messages highlight the importance of ensuring their households and properties are fully prepared for wildfires.

Recreational fire users: Participants in our research were extremely concerned about the dangers posed by recreational users of fires in their localities – generally domestic and international visitors and absentee property owners who light campfires, use fireworks, etc. All three case study areas had suffered wildfires as a result of visitor activities. Community and key respondents agreed that a noticeable proportion of recreational users, especially visitors, appear to lack knowledge about or ignore fire restrictions, and have little awareness of fire risks and fire prevention precautions. This is a challenging, but important, audience for future communication efforts.

Cultural fire users: Respondents in our study who used fire for cooking food by traditional methods (e.g. hangi and umu) showed excellent levels of knowledge around fire restrictions, awareness of fire risk and how to prevent a hangi from becoming an out-of-control fire. However, fire managers need to ensure their messages continue to target cultural fire users to ensure they have easy access to information on restrictions and permit requirements, are kept aware of fire risk, remain well informed about wildfire prevention methods, and are prepared should a wildfire threaten their marae or property.

Non-fire users: The majority of New Zealanders do not use fire or pose any risk of starting a fire. Most live in urban areas and small townships or suburban areas in rural environments and do not use fire on their properties. Hence communication with this group needs to focus on ensuring they have a heightened awareness of the risk wildfire poses to their communities and that they are appropriately prepared at household, property and community levels should a wildfire occur.

Figure 5. *(upper) Recreational fire users cooking on a campfire. (lower) Hangi pit used by cultural fire users alongside a marae.*

Methods of communication

As well as tailoring different messages to each broad group, the research has shown that fire agencies should carefully consider their methods of communication. Currently a wide range of wildfire communication approaches are employed across the country as part of a national fire prevention campaign, and local RFAs supplement this in their own way (Langer, et al. 2009; Hide, et al. 2011). The research demonstrates that to be most effective, specific methods must be tailored to meet the needs of each of the four target audiences.

One-way traditional broadcast approaches include use of leaflets, signage, local media (radio and TV), websites, social media and the national campaign using the cartoon character 'Bernie'. Such methods have the advantage of potentially reaching a large number of people in a relatively small amount of time. Some broadcast approaches can be reasonably inexpensive and therefore are widely used by RFAs. Although they lack the advantages derived from personal contact with members of the community, these approaches still have a place, particularly if used in tandem with another method (e.g. providing a leaflet to reinforce take-home messages delivered at a community meeting).

Opportunities exist for targeted communication via **conduits**, by sending emails and text messages to key people in the community, such as FireSmart champions, community fire wardens (currently used in the Red Zone of Closeburn) and volunteer fire fighters to disseminate amongst their own networks. This both broadens the captured audience and takes advantage of existing community communication linkages.

Figure 6. Some methods of one-way communication (leaflets, roadside signs, council newsletters and television advertisements).

Figure 7. *Some methods of two-way dialogue with individuals and families at A&P shows, community meetings and property site visits.*

Two-way dialogue focuses on personal or face-to-face communication with individuals and community groups. Methods are varied and include issuing fire permits, pre-permit inspections, Agricultural and Pastoral (A&P) shows, school fairs, local markets and field days, community meetings, farmers discussion groups and FireSmart activities.

Our study found that rural fire and land agencies vary in how much they use conduits and two-way dialogue as communication techniques. National and local key respondents recognised that such methods can be very effective, although two-way dialogue can require more time and financial resources than most one-way methods. Face-to-face contact was viewed as providing opportunities to change preconceptions, alter people's opinions and to build longer term relationships.

Face-to-face communication with both individuals and groups, which allows two-way dialogue, remains the most effective means of communication, although it often requires more time and funding than one-way communication. However, as these methods are likely to be more effective, they can be a more efficient use of resources if they are used carefully to target certain messages to each audience. Two-way dialogue can give fire managers the opportunity to build good relationships with the public, while addressing the public's concerns and queries.

An array of one-way broadcast approaches combined with communication directed through conduits and two-way dialogue should be targeted towards different audience groups, as recommended in Tables 2-5.

Table 2. *Recommended methods of communication for rural and semi-rural fire users.*

	One-way broadcast	Direct through conduits	Two-way dialogue
Rural and semi-rural fire users **KEY MESSAGES:** **Awareness** **Information** **Prevention** **Preparedness**	**National campaign** - update Bernie **Leaflets** - link to 2-way dialogue **Signs** - roadside, updated regularly **Local media** - target farming pages, rural programmes, etc. **Websites** - RFA and council websites for permit & restriction info, defensible space etc. **Social media** - during or immediately following wildfires or extreme fire danger	**Emails and texts** - targeted emails and texts to permit holders, fire wardens, community FireSmart champions, etc. **Targeted conduits** - communication through volunteer fire force - communication through fire wardens, community FireSmart champions, etc. **Community participation** - strong community champion - fire wardens	**2-way dialogue with individuals** - personal site visits prior to fire permit issue **2-way dialogue with groups** - farmer group meetings - University agriculture courses - rural community meetings **Community participation** - FireSmart/Red Zones - community planning.

Table 3. *Recommended methods of communication for recreational fire users.*

	One-way broadcast	Direct through conduits	Two-way dialogue
Recreational & Visitors **KEY MESSAGES:** **Awareness** **Information** **Prevention**	**National campaign** - target visitors **Leaflets** - link to 2-way dialogue **Signs** - target visitors, e.g. picnic areas, start of walking tracks **Local media** - radio articles/ sound bites, especially following wildfires or extreme fire danger **Websites** - target websites used by visitors, e.g. DOC **Social media** - during or immediately following wildfires or extreme fire danger	**Emails and texts** - targeted emails and texts to community groups, recreation groups, DOC managers etc. **Targeted conduits** - communication with tourism operators, recreational club leaders, etc.	**2-way dialogue with individuals** - personal visits to camp ground owners, tramping hut wardens, etc. **2-way dialogue with groups** - talk at camp grounds, tramping huts, etc. - talk to clubs, e.g. mountain bike club.

Table 4. *Recommended methods of communication for cultural fire users.*

	One-way broadcast	Direct through conduits	Two-way dialogue
Cultural users **KEY MESSAGES:** **Awareness** **Information** **Prevention** **Preparedness**	**National campaign** - target cultural users **Leaflets** - link to 2-way dialogue **Signs** - simple messages near marae[1] **Local media** - targeted newsletters & radio articles, esp. after wildfires or extreme fire danger **Websites** - RFA and council websites, e.g. info on hangi permits **Social media** - during or immediately following wildfires or extreme fire danger	**Emails and texts** - targeted emails and texts to iwi, rūnanga and hapu[2], regular holders of marae hangi **Targeted conduits** - communication through volunteer fire force	**2-way dialogue with individuals** - personal site visits prior to hangi **2-way dialogue with groups** - talk at hui[3], hapu/rūnanga meetings, etc. **Iwi participation** - strong leaders - iwi input into community planning.

Table 5. *Recommended methods of communication for non-fire users.*

	One-way broadcast	Direct through conduits	Two-way dialogue
Non-fire users **KEY MESSAGES:** **Awareness** **Preparedness**	**National campaign** - target non-fire users **Leaflets** - link to 2-way dialogue **Signs** - target visitors, e.g. picnic areas, start of walking tracks **Local media** - targeted newsletters & radio articles, esp. after wildfires or extreme fire danger **Social media** - during or immediately following wildfires or extreme fire danger **Websites** - emergency kit information, etc.	**Emails and texts** - targeted emails and texts to community leaders, FireSmart champions, etc. **Targeted conduits** - communication with tourism operators	**2-way dialogue with groups** - talk to a range of community groups, e.g. early childhood, resident associations, neighbourhood watch groups, etc. **Community participation** - FireSmart/Red Zones - strong community champion - community planning.

[1] Marae are buildings and land associated with a Māori community facility or complex which serve as a focus for many Māori community activities.

[2] Māori governing authorities.

[3] A hui or meeting brings people together for a particular purpose. Hui can be held in many settings and normally have some level of Māori protocol associated with the meeting process.

Conclusions

Scion Rural Fire Research Group research findings allow the opportunity for fire and land managers across New Zealand to improve their communication techniques through an enhanced understanding of the distinct rural-urban interface and rural fire audiences, and the messages they each require. By focusing on three case study areas and including discourse with national key respondents, the research has provided a useful summary of current approaches in wildfire communication in New Zealand. This in turn has enabled recommendations to be made on how to gain the most benefit from each technique when targeted to specific audiences.

The identification of separate audiences is a vital step for future wildfire communications. Our research has shown that four audiences need to be considered by fire managers: rural and semi-rural fire users who are responsible for most uncontrolled wildfire starts; recreational fire-users who may have little rural fire knowledge, particularly if they live in urban areas or are overseas visitors; cultural fire users who light hangi, umu etc. under permits; and non-fire users.

Research findings show that domestic and overseas visitors who use fire for recreation purposes are a crucial audience for fire managers to communicate with since it is likely that many will visit fire-prone areas around New Zealand.

High levels of concern were expressed by study participants about the risks that visitors posed to local communities, through lack of awareness of wildfire risk and fire restrictions, and unsafe practices. Therefore awareness and prevention messages should be targeted towards recreational fire users through one-way mechanisms such as improved signage, local media and social media, communication directed through conduits such as tourism operators and, where possible, two-way dialogue.

Fire managers need to use an array of communication mechanisms, such as one-way broadcast, messages directed through conduits and two-way dialogue, to keep non-fire users aware and prepared.

We stress that the ability to effectively communicate with at-risk communities is not a simple 'one size fits all' approach. Our research has demonstrated the importance for fire managers to have a carefully considered communications strategy, at both national and local levels. These communication strategies need to concentrate on which messages each audience requires, and how best to disseminate these messages to them. Such a strategy will improve the effectiveness of New Zealand wildfire communication.

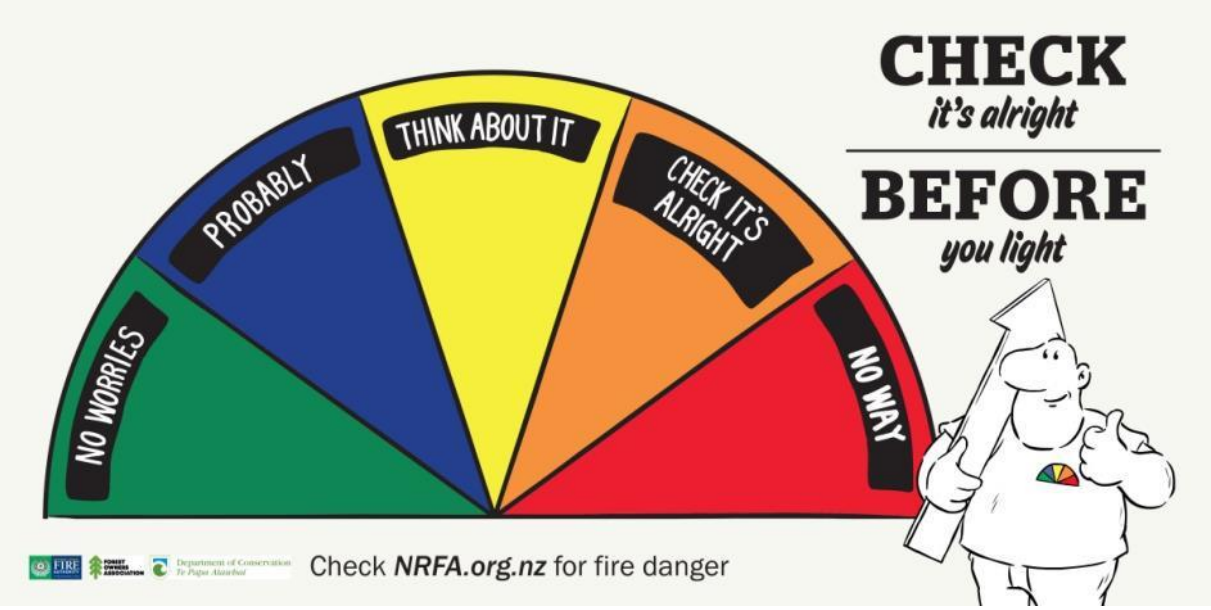

Figure 8. *New NRFA one-way communication message since interviews and focus groups.*

Figure 9. *Closeburn fire, Queenstown. Informing and educating visitors is an important means of reducing localised wildfires.*

Recommendations

- NRFA, RFAs, allied agencies, and fire and land managers should consolidate their communications strategies with particular consideration of audiences, messages and methods.
- Particular attention should be given to the appointment of specialised rural fire communication roles at national and regional levels.

Analysis of the first stage of this study has identified a number of areas that require further research:

- A more in-depth study on lifestylers and those living on the margin of townships/suburban and rural areas should be undertaken to improve communication to these potential fire users.
- Further research should concentrate on visitors to wildfire prone areas from urban centres and overseas as speciality target groups. In time, this should be extended to consider absentee property owners, those in rental properties and transient workers.
- Additional data collected in this study on community resilience should be analysed to assist in further understanding New Zealand rural and rural-urban communities to identify means to increase community resilience and improve recovery following future wildfire events.

Acknowledgments

This project was financially supported by the Bushfire Cooperative Research Centre, the Ministry of Business, Innovation and Employment (MBIE) and the New Zealand rural fire sector (through members of the Scion Rural Fire Research Advisory Committee). The authors wish to acknowledge the RMIT University team for sharing their research framework and methodology to allow a similar study to be undertaken in New Zealand.

The authors are indebted to the rural fire and land managers who guided the case study selection, provided local knowledge and community contacts, and were interviewed for this study. Similarly, the authors acknowledge the willingness of community respondents who generously gave their time and shared their experiences.

We also thank Grant Pearce, Scion, who provided guidance and assistance with the project, and Sally Chesterfield, Southern Rural Fire Authority, both of whom constructively reviewed the full report. Images in this FTTN were kindly supplied by: DOC, Queenstown (Figures 1, 2 middle and 7 lower left), Maria Colaco (Figures 2 left & 4), Ian Pickering (Figure 2 right), Herb Christophers (Figure 5 upper), Sally Chesterfield (Figure 7 upper left & right), Ian Reade (Figure 7 lower right) and David Comer (Figure 9).

References

Doherty, J.J., Anderson, S.A.J., & Pearce, G. (2008). An analysis of wildfire records in New Zealand: 1991-2007. Scion Client Report No. 12789. (Christchurch: Scion).

Ellis, S., Kanowski, P., & Whelan, R. (2004). National Inquiry on Bushfire Mitigation and Management. (Canberra: Council of Australian Governments).

Hart, M., & Langer, E.R. (2011). Mitigating the risk of human caused wildfires: literature review and stakeholder study. Fire Technology Transfer Note #42. 12 p. (Christchurch: Scion, Rural Fire Research Group).

Hart, M., & Langer, E.R. (2014). Effective communication: communities and wildfire in New Zealand. Contract report to Bushfire Cooperative Research Centre. Scion Client Report No. 21017. (Christchurch: Scion).

Hide, S., Tappin, D., & Langer, E.R. (2011). What is the general public's perception of rural fire danger communications? Fire Technology Transfer Note 41. 6 p. (Christchurch: Scion, Rural Fire Research Group).

Jakes, P., & Langer, E.R. (2012). The adaptive capacity of New Zealand communities to wildfire. International Journal of Wildland Fire, 21(6), 764-772.

Langer, E.R., Tappin, D., & Hide, S. (2009). Fire danger warning communication in New Zealand: Summary of a study of Rural Fire Authority communications in Northland. Fire Technology Transfer Note No. 38. 6 p. (Christchurch: Scion, Rural Fire Research Group).

Pyne, S.J. (2001). Fire: A Brief History. (Seattle: University of Washington Press).

Further information

More information on wildfires and communities in New Zealand, including the Scion references cited above, can be found in reports and other Fire Technology Transfer Notes available from the Scion Rural Fire Research website: www.scionresearch.com/fire

"Effective communication is essential to reduce and minimise human-caused rural fires and therefore wildfire events which could impact on New Zealand communities in the future. Findings from the Scion Rural Fire Research Group effective communication project will assist fire agencies to develop future risk-communication strategies and in turn direct communication practices to achieve maximum impact. This research will assist in promoting better community awareness of rural fire risk, prevention of wildfires and improved household, property and community preparedness."

Murray Dudfield, National Rural Fire Officer and Chairperson of the Rural Fire Research Advisory Committee.

Funding for the Scion Rural Fire Research Group is provided by:

National Rural Fire Authority; Ministry of Business, Innovation & Employment Hikina Whakatutuki; New Zealand Defence Force Te Ope Kātua O Aotearoa; Department of Conservation Te Papa Atawhai; Forest Owners Association; Local Government New Zealand te pūtahi matakōkiri; New Zealand Fire Service Commission Whakaratonga Tuī