# TE AHI I TE AO MĀORI

## Māori use of fire: Traditional use of fire to inform current and future fire management in New Zealand

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### Abstract

This paper is the result of a research study of historical knowledge on the use of fire by Māori gathered from published literature and kōrero with kaumātua. It also explores the effects of fire on the landscape of Aotearoa New Zealand and traditional use of fire by rural Māori communities. Some of the oral history of Māori was recorded by early European settlers who lived amongst iwi to document the people and life that once existed in early Aotearoa. These are important documents held in New Zealand as archival treasures. Kōrero with kaumātua in the eastern Bay of Plenty adds to this by drawing on their personal experiences. The events of the past, both written and oral, reveal pertinent background understanding. This will assist with and guide the design of some practical solutions to age-old issues regarding the use of fire and to prevent further wildfires in the future.

### Keywords

te ahi, fire, Māori, traditional, rural

### Introduction

New Zealand's landscape and history have been shaped by fire with Māori and Europeans contributing to both. Fire was an essential part of everyday life for those living in early rural New Zealand. Significant Aotearoa literature, such as *Te Ao Hou* and the *Journal of the*

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*Polynesian Society*, record details of a number of important studies during the 19th century that have captured examples of how Māori and Europeans used fire in New Zealand.

This paper attempts to explore the relationship between Māori and te ahi, and their use of fire as a primary resource and tool. It draws together separate elements of historical knowledge to give a better perspective on Māori use of fire and provides an introduction to understanding traditional use of fire by undertaking three case studies with kaumātua. The rationale for this approach is based on the premise that mātauranga Māori is a useful source of relevant knowledge, information and data that can be used to inform scientific understanding (Ripeka Mercier, Stevens, & Toia, 2012). Retracing the past of our tipuna will aid in the understanding necessary to design strategies to assist in reducing future wildfires, and hence protect and conserve our future forests and natural landscape. The aim of the paper is, therefore, to provide background understanding on the traditional use of fire and some Māori perspectives on Māori use of fire to assist in informing rural fire authorities to undertake their responsibilities.

## Māori fire culture origins

Māori had an established fire culture with associated belief systems and rules surrounding the sacredness of fire and its uses before they arrived in Aotearoa. As part of Māori culture, fire was embedded in kawa and tikanga and was paramount to the preservation of Māori cultural practices and methods, as well as to safeguard the survival of an indigenous culture. In Māori mythology, the creation of fire stems from Au-ahi-turoa, one of the sons of Tama-nui-te-Ra (sun god). Au-ahi-turoa came down from the heavens to earth and married Mahuika (fire conserver), the youngest sister of Hine-nui-i-te po (goddess of the underworld). A legend describes how Maui destroyed all but one of the five fire children of Mahuika. Toiti, the surviving offspring, was personified in the form of the kaikōmako (*Pennantia corymbosa*) tree (Best, 1924a).

Māori associated fire with time and place as well as related concepts such as "ahi kā", which translates to "keeping the ancestral fires burning" ("ahi kā", n.d.). This was done by proving a sustained relationship with the land through the use of whakapapa that connected back to primary ancestors who lived on the land in a specific location or area. The Māori word "ahiahi" is translated to mean "evening" as derived from the word "ahi", since evening was the time when fires were lit ("ahiahi", n.d.).

The published works of Elsdon Best provide detailed accounts of the cultural use of fire, its purpose, and its relationship within te ao Māori during the early 1900s. Best described how Māori had an utmost respect of fire, and considered it as being the most tapu of all the four natural elements (others being water, air and earth) in the natural world. Best (1924b, p. 155) determined that "Māori had a great respect for fire, and spoke of it as a parent of man as he did of a house". This was described by the old aphorism "He mata ahi, he mata tangata", which means "that the fire parent and human parent are equally useful to man".

Many religious ceremonies involved the kindling of special ritual fires. Each ritual required that a new fire be generated. The area where a sacred fire had been kindled was very tapu, until it had been made tapu noa or "made common" by a tohunga. Sacred fires were associated with the tohunga and the tapu of the tūāhu, a sacred place for ritual practices by a tohunga.

## Effect of Māori use of fire on the landscape

Much of New Zealand was covered in native forest when the first Māori Polynesians arrived around 1280 AD (Perry, Wilmshurst, & McGlone, 2014). Tussock grasses dominated

the flatlands while damper districts were covered with bracken fern (*Pteridium esculentum*) and mānuka (*Leptospermum scoparium*) scrub. This densely vegetated terrain made travel difficult for both people and animals, and Māori resorted to the simple device of "burning their way into and through the country" (Rollo, 1994, p. 22). Burning areas to clear land for cultivation and residency was also necessary. In pre-European times, Māori did not possess adequate wood-cutting tools; therefore fire was their principal tool for clearing land. This method was known as "hāpai tū" and included the removal of all timber by fire (Best, 1924b).

There is debate in the international literature about the early human impacts on Aotearoa (Perry et al., 2014), and ethnographical accounts of fire usage by various cultures are growing (Huffman, 2013). Fires ignited by lightning strikes were a key factor in shaping the vegetation cover prior to human habitation (Ogden, Basher, & McGlone, 1998). However, once people arrived, the key agent in forest loss was the introduction of human-lit fires. Many woody ecosystems were highly susceptible to fire as they had previously been exposed to few sources of ignition. Evidence of early human fire activity indicates that forest loss was rapid and intense (McWethy et al., 2010; Perry, Wilmshurst, McGlone, McWethy, & Whitlock, 2012; Perry, Wilmshurst, McGlone, & Napier, 2012). Human actions also increased the frequency of wildfires. As Perry et al. (2014, p. 157) explained:

> The greatly increased fire activity that accompanied human settlement resulted in widespread, and in some cases permanent, shifts in the composition, structure and function of many terrestrial ecosystems. The combined effects of Māori and European fire have left long-lasting legacies in New Zealand's landscapes with the most obvious being the reduction of forest cover from 85–90% to 25% of the land area.

These effects have flowed on to other ecosystems (resulting in the expansion of grasslands (Hobbs et al., 2006) and processes; for example, the pastoral use of fire since European arrival (O'Connor, 1984). A recent review by Christianson (2014) has also noted similar effects in other countries colonised by Europeans.

## Māori use of fire as a tool

### *Food collection, storage and cooking*

Fire was used as a hunting tool to deprive wild game of forest or scrub cover, or to drive them out. This also aided growth of new understorey plants such as bracken fern and grasses (Guild & Dudfield, 2009) as well as clearing land for agricultural cultivation of crops such as kūmara (*Ipomoea batatas*) in māra kai (Simmons, 1969). The process for clearing land to grow kūmara was known as "swiddening". It involved burning the forest edges and planting kūmara in the ashes (Taylor & Smith, 1997).

Māori also dug semi-subterranean rua whakaahu to store kūmara seed tubers (Tapsell, 1941). In colder areas, to aid and stimulate growth, the shallow pits were hollowed out, then warm fire embers were added and covered over with soil. This took place before the pits were lined with dry fern, layers of tubers, more fern, and finally covered with earth and left for three weeks or more. This process was necessary to ensure sprouting. The kūmara had a pest, a large caterpillar, that Māori called hōtete. This pest appeared in great numbers on the kūmara plants and Māori collected and burned them. They also made smouldering fires in their cultivations on which were burned leaves of the kawakawa (*Macropiper excelsum*).The resulting smoke is said to have destroyed the caterpillars (Best, 1941).

The hāngī is a traditional method of cooking (Phillipps, 1956). To make a hāngī, a pit is dug in the ground and large logs are stacked high and specially selected stones are placed on top

and a fire is lit. These stones can reach temperatures of up to 1,100 °C and are ready for use when they turn "white hot". These stones (andesite boulders; Flowers, 2012), which will not easily crack with heat, were referred to as taikowhatu. The wood ashes are removed and the rocks are left to form the basis of the hāngī. Food is then placed on top of the rocks in rourou. Water is poured onto the rocks to form steam and the entire rourou is then covered with cloth and leaves. The entire cooking process takes about three hours. The umu differed from the hāngī in that no stones were used to cook the food. The food was cooked in cast iron pots and placed directly on the hot embers.

### *Māori transport/weapons*

The traditional process of making a waka included the selection, access and removal of a suitable tree trunk, which required the observance of rituals and ceremonies. A tōtara tree (*Podocarpus totara*) would have been selected and prepared years before felling. Tōtara was the preferred wood, due to its high oil content and light weight (Best, 1925). Karakia and incantations would be said, and felling would take place through a combination of fires around the base of the tree and chopping with handheld adzes. When the fire had charred the wood to the depth of 2 to 3 cm or less, it was removed and the charred surface chipped off with adzes, and this process continued until the trunk was severed. The hollowing out of a dugout canoe hull was a similar process to the felling, except done using rows of small fires that were kindled along the trunk as far as the riu was to extend. After the burning, fire was removed and the charred wood chipped away with stone adzes, the fire rekindled and the process repeated.

Fire was also used to harden and aid the bending of wood; for example, in the case of making taiaha and patu or in shaping bark pātua for carrying water or preserving food. The wood or bark was heated with a glowing fire, thereby hardening or assisting it to bend (Bennett, 1956; Downes, 1928).

### *Production and handling of fire*

"Te hika ahi", or the fire plough as known by ethnographers (Best, 1924a), was a tool used by Māori for rubbing two pieces of wood together to produce fire. Te hika or kaikohure was rubbed in a groove formed in a lower piece of wood (kauahi or kaunoti) until smoke, red embers and then fire would appear. Dried bracken fungus (*Polyporus* spp.) was the customary material used to help ignite the friction. The woods most suitable for this purpose were kaikōmako, makomako (*Aristotelia serrata*) and māhoe (*Melicytus ramiflorus*) (Phillipps, 1956). Kaikōmako, māhoe, tōtara, patatē (*Schefflera digitata*) and pukatea (*Laurelia novae-zelandiae*) were seen as the guardian trees of fire (Best, 1924a).

Māori not only carried fire-generating apparatus when travelling, but they often carried live fire by procuring some dry material of slow combustion that would smoulder but not burst into flame. The most commonly used were harakeke (*Phormium tenax*) and bracken fungus (Best, 1927). Māori also made rama from amoka of the tōtara tree, dried leaves of cabbage trees (*Cordyline australis*), or resinous wood such as māpara from kahikatea (*Dacrycarpus dacrydioides*) trees and titaki. The form was a "cigar shaped" torch that was saturated with piro or kato, the fat from young mutton birds. The rama was used for night hunting, setting fire to vegetation and agricultural purposes (Phillipps, 1953).

## Effect of European use of fire on the environment

The arrival of the first European settlers in the 1800s accelerated the use of fire to clear native forest in New Zealand. Kauri (*Agathis australis*) gum diggers alone burned large areas

of kauri forest to clear land (Colenso, 1868; Lloyd, 1979, in Steward & Beveridge, 2010; von Hochstetter, 1867), which led to an estimated 70% reduction in the kauri resource by 1873 (Masters et al., 1955, in Steward & Beveridge, 2010).

Māori customs and practices were affected by the signing of the Treaty of Waitangi in 1840. Subsequent government legislation (Forests Act 1874–1949, followed by the Forest and Rural Fires Act 1947 and its revisions of 1955 and 1977) has had a crucial impact on the regulation of fire use. In addition, fire regulation is covered by other legislation such as the Resource Management Act 1991 (hazard identification and smoke discharge; sections 5 and 15); Local Government Act 2002 (removal of scrub and so forth likely to constitute a fire hazard; section 183); and the Conservation Act 1987 (the Department of Conservation must perform the functions conferred on it by the Forest and Rural Fires Act; section 6[g]).

Significant fires occurred following the arrival of European settlers. Up until 1987, at least one major forest fire (> 500 ha) occurred nationally each decade within exotic and indigenous forest, with a loss of 40,000 ha of exotic forest plantations since 1946 (Pearce, Cameron, Anderson, & Dudfield, 2008). The Department of Conservation has estimated that between 1965 and 1985 a total of 1,629 fires burned a total of 80,000 ha of indigenous forest (Forest and Rural Fires Association of New Zealand, 2012).

Today the National Rural Fire Authority has the responsibility for coordinating fire control in New Zealand's forest and rural areas as determined by the Forest and Rural Fire Act 1977. Rural fire authorities carry out operational fire control and other rural fire management activities throughout New Zealand, including mitigation of human-caused fires and education of communities in the safe use of fire and preparedness in case they are threatened by wildfires in the future. Fire is still used as a land management tool (but only under controlled circumstances) in most areas of New Zealand. It is used for farming practices, such as the clearance of crop residues and woody weed vegetation and stimulating pasture growth (Aspinall, 2001), as it is one of the most cost-effective tools available to landowners. However, escaped land-clearing burns were the most common cause of wildfires with known causes, accounting for 20% of the total number of rural fires and almost half the area burned from 1991 to 2007 (Anderson, Doherty, & Pearce, 2008). In general, the use of fire to clear land is considered a high risk and can be costly to extinguish if it gets out of control. For example, fire is no longer considered an acceptable management option on Department of Conservation-administered land because of risk concerns (Gous, Raal, & Watt, 2014). There are numerous examples of wildfires damaging rural land, and sometimes forest and dwellings, every year. Therefore rural fire authorities routinely impose restrictions and bans to reduce the risk of uncontrolled fires, and attempt to communicate messages to landowners and recreational users to use fire carefully to limit the number of wildfires.

Rural fire authorities will benefit from an increased understanding of past and present use of fire by Māori. This will aid their work with rural communities to increase awareness of the risk of wildfires and to design strategies to communicate safe controlled use of fire more effectively, thereby minimising the chances of future wildfire events. Significant areas of rural land are in Māori ownership or management, and this area is increasing as a result of Treaty settlements and Māori economic development. It is important that rural fire authorities appreciate Māori perspectives on land management, and the role of fire in this, so that they can work effectively with Māori landowners to protect the rural environment, forest and other assets, and continue to maintain the use of fire as an effective tool.

## Case study kaupapa Māori theory approach

Three case studies with kaumātua kōrero were conducted to gather relevant information on the historical knowledge of Māori fire use in rural communities.

The theoretical approach of kaupapa Māori was considered appropriate in the case studies as it is aligned within te ao Māori me ngā tikanga. A key element in the discussion of kaupapa Māori is the centrality of "te reo me ona tikanga" and kaupapa Māori ethics demand that the mana of the relationship is maintained. Relationships involve research or consultation and extend beyond the individual researchers or facilitators and participants. This process includes taking the time to allow prospective participants to explore the āhua of the research or facilitator, being flexible, and allowing individuals and groups to choose or select their own participants in the process. In addition, it follows the appropriate protocols, including acceptance of manaakitanga and being prepared to be questioned and challenged at times. Researchers and facilitators need to follow the kawa of the "home people"; that is, the participants (Milne, 2005).

Nepe (1991) described the "conceptualisation of Māori knowledge" as being developed through oral tradition. It is the process by which the Māori mind receives, internalises, differentiates and formulates ideas and knowledge exclusively through te reo Māori and is "tūturu Māori". It is knowledge that validates a Māori worldview, and is owned and controlled by Māori. Underpinning these guiding principles, there is an unwritten lore where discretion is given to those who seek knowledge by those who give the knowledge.

## Case study methodology—kanohi ki te kanohi

A detailed examination of existing documented material in books, published journals and websites was undertaken as part of the methodology adopted. Kanohi ki te kanohi was the preferred method for the interviews with kaumātua.

Traditionally, knowledge is not universally available; rather, it is entrusted to chosen individuals who ensure its accurate transmission and appropriate use for the good of the people (Makareti, 1986; Mead, 2003; Smith, 1999). Hence, three kaumātua living in surrounding areas of the eastern Bay of Plenty were approached to partake in this research to initiate the understanding of Māori use of fire. The kaumātua were offered to sign a written consent form to participate in the research (although one kaumātua did not want to sign the form, he did agree to the interview). The interviews were conducted in the chosen surroundings of each kaumātua, reflecting their life experiences and knowledge passed down from their tipuna. A tono was prepared indicating where they felt most comfortable. The intention, purpose and sponsors of the project were explained to each kaumātua. Part of each interview was conducted by providing 10 structured questions that were designed to generate open discussion about their knowledge and experience with fire from a personal and whānau perspective. The kaumātua who participated considered it a privilege and great opportunity to be asked to share their knowledge and experiences with others. They gave kōrero in both te reo Māori and English to best express and give true context to the meaning of their kōrero.

## Case study results

Three case studies were conducted with kaumātua from the areas of Te Urewera and Tarawera Forest, located in the eastern Bay of Plenty. These areas have significant historical meaning to iwi and were aptly named due to historical events that occurred (each place name ends in "wera"). The kaumātua expressed historical knowledge and traditional use of fire from

their life experiences growing up in rural Māori communities. Their contribution was a primary input into this research and the information they provided was invaluable. The three kaumātua shared a common knowledge of kaupapa Māori and understood the holistic approach in alignment with te ao Māori me ngā tikanga.

### *Case study 1: Te Urewera, Rūātoki*

The location of the first case study was in the north-east boundary of Te Urewera National Park, in the small rural community of Rūātoki. This is the home of the Ngāi Tūhoe iwi. "Matua" (to retain anonymity) has lived here most of his life, is well-known and respected amongst his iwi, and holds much knowledge of the area and its history. As a kaitiaki of the ngahere, he believes it is his duty to preserve and protect this environment. In his own words, he described Te Urewera as "te pātaka kai". It has long provided food, sustenance and a wonderful lifestyle for whānau and iwi. The use of fire is long embedded in Tūhoe history relating to its people and landscape. The name Te Urewera derives from a tawhito kōrero of a chief's son who burnt his genital area whilst sleeping too close to a fire, hence ure and wera.

Matua described how his tipuna carried fire while travelling or preserved it for future use. They learnt how to cover the warm embers and ashes in the earth and then reignite by blowing on them. He said this method was known as "tamou" (this is a term used only by Ngāi Tūhoe). He also recalled his tipuna talking of the benefit from burning mānuka to produce smoke, which helped to pacify the honey bee while gathering honey. This practice was known as "te nanao mīere". The preferred trees honeybees would pollinate were the mānuka, rewarewa (*Knightia excelsa*) and tawhero (*Weinmannia silvicola*).

The dense native forest of Te Urewera is lush and green; therefore the threat of fire was not of great concern. However, in the summer season, the undergrowth can become very dry and threaten the forest, if a fire were to be caused by human activity. When asked what would be his first point of contact or action if there was a fire, wild or out of control, his response was:

> Due to the area's location and isolation, it is better to put in place preventative measures by monitoring people traffic such as who is entering the bush, for what purpose and for how long, especially during the summer season.

Matua considered that it was necessary to know what is going on in the local community, marae, and with neighbours, and any activity that may be of concern such as burning of vegetation or rubbish. He emphasised that teaching others about fire safety and explaining why they need to know about fire is important. Sharing responsibility within a wider community rather than concentrating it in just a few individuals made sense to him when living out in rural areas as there is more reliance on your neighbour, in times of dire need, rather than waiting for authority services to arrive. However, he also said it is essential to know who the "key" people are in the community to contact in emergency situations. He added that modern technology, such as cell phones and handheld radios, has helped to improve communication and can save time and costs. Teachings of kaitiakitanga, kāinga tūturu and leaving behind a future legacy for mokopuna were good reasons Matua considered for why you should care for your natural environment, including preventing fires.

### *Case study 2: Tarawera Forest*

The small forestry mill town of Kawerau is the entrance into the Tarawera Forest. "Uncle" grew up in and around the Tarawera Forest. He remembered it as being a popular hunting area and workplace for many of the local timber mill and forestry workers.

In the literature, the common translation of Tarawera is "burning spears". When asked

to give his interpretation of Tarawera, he explained: "There were three peaks before the explosion of the Mount Tarawera in 1886. They were known as Ruawāhia [highest peak], Tarawera and Te Umanga. After the eruption, the only peak that remained was Tarawera." Uncle's recollection of growing up in this area and the use of fire remains strong. His early years as a hunter were good years. The Tarawera Forest provided a supply of fresh meat such as pig and deer. The bush was dense with native trees, particularly mānuka, kānuka (*Kunzea ericoides*) and kahikatea. He remembered that fires would sometimes be lit to clear the way so travel through vegetation was easier. Areas chosen were generally small, and each hunter usually carried a "sugar bag" sack to put out the fire, once it had burnt off enough scrub. They knew never to light fires on windy days or during the summer season, although he admitted it was sometimes just "luck" that these fires did not get out of control.

One incident of a forest fire, which Uncle described as being the biggest fire he had ever seen in the forest, was caused by careless human activity. The fire service had very limited resources at the time, which meant the Tarawera community helped to put out the fire. Luckily, the Tarawera River runs directly through the forest and water was easily accessible. There have been many reported minor fire incidences over the years. However, he considered that these became more frequent and threatening when the Tarawera Forest was planted in radiata pine (*Pinus radiata*), replacing the native flora, which was primarily to promote and provide timber for domestic and subsequently for export revenue. In the area of Maungawhakamana, located at the southern end of the Rotomā Ranges in the eastern Bay of Plenty, he spoke of an old kauri tree still standing that is partially burnt around the entire mid-section of the trunk. It has old burn markings of about 2.5 cm in depth, which suggest an unsuccessful felling attempt using fire (as reported above).

### *Case study 3: Onepū District*

The small settlement of Onepū is just behind the Norske Skog paper mill located between Kawerau and Te Teko. This is the papakāinga of "Nan" who grew up in a small rural community during the 1950s and 1960s. She shared fond memories of how fire was an important part of rural living, used in the home, at school and on the marae, as well as for seasonal burning of vegetation. Nan recalled that there was no electricity supplied to this area at the time, therefore kerosene lanterns or handmade candles were the only means of light to see in the dark. Candle wicks made from plaited cloth were saturated in pig or cow fat, as this was slow burning. The wood fire had a multipurpose function as it was used for cooking and for heating the home. The cooking was done inside and outside, when occasions such as whānau or community gatherings took place. Nan referred to umu rather than hāngī-style fire to cook kai as no stones were used (though they were plentiful due to the topography of the area). Food was put in cast iron pots and placed directly on the hot embers, then partially covered with earth and left to cook. According to tradition, the hāngī was only dug on the marae and the customary practice of making, laying and upheaving the hāngī was handled only by men. The task of preparing the food was done by women. Mānuka and kānuka woods were plentiful in the area and used as the main source of fuel to heat hāngī stones.

Nan explained that the old outside "copper" was lit for heating water to bathe and wash clothes. An open fireplace provided warmth inside and lighting to read. Other domestic uses of fire, such as heating tools for ironing clothes, soldering and horse-shoeing, were common. The old mission school house had a huge open fireplace, which was lit nearly every day to provide light and warmth. It was a job for the boys to keep it well stacked and stoked. The only air ventilation was a window or the door.

Land was cleared by burning in preparation

for planting new crops, as this method was both fast and clean. Water-soaked sugar bags were always on the side, ready in case the fire got out of control. The burning of rubbish and greenery was done seasonally. Nan also recalled that, as a child, fire was not something to fear. Remembering the nights sleeping under the stars, the campfire was like a welcomed friend. To help pass time, the fire provided entertainment, protection and comfort. She was always told never to play with matches and to be cautious with fire.

## Discussion

The research summarised in this paper provides initial research on the historic use of fire by Māori and background on the relationship of te ahi as a natural element of te taiao Māori and Māori people. Traditional Māori belief is that fires are an intrinsic part of their natural environment and connect through whakapapa to their tipuna, Ranginui (sky father) and Papatūānuku (earth mother). Māori brought fire to Aotearoa when they migrated from Hawaiki. Fire became an important and useful tool and resource. Throughout Māori history, fire has contributed to changing and reshaping the native forest landscape of Aotearoa. The use of fire by Māori has played a significant role in their culture, land and people. The case studies with kaumātua provide a further historical perspective and a greater understanding of Māori use of fire to guide current and future fire management. Although, to date, no specific fires have been attributed to Māori, New Zealand human activity is responsible for the vast majority of wildfires and can therefore arguably be largely prevented.

Those who participated in this research study developed an interest and raised awareness of fire and were surprised by how much they knew or did not know about fire and its use. The historical use and knowledge of fire by Māori was more relevant to kaumātua who grew up and lived amongst those of the past era. The perception of fire compared with past and present generations has changed dramatically over time. Older generations described fire as being part of their everyday basic necessity for domestic use. Tamariki were taught by elders to respect fire, and they knew it provided warmth, food and comfort. Kaumātua talked about differing cultural attitudes they had experienced over their lifetime and reflected that now the younger generation considers fire as more a threat than as a tool.

The knowledge presented here provides a positive step towards gaining a better understanding of Māori perspectives on Māori use of fire in the past to assist in informing rural fire authorities to undertake their rural fire management and fire risk mitigation responsibilities for Māori within New Zealand communities. An increased understanding of past and present use of fire by Māori will aid rural fire authorities in their work with rural communities to increase awareness of the risk of wildfires and to design strategies to communicate safe, controlled use of fire more effectively, thereby minimising the chances of future wildfire events. A significant proportion of New Zealand's rural land is in Māori ownership or management, and this area is increasing as a result of Treaty settlements and Māori economic development. The use of fire as a land management tool remains for all land managers despite its inherent risk of uncontrolled wildfires. It is therefore important that rural fire authorities appreciate Māori perspectives on land management, and the role of fire in this, so that they can work effectively with Māori landowners to protect the rural environment, forest and other assets, and continue to maintain the use of fire as an effective tool. More knowledge is required to understand Māori and their present use of fire, their current fire risk and preparedness levels. It is important for rural fire authorities, as well as Māori themselves, to ensure Māori are adequately prepared if wildfires occur near their homes, and to develop appropriate fire risk mitigation

strategies to ensure wildfire ignitions do not occur from Māori use of fire in the future.

A cooperative and meaningful working relationship between Māori and all relevant stakeholders in government, public and private sectors needs to be developed to enable partnerships that can assist, educate and inform on both rural and urban fire issues. This needs to include focus on how to increase awareness, decrease careless use of fire and increase preparedness for wildfires. There are opportunities to better integrate and "piggy-back" rural fire messages and education onto urban messages, particularly for household fire prevention and protection within buildings, including homes and marae. Māori need to be active participants in determining appropriate communication messages and strategies to ensure careful use of fire in their communities. Community participation using indigenous knowledge and natural resources should guide the development of strategies to improve dialogue between Māori and fire managers in planning more effective communication of fire risk and use of fire for rural communities. It is important that each stakeholder actively partners with Māori to nurture these processes and to work with rural and urban fire authorities to reduce fire risk and better prepare rural areas and rural communities to minimise wildfire events.

## Conclusions

A common shared understanding by those who participated in this research was the importance of fire within te ao Māori, in terms of whakapapa, land, history and iwi. Government legislation has been a key mechanism that has put restrictions on land use, resulting in the decline of traditional Māori practices and methods of fire use. Similarly, today's societal values and perspectives of fire have changed with respect to fire being seen as more of a managed activity rather than a customary practice or method.

Indigenous knowledge and skills of Māori and fire use still have an important role in the conservation and protection of the natural environment of Aotearoa. Further study is needed to understand the differences and commonalities of learning between the Māori perspective and the Western science approach. Māori indigenous knowledge and skills are key components for providing a greater understanding of present day use of fire by Māori in the rural landscape, whilst retaining traditional and cultural practices of fire use. Further knowledge will be required to gain an in-depth understanding of Māori and their use of fire, and the risks relating to fire in the landscape and home. This improved understanding can then be used to guide the design of effective strategies to communicate these fire risks, as well the continued use of fire as a tool in appropriate circumstances in the future.

## Acknowledgements

The authors acknowledge all those who contributed their knowledge, kōrero and sharing of their life experiences in terms of this kaupapa. This research would not have been possible without the contribution of information and invaluable knowledge given by kaumātua, whānau and friends. The study was undertaken as a summer student internship funded by Scion, with writing support from Dr Ruth Falshaw and guidance from Grant Pearce. This support was greatly appreciated.

## Glossary

| | |
|---|---|
| ahi | fire/burn |
| ahi kā | keeping ancestral fires burning |
| ahiahi | evening |
| āhua | appearance, character |
| amoka | thick bark of tōtara tree (Māori Stewart Island term) |

| | |
|---|---|
| ao | world, domain |
| hāngī | earthen oven |
| hāpai tū | land clearing by fire |
| harakeke | New Zealand flax (*Phormium tenax*) |
| hika | pointed stick rubbed on grove in kauahi or kaunoti to create fire |
| hōtete | a large caterpillar (*Agrius convolvuli*) |
| iwi | tribe/tribal |
| kahikatea | white pine (*Dacrycarpus dacrydioides*) |
| kaikohure | pointed stick rubbed on grove in kauahi or kaunoti to create fire |
| kaikōmako | *Pennantia corymbosa* |
| kāinga tūturu | home of origin, the homeland |
| kaitiaki | guardian/caretaker |
| kaitiakitanga | guardianship |
| kanohi ki te kanohi | face to face |
| kānuka | white teatree (*Kunzea ericoides*) |
| karakia | prayers |
| kato | muttonbird fat |
| kauahi or kaunoti | wood rubbed by a stick to create fire |
| kaumātua | elders |
| kaupapa | subject, matter |
| kawa | Māori lore |
| kawakawa | pepper tree (*Macropiper excelsum*) |
| kōrero | discussion |
| kūmara | sweet potato |
| māhoe | whiteywood (*Melicytus ramiflorus*) |
| makomako | wineberry (*Aristotelia serrata*) |
| mana | integrity |
| manaakitanga | hospitality, kindness |
| mānuka | tea tree (*Leptospermum scoparium*) |
| māpara | heartwood—especially of kahikatea and rimu |
| māra kai | food garden |
| marae | physical, communal meeting place of significance |
| mātauranga | knowledge/wisdom |
| me ngā tikanga | Māori worldview and customs |
| mīere | honey |
| mokopuna | grandchild |
| nanao | to feel or lay hold of |
| ngahere | forest |
| papakāinga | homestead |
| pātaka kai | food cupboard |
| patu | Māori weapon |
| pātua | vessel or basket |
| piro | muttonbird fat |
| pukatea | *Laurelia novae-zelandiae* |
| rama | torches |
| riu | hold of a canoe |
| rourou | baskets |
| rua whakaahu | store pit for seed tubers |
| taiaha | Māori weapon |
| taikowhatu | hāngī stones, which do not easily crack with heat |
| tamariki | children |
| tamou | reigniting embers |
| tapu | sacred |
| tapu noa | free from tapu or "made common" by a tohunga |
| tawhero | *Weinmannia silvicola* |
| tawhito kōrero | ancient story |
| te hika ahi | the fire plough |
| te reo | the Māori language |
| te reo me ona tikanga | the Māori language and philosophies |
| te taiao | natural environment |
| tikanga | Māori custom/ philosophies |
| tipuna | ancestors |
| titaki | dried grass (Māori Stewart Island term) |
| tohunga | skilled person |
| tono | to ask or request |
| tōtara | *Podocarpus totara* |
| tūāhu | sacred place for ritual practices by a tohunga |

| | |
|---|---|
| tūturu | original |
| umu | cooking with hot embers |
| ure or uri | penis |
| waka | canoe |
| wera | burn/hot |
| whakapapa | genealogical ties |
| whānau | family group |

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