



FIRE INVESTIGATION REPORT

State Highway 47, National Park, 3989



Incident Information:
F4353497
Vegetation Fire
01:11 PM 08 December 2025

Report completed by:
Detheridge-Davies, Grant, Fire Investigator
Fire and Emergency New Zealand, Te Ūpoko

Table of contents

Author's brief	3
Executive summary	4
Terms of Reference	5
Incident Background	5
Objectives	5
Scope	5
Land Use and Description	6
Property and Land Use	6
Overall Summary	6
Pre-Incident Events	7
Discovery of Fire	8
Fire and Emergency New Zealand Response	9
Scene Examination	10
Scene Examination-Exterior	10
Scene Examination-Interior	13
Fire Spread and Behaviour	14
Today's FWI Measurements	14
Previous Day FWI Measurements	15
Overall Fire Spread and Behaviour Summary	17
Conclusions	18
General Area of Origin	18
Specific Area of Origin	18
Ignition Area	18
Ignition Source	18
First Fuel Ignited	18
Circumstances of Ignition	18
Supposed Cause	18
Burnt Area	18
Fire Classification	18
Elimination of Other Possible Causes	19
Report Approvals	20

Author's brief

My full name is Grant Detheridge-Davies. I am a Specialist Wildfire Fire Investigator for Fire and Emergency New Zealand.

I have served with Fire and Emergency since July 2017. I have been responsible for determining the origin and cause of wildfires since 2015 with the National Rural Fire Authority and now Fire and Emergency.

I have completed the following training courses:

Fire Investigation (Vegetation) L1 in 2015

Fire Investigation (Vegetation) L2 Unit Standard 10615 in 2017 (With refresher training in September 2023)

Fire Investigation (Structural) FI1 in 2018

I have experience in both structural and wildfire firefighting over a period of 25 years and gained experience in Wildland environment fire investigation during this time.

I have the following memberships:

EMPS Register Fire Investigator

I have the following additional experience:

National Certificate in Fire and Rescue (Vegetation) (L4) 2016

National Unit Standard in Intermediate Fire Behaviour 2014

National Unit Standard in fire environment on vegetation 2009

I was appointed as a FENZ Inspector under Section 166 of the Fire and Emergency New Zealand Act on the 1 July 2017

Executive summary

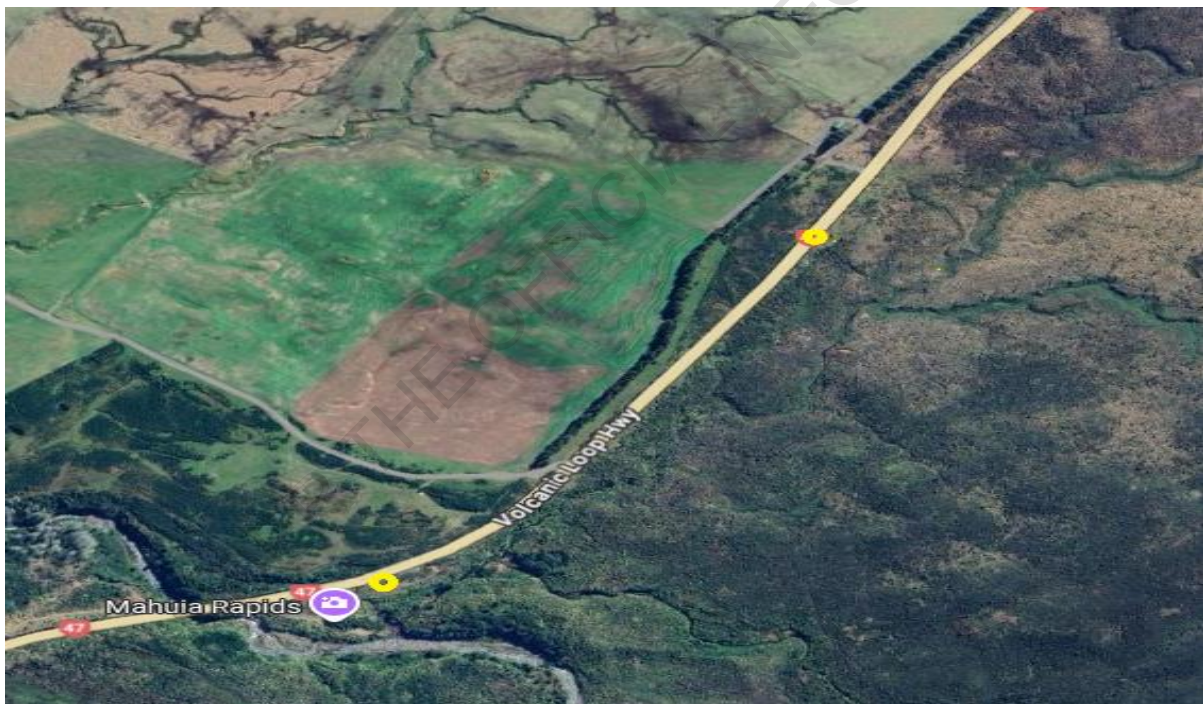
On 8 December at 01:11 p.m. Fire and Emergency, New Zealand received a 111 call to several vegetation fires on Volcanic Loop Highway SH 47.

An overflying helicopter reported the fire as over an 1/2-hectare in size and growing. Due to fire conditions a 3rd alarm and request for 3 helicopters was transmitted.

The first arriving crew National Park 281 transmitted a K66 confirming a vegetation fire with multiple seats of fire which were growing rapidly.

Specialist fire investigator, Grant Detheridge-Davies, attended the scene.

Based on physical evidence gathered at the scene, supported by witness statements and photographs it was concluded the probable cause of the fire was a trailer being towed by a camper van having a flat tire then breaking an axle, resulting in the underside of the trailer contacting the road surface creating hot metal sparks setting roadside vegetation on fire.



Map: Yellow dots approximate location of ignition areas, Between GPS coordinates -39.1411026 175.5147524 and -39.146477, 175.509085

For Fire and Emergency statistical purposes the cause of the fire has been classified as accidental.

Terms of Reference

Sponsor: Dravitzki, Nigel - District Manager

Incident Background

Multiple vegetation fires were reported at 1:11 p.m. on 8 December 2025 located on SH 47 on the side of the road in the Tongariro National Park area.

Specialist fire investigator Grant Detheridge Davies attended the scene, on the 10 December 2025.

The origin of the fire was located at multiple sites beside SH 47 in the water table area of the left lane as you travel south towards Waimarino.

The location contained various types of vegetation, predominantly tussock grasses and flaxes as first fuels.

The reason for the attendance of a SFI was: Vegetation Fire.

Objectives

Origin and Cause

Scope

Nil given

Land Use and Description

Fire was roadside, SH47, in Tongariro National Park.

Property and Land Use

Property Ownership	Land Use	More Information
Other	Road Reserve	
Services		

Overall Summary

Fires were along the side of SH47 road reserve which bordered PCL land, Tongariro National Park. The eastern side of the road reserve borders the Tongariro National Park, which is a world heritage site.

The western side of the road reserve borders farmland.

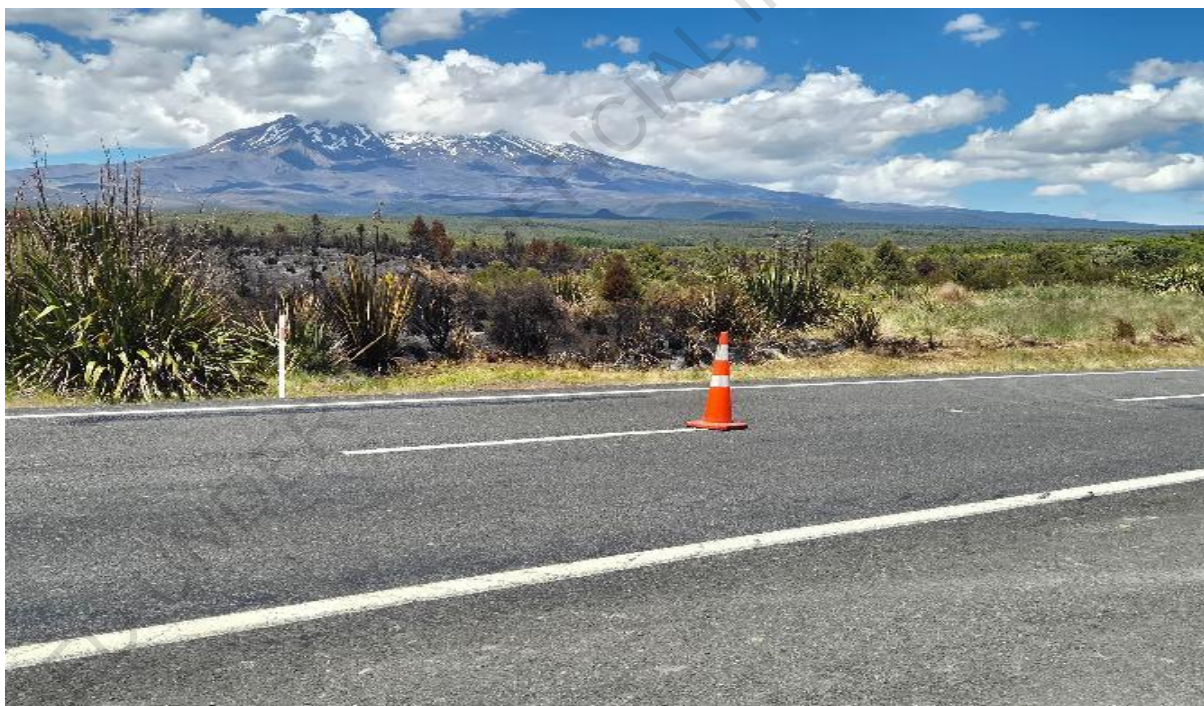


Figure 1. One of the fire start locations

Pre-Incident Events

Motorists traveling north on SH47, between SH48 and Mangapopo reported seeing a camper van towing a trailer travelling South toward Waimarino, the towed trailer was emitting large number of sparks onto the side road from what appeared to be a major mechanical fault.

Fire season status was Open.

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982

Discovery of Fire

Motorists traveling north on SH47, between SH48 and Mangapopo reported seeing a camper van towing a trailer traveling South toward Waimarino, the towed trailer was emitting a large number of sparks onto the side road from what appeared to be a major mechanical fault.

As the motorists carried on, they saw smoke and came across a number of fires started on the roadside, they rang 111.



Figure 2. Photo taken by witness of the most southern fire start after they had passed the trailer traveling in the opposite direction

Fire and Emergency New Zealand Response

Information sourced from Fire and Emergency Computer Aided Despatch Incident Report.

Incident Number	F4353497
Incident Date Time	08 Dec 2025, 01:11:00 PM
Call Type	
Method Call Received	
First Arriving Fire Appliance	NATI281
First Fire Appliance Arrival Time	01:29 PM
Second Arriving Fire Appliance	WHAK2920
Second Fire Appliance Arrival Time	01:47 PM

Scene Examination

Scene Examination-Exterior

First callers mentioned a camper van dragging a damaged trailer along SH47, with the trailer emitting showers of sparks onto the roadside.

They then observed several fires started along the roadside where the camper and trailer had passed.

Information from the first arriving FENZ appliance and passing police officers confirmed at least 4 fires started on the road over approximately 850m.

On inspecting the road, black marks showed where the trailer first had an issue with what looks like a tire blow out, just north of the SH47 and Mangapopo Road intersection.

Just south of this intersection deep cuts into the road surface with large amounts of displaced roading material showed where the axle broke on the trailer which would have caused the overside of the trailer and broken axle to come in contact with the road surface, due to the speed of the towing vehicle this would have resulted in sparks being produced.

Damage to the road surface was also observed at multiple points along the 4.5Km stretch of SH47 from the first marks observed on the road to where the camper and trailer stopped at the intersection of SH47 and SH48

Damage to the road surface was identified before and alongside the identified fire start points.

The use of a magnet and metal detector confirmed the presentence of metal filings and steel pieces in and around these drag marks, most showing they had been subjected to high temperature.

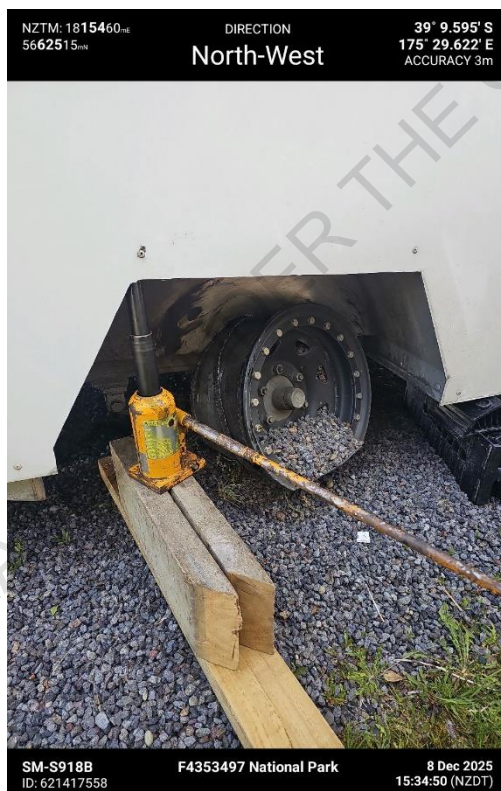


Figure 3.

Trailer damaged wheel and broken axle.

Photo from Police



Figure 4. and 5. Road damage caused by broken trailer axle



Figure 5.

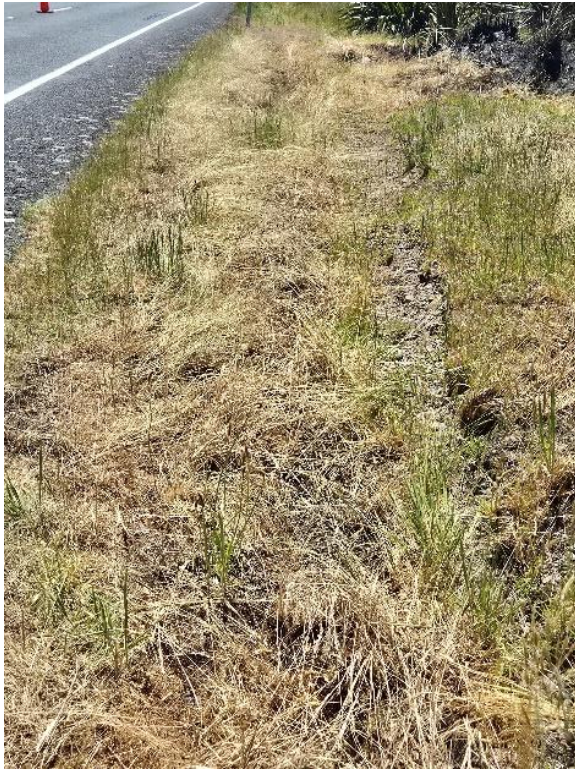


Figure 6. Roadside vegetation



Figure 7. Southern fire start

Scene Examination-Interior

Due to a fire investigator not being available to attend the event until 2 days after ignition several areas had been affected by suppression activities.

The general origin area for four fire starts was identified through witness statements and discussion with the OIC's from the first arriving appliances.

Where possible fire directional indicators were identified to confirm these, the indicators identified were protection, angle of charr, charring and grass stem fall.

This information confirmed the specific origin area in all four cases; it also identified a possible fifth that had quickly merged with one of the others.



Figure 8. Shows ignition area and fire progression from roadside up the bank into a higher fuel load.



Figure 9. Shows fire progression in Fig 8. from the top of the bank out into the general origin area.

Fire Spread and Behaviour

Today's FWI Measurements

Remote Automatic Weather Station (RAWS)

Station Name: Manawatu-Whanganui National Park Township - NAT

Date: 08 Dec 2025, 1pm

Fire Danger Class

Forest	Scrub	Grass	FFMC	DMC	DC	BUI	ISI	RH %	WS	GUSTING	FWI	GC %
Low	Extreme	Moderate	86.4	7.5	32.6	9.6	6.4	60	15	25	6.7	30

Up-to-date weather observations and forecasts are crucial for determining fire danger and fire behaviour.

Fine Fuel Moisture Code (FFMC): 86.4

Numerical rating of the moisture content of the surface litter and other cured fine fuels. It indicates the relative ease of ignition and flammability of fine fuels.

Ignition Potential -Easy

Duff Moisture Code (DMC): 7.5

Numerical rating of average moisture content of loosely compact organic layer of moderate depth.

Mop up needs - little

Drought Code (DC): 32.6

Numeric rating of the average moisture content of deep compact, organic layers. This code is a useful indicator of seasonal drought effects on forest fuels, and the amount of smouldering in deep duff layers and large logs that would occur during a fire. A DC of 300+ indicates mop up will be difficult and prolonged.

Mop up needs - little

Build Up Index (BUI): 9.6

The BUI is a numerical rating of the total amount of fuel available for combustion that combines the Duff Moisture Code (DMC) and the Drought Code (DC). A BUI of >60 is considered as Very High.

Difficulty of control - easy

Initial Spread Index (ISI): 6.4

The ISI is a numerical rating of the expected rate of fire spread shortly after ignition. It combines the effects of wind and FFMC on the rate of spread without the influence of variable quantities of fuel. An ISI of 8-15 indicates rapid spread of fire. An ISI of 16+ indicates an extremely fast-moving fire.

Rate of spread - Moderately fast

Relative Humidity (RH): 88

Relative Humidity is the amount of moisture in the air compared with the amount of moisture the air can hold. When the air is saturated, its RH is 100%, extremely dry air can have a reading of zero percent. Relative humidity % Below 60% contributes to fire development Below 30% contributes to rapid fire development Below 15% contributes to extremely rapid-fire development.

Wind Speed: 15 Gusting : 25

Fire Weather Index (FWI): 6.7

Numerical rating of fire intensity that combines ISI and BUI. It indicates the likely intensity of a fire and is suitable as a general index of fire danger.

Grass Curing : 30

Describes the seasonal die-off of grasslands. The proportion of dead material within the grass fuel complex expressed as a percentage.

Previous Day FWI Measurements

Remote Automatic Weather Station (RAWS)

Station Name: Manawatu-Whanganui National Park Township - NAT

Date: 07 Dec 2025, 1pm

Fire Danger Class

Forest	Scrub	Grass	FFMC	DMC	DC	BUI	ISI	RH %	WS	GUSTING	FWI	GC %
Low	Extreme	Moderate	86.3	5.6	24.5	6.2	6.9	48	19.8	31	6.3	30

Up-to-date weather observations and forecasts are crucial for determining fire danger and fire behaviour.

Fine Fuel Moisture Code (FFMC): 86.3

Numerical rating of the moisture content of the surface litter and other cured fine fuels. It indicates the relative ease of ignition and flammability of fine fuels.

Ignition Potential -Easy

Duff Moisture Code (DMC): 5.6

Numerical rating of average moisture content of loosely compact organic layer of moderate depth.
--

Mop up needs - little

Drought Code (DC): 24.5

Numeric rating of the average moisture content of deep compact, organic layers. This code is a useful indicator of seasonal drought effects on forest fuels, and the amount of smouldering in deep duff layers and large logs that would occur during a fire. A DC of 300+ indicates mop up will be difficult and prolonged.
--

Mop up needs - little

Build Up Index (BUI): 6.2

The BUI is a numerical rating of the total amount of fuel available for combustion that combines the Duff Moisture Code (DMC) and the Drought Code (DC). A BUI of >60 is considered as Very High.

Difficulty of control - easy

Initial Spread Index (ISI): 6.9
--

The ISI is a numerical rating of the expected rate of fire spread shortly after ignition. It combines the effects of wind and FFMC on the rate of spread without the influence of variable quantities of fuel. An ISI of 8-15 indicates rapid spread of fire. An ISI of 16+ indicates an extremely fast-moving fire.
--

Rate of spread - Moderately fast

Relative Humidity (RH): 48

Relative Humidity is the amount of moisture in the air compared with the amount of moisture the air can hold. When the air is saturated, its RH is 100%, extremely dry air can have a reading of zero percent. Relative humidity % Below 60% contributes to fire development Below 30% contributes to rapid fire development Below 15% contributes to extremely rapid-fire development.

Wind Speed: 19.8 Gusting :

Fire Weather Index (FWI): 6.3

Numerical rating of fire intensity that combines ISI and BUI. It indicates the likely intensity of a fire and is suitable as a general index of fire danger.
--

Grass Curing : 30

Describes the seasonal die-off of grasslands. The proportion of dead material within the grass fuel complex expressed as a percentage.
--

Overall Fire Spread and Behaviour Summary

Once the tussock grass on the side of the road was ignited, the fire quickly spread to other surrounding dry fuels.

Scrub fuels such as turpentine Shrubs/bushes, alpine cedars and flaxes generally remain in the elevated fire danger category. On the day of the fire, scrub fuels had an Extreme fire rating.

This along with a 15Km/h wind recorded at the National Park RAWS enabled the fire to increase in fire intensity and rate of spread, becoming a high intensity and fast-moving fire.

Witnesses said the fires grew and merged at a fast rate.

Conclusions

General Area of Origin

General area of origin was roadside along almost a kilometre of SH47 alongside Tongariro National Park.

Fire spread from roadside to burn through approximately 300 hectares.

Specific Area of Origin

Four specific areas of origin were identified along an almost kilometre of SH47 alongside Tongariro National Park.

Ignition Area

Four ignition areas were identified along an almost kilometre of SH47 alongside Tongariro National Park.

Ignition Source

Sparks from a towed trailer with a damaged wheel and broken axle being dragged along the road surface which created high temperature sparks that were sprayed into roadside vegetation.

First Fuel Ignited

Tussock Grass.

Circumstances of Ignition

Sparks from a towed trailer with a damaged wheel and broken axle coming in contact with dry vegetation on the roadside.

Supposed Cause

Trailer with a damaged wheel and broken axle being towed by a camper van, being dragged at speed causing the under carriage and broken axle of the trailer to be dragged across the road surface which created high temperature sparks.

Burnt Area

Approximately 296ha.

Fire Classification

Fire Classification: Accidental.

Elimination of Other Possible Causes

Ignition Source	Lightning (No Damage - Non Competent)
More Details	No recorded lighting in the area at that time
Ignition Source	Electric Fences (No Damage - Non Competent)
More Details	No electric fence in the area
Ignition Source	Incendiary Devices / Accelerants (No Damage - Non Competent)
More Details	No evidence was collected to suggest any incendiary devices or accelerants were in the vicinity
Ignition Source	Power Lines (No Damage - Non Competent)
More Details	No Powerlines in the area of fire start
Ignition Source	Spontaneous Combustion (No Damage - Non Competent)
More Details	No sign of recent roadside mowing or the dumping of garden waste was found
Ignition Source	Cutting, Welding, Grinding (No Damage - Non Competent)
More Details	No workers of this nature were reported in the area

Report Approvals

Investigation and report completed for and on behalf of Fire and Emergency by:

Investigator

Name : Detheridge-Davies, Grant
Job Title : Fire Investigator
Date : 20 Jan 2026 02:30 PM

I confirm the truth and accuracy of this report. I make this statement with the knowledge that the report may be used in legal proceedings. I am aware that it is an offence to make a statement that is known by me to be false or intended by me to mislead.

A technical review of this report has been completed by:

Name : Foley, John
Job Title : Fire Research and Investigation Unit
Date : 22 Jan 2026 01:23 PM

This report has been approved by:

Name : Madgwick, Barry
Job Title : Test
Date : 23 Jan 2026 01:08 PM