Activity controls to manage wildfire risk within reserves

Note: All trigger points are based on the Fire and Emergency NZ (FENZ) "Establish triggers for voluntary restrictions on high fire risk activities" (2022) publication.

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QUEENSTOWN LAKES DISTRICT COUNCIL

Overview

The purpose of this document is to create a standardised methodology to provide activity and event controls in relation to ignition risks associated with wildfire conditions. The intended audience is permit holders, lessees, event organisers, volunteers, council employees and contractors carrying out activities with in the reserve. They are to review wildfire risk mitigation regularly, (assessment is to be used all year and not just in a prohibited season) for all activities and events that may have the potential to start a fire.

The controls are put in place to reduce the risk of wildfire ignitions from activities and events that may cause sparks or generate heat, also known as 'Hotworks'. The assessment of ignition risk is based on Fire and Emergency NZ (FENZ) Trigger Points, "Establish triggers for voluntary restrictions for high fire risk activities" (2022) publication.

Activities such as smoking, fireworks, chainsaw use, grass mowing when the grass or scrub is dry, cutting, grinding and actions where metal may strike metal or stone have a history of starting fires. These typically ignite in fine fuels such as grass and scrub.

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This document and further wildfire information can be sourced on QLDC's web page **www.qldc.govt.nz**

Wildfire Ignition Factors

The controls are aimed at reducing the chance of ignition from activities that may cause a spark or heat, known as 'Hotworks'. To measure the overall risk an assessment of the fuel source is required.

Two main factors are considered when measuring potential fire ignition risk. These include,

- grass curing, which is the measure of the volume of dead/ dry grass
- the Fine Fuel Moisture Code **(FFMC)** Indicative value representing the moisture content of fine fuels such as grass or scrub.

(See page 11 for case study data and average number of days restrictions could be in place per year)

GRASS FUELS

At low **grass curing** values, the proportion of dead grass fuel present is low and there is little fuel to be ignited. Potential for fire spread is also low and any fire will only spread slowly, if at all, and with lower fire intensity so that control is more easily achieved.

At high **grass curing** values, the proportion of dead grass fuel present is higher meaning fire will develop and spread faster with higher intensity making control more difficult.

At low **FFMC** values, grass fuels are moister so that the likelihood of ignition is low, and fire spread is impeded.

At high **FFMC** values, grasses are drier and are easily ignited, develop fast, and spread rapidly.

Spark Hazardous Activities

(Any activity that is not listed can be grouped based on its ignition potential)

Low risk examples	Moderate risk examples	High risk examples
General recreation that excludes motorised items. (walking, biking)	Roadsides, reserves and general mowing or mulching. (excludes irrigated areas)	Welding, grinding, gas cutting, blasting, fireworks, open fires.
Mountain Biking: hot brakes.	Forestry operations, including harvesters and thinning.	
	Land preparation including tractors and implements that strike or move through the ground.	
	Tracked machine operation. (excludes rubber tracks)	
	Exhaust and hot engine type operations. (generators, small motors, motorbikes, blowers etc)	
	Use of scrub bars, chainsaws, chippers.	
	High public use/events that may involve the following - cigarettes/campfires/gas cookers/BBQ/vehicles	

How to Determine the Activity and/or Event Controls

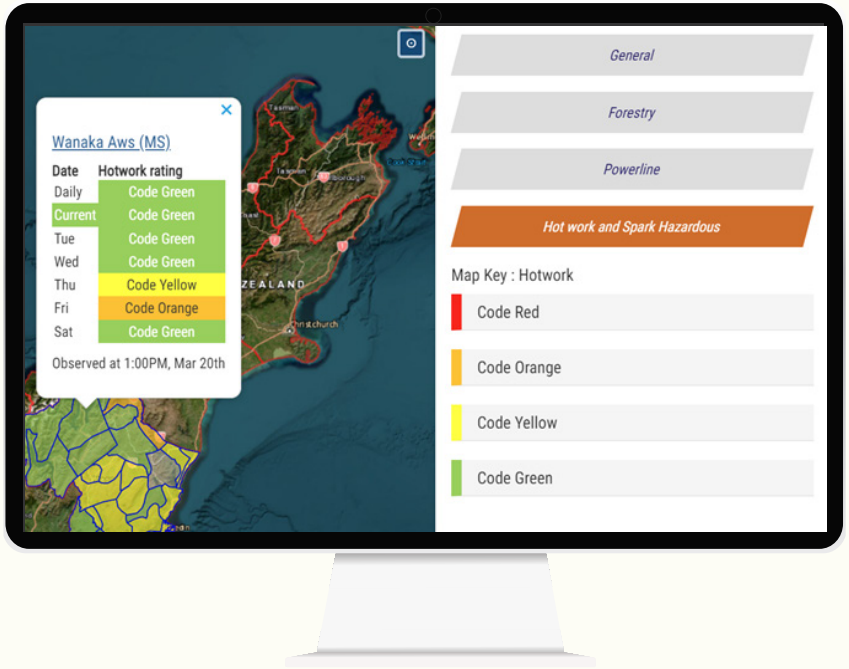
There are two ways of determining the control levels.

1. USE THE ‘HOTWORKS’ DANGER LEVEL.

This is produced each day by NIWA on the Fire and Emergency NZ/NIWA fire weather website. This is the recommended procedure unless you are qualified or experienced in fire science.

Please note, the trigger point assessment provided is based on the weather data from the Queenstown/Wānaka Airport Weather Stations (depending on which site you have chosen) and may not provide the site specific environmental conditions for your event or activity.

To access this data, go to **fireweather.niwa.co.nz/region/Otago** and follow the steps below.



NIWA/FENZ Fire Weather Website

Disclaimer: This link is to the FENZ / NIWA fire weather website, the link was provided on the date of publication of this document, over time the web page format and information may change and you may have to search for the correct information.

1. Select ‘Hot work and Spark Hazardous’ on the right-hand side.
2. Click on the map at the appropriate location to see daily, current and forecast levels.
3. Once you have the colour code, go directly to the tables at the end of this document to determine the controls that apply to your activity or event.

2. SITE SPECIFIC ASSESSMENT PROCEDURE

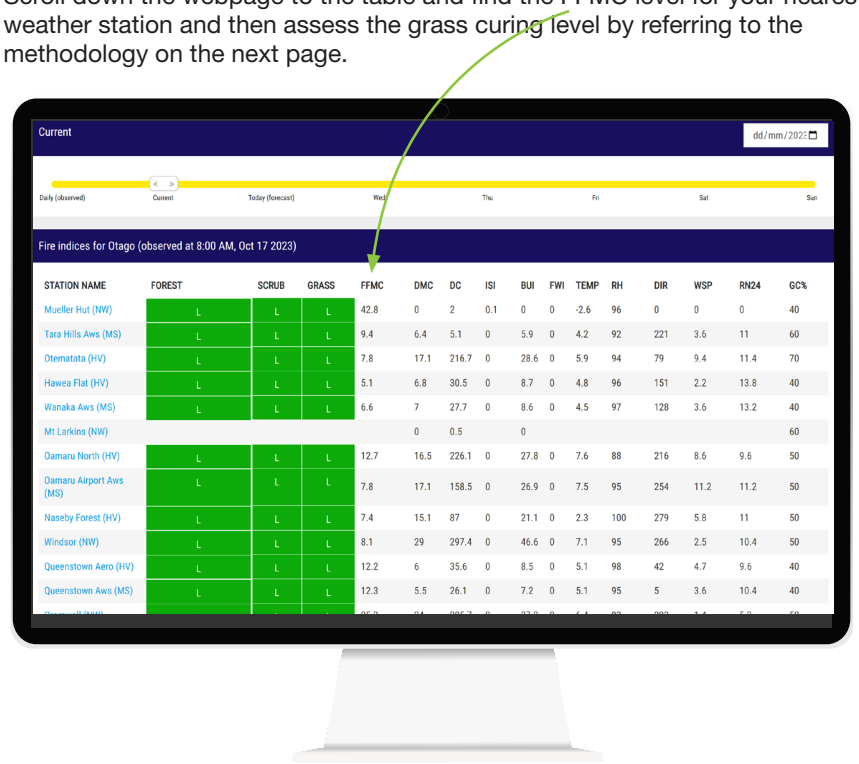
This method is used to determine the ‘Hotworks’ code for a specific location.

Please note, you will need to have experience and a basic understanding of fire science to understand how to do this, alternatively seek advice from a fire specialist.

How to determine the Fine Fuel Moisture Code (FFMC)

To determine the FFMC use the Fire and Emergency NZ/NIWA fire weather website **fireweather.niwa.co.nz/region/Otago** and follow the steps below.

1. Scroll down the webpage to the table and find the FFMC level for your nearest weather station and then assess the grass curing level by referring to the methodology on the next page.



2. Using the matrix below, identify the relevant risk by cross matching the onsite grass curing level with the FFMC for the day and time. Where these two indices meet, gives the colour-coded risk level for the site.

3. Look up the applicable controls in the tables below to determine equipment, activity, and timing restrictions for your activity.

FFMC	Curing (%)		
	<50	50-85	>85
<76	Green	Green	Green
76-83	Green	Green	Yellow
84-87	Green	Yellow	Orange
88-91	Yellow	Yellow	Orange
92-95	Yellow	Orange	Red
>96	Orange	Red	Red

Code	Controls
Green	No controls (basic firefighting tools required)
Yellow	Firefighting equipment/wetting down required
Orange	Restricted operations/hours of work
Red	Total shutdown of activities/restricted hours of work

Figure 3.1 Recommended activity trigger matrix for spark-hazardous activities, based on the Fine Fuel Moisture Code (FFMC) and grass curing (%).

HOW TO DETERMINE GRASS CURING LEVEL

Use the guide below to help determine the grass curing level.

> At low grass curing values, the proportion of dead grass fuel present is low and there is little fuel to be ignited. Potential for fire spread is also low and any fire will only spread slowly, if at all, and with lower fire intensity so that control is more easily achieved.

> At high grass curing values, the proportion of dead grass fuel present is higher meaning fire will develop and spread faster with higher intensity making control more difficult.

Remember, when estimating the amount of cured or dead grass, ensure that you consider the amount of thatch that may be under the top grasses.

From early growth to start of seed head development	0	GREEN PHASE	
Seed heads formed and flowering	10		
Seed heads maturing and changing colour	20		
Yellow becoming apparent in leaves	30		
Slightly more than half green	40	YELLOW PHASE	
Half green and half yellow, half of stems have dropped their seeds	50		
Slightly more than half yellow	60		
Yellow dominating landscape, some green visible	70	DRY PHASE	
Lower third of stalk may be green	80		
Very little green in landscape, all seeds dropped	90		
No green in landscape, stalks fully cured and break easily	100		

Fire Prevention Guideline

For activities and events that may cause heat and/or sparks ‘Hotworks’.

CODE GREEN: NO / MINIMAL CONTROLS REQUIRED

*Note: Items in **blue** indicate the requirement has been introduced at that colour code level.*

Requirements for...	**Extinguishers** (minimum for all equipment/vehicles)	**Water and additional equipment**	**Additional activity requirements** (A reliable method of communication is required for all activities)
HIGH RISK ACTIVITIES			
Welding, grinding, gas cutting, blasting, fireworks, open fires.	**2kg dry powder**	**9 litre pressurised water or foam (AFFF) extinguisher or full 15 litre knapsack. Shovel.**	**Only on bare earth / non-flammable or wetted down areas. Patrol for 30 minutes after completion of activity.**
MODERATE RISK ACTIVITIES			
Roadsides, reserves and general mowing or mulching. (excludes irrigated areas).	**2kg dry powder**	**9 litre pressurised water or foam (AFFF) extinguisher or full 15 litre knapsack, shovel.**	
Forestry operations, including harvesters and thinning.			
Land preparation and earthworks including tractors and implements that strike or move through the ground.			
Tracked machine operation. (excludes rubber tracks).			
Exhaust and hot engine type operations (vehicles, generators, small motors, motorbikes etc). Spark arrestors to be fitted.			
Use of scrub bars, chainsaws, chippers (excludes non steel blades).			
High public use/events that may involve the following: cigarettes/campfires/gas cookers/BBQ/vehicles.			
LOW RISK ACTIVITIES			
General recreation the excludes motorised items. (walking, biking).			

CODE YELLOW : FIREFIGHTING EQUIPMENT / WETTING DOWN REQUIRED

*Note: Items in **blue** indicate the requirement has been introduced at that colour code level.*

Requirements for...	**Extinguishers** (minimum for all equipment/vehicles)	**Water and additional equipment**	**Additional activity requirements** (A reliable method of communication is required for all activities)
HIGH RISK ACTIVITIES			
Welding, grinding, gas cutting, blasting, fireworks, open fires.	2kg dry powder	9 litre pressurised water or foam (AFFF) extinguisher or full 15 litre knapsack. Shovel **within 5m of worksite**	Only on bare earth / non-flammable or wetted down areas. Patrol for 30 minutes after completion of activity. **Wet down area within a min of 4m of the worksite or where sparks may occur.**
MODERATE RISK ACTIVITIES			
Roadsides, reserves and general mowing or mulching. (excludes irrigated areas).	2kg dry powder	9 litre pressurised water or foam (AFFF) extinguisher or full 15 litre knapsack, shovel. **Consider having 500L of water under pressure, available within 5 minutes when pilot vehicles or similar are supporting roadside mowing operations.**	**Ensure engine compartments are clean. Ensure bearings and other moving parts are greased and in good condition. (Check periodically throughout the activity)** **Where dry or dead grass/scrub is present, consider having an observer behind the operation or where all work can be seen.** **No smoking in high-risk sites. Designated smoking areas for events or activities occurring in other sites.** **Refuel equipment and store fuel away from operating sites.** **Clear vegetation around stationary small motors. Don't park vehicles, motorbikes etc on dry grass.** **Events to require a basic fire plan detailing location of fire extinguishers, designated smoking areas, evacuation routes/safety zones and other mitigation specific to the hazards generated by the event and its activities.**
Forestry operations, including harvesters and thinning.			
Land preparation and earthworks including tractors and implements that strike or move through the ground.			
Tracked machine operation (excludes rubber tracks).			
Exhaust and hot engine type operations (vehicles, generators, small motors, motorbikes etc). Spark arrestors to be fitted.			
Use of scrub bars, chainsaws, chippers (excludes non steel blades).			
High public use/events that may involve the following: cigarettes/ campfires/gas cookers/BBQ/vehicles.			
LOW RISK ACTIVITIES			
General recreation the excludes motorised items. (walking, biking).			Fire Danger Signage to be present.

*Note: Items in **blue** indicate the requirement has been introduced at that colour code level.*

Requirements for...	**Extinguishers** (minimum for all equipment/vehicles)	**Water and additional equipment**	**Additional activity requirements** (A reliable method of communication is required for all activities)
HIGH RISK ACTIVITIES			
Welding, grinding, gas cutting, blasting, fireworks, open fires.	2kg dry powder	9 litre pressurised water or foam (AFFF) extinguisher or full 15 litre knapsack. Shovel within 5m of worksite, and **1000L of water under pressure with 60m of hose, available within 2 minutes.**	Only on bare earth / non-flammable or wetted down areas. Patrol for 30 minutes after completion of activity. Wet down area within a min of 4m of the worksite or where sparks may occur. **Restriction/closure when wind speed is greater than 30km/hr. (equivalent to FWI 30. Extreme)**
MODERATE RISK ACTIVITIES			
Roadsides, reserves and general mowing or mulching. (excludes irrigated areas).	2kg dry powder	9 litre pressurised water or foam (AFFF) extinguisher or full 15 litre knapsack, shovel, and **500L of water under pressure with 60m of hose, available within 2 minutes for mowing, forestry operations, earthworks, chainsaw and scrub bar (steel blade) use, events, and other high public use activities where there is the chance of an ignition.**	**Restriction/closure when wind speed is greater than 30km/hr. (equivalent to FWI 30. Extreme) for mowing, forestry operations, earthworks, chainsaw and scrub bar use, events, and other high public use activities where there is the chance of an ignition.** Ensure engine compartments are clean. Ensure bearings and other moving parts are greased and in good condition. (Check periodically throughout the activity). **Have an observer** behind the operation or where all work can be seen where dry or dead grass/scrub is present. No smoking in high-risk sites. Designated smoking areas for events or activities occurring in other sites. Refuel equipment and store fuel away from operating sites. Clear vegetation **and wet down** around stationary small motors. Don't park vehicles, motorbikes etc on dry grass. Events to require a robust fire plan detailing location of fire extinguishers, designated smoking areas, evacuation routes/safety zones and other mitigation specific to the hazards generated by the event and its activities. **Consider activity restriction/closure (dependant on risk level of activity) when FWI greater than 30km/hr. (equivalent to FWI 30. Extreme).**
Forestry operations, including harvesters and thinning.			
Land preparation and earthworks including tractors and implements that strike or move through the ground.			
Tracked machine operation (excludes rubber tracks).			
Exhaust and hot engine type operations (vehicles, generators, small motors, motorbikes etc). Spark arrestors to be fitted.			
Use of scrub bars, chainsaws, chippers (excludes non steel blades).			
High public use/events that may involve the following: cigarettes/ campfires/gas cookers/BBQ/vehicles.			
LOW RISK ACTIVITIES			
General recreation the excludes motorised items. (walking, biking).			Fire Danger Signage to be present. **Consider activity restriction/closure (dependant on risk level of activity) when FWI greater than 30. (equivalent to FWI 30. Extreme).**

CODE RED: TOTAL SHUTDOWN OF ACTIVITY / RESTRICTED HOURS OF WORK

*Note: Items in **blue** indicate the requirement has been introduced at that colour code level.*

Requirements for...	**Extinguishers** (minimum for all equipment/vehicles)	**Water and additional equipment**	**Additional activity requirements** (A reliable method of communication is required for all activities)
HIGH RISK ACTIVITIES			
Welding, grinding, gas cutting, blasting, fireworks, open fires.	2kg dry powder	**Not Permitted (exemptions could be sought for safety requirements).**	**Not Permitted (exemptions could be sought for safety requirements).**
MODERATE RISK ACTIVITIES			
Roadsides, reserves and general mowing or mulching. (excludes irrigated areas).	2kg dry powder	9 litre pressurised water or foam (AFFF) extinguisher or full 15 litre knapsack, shovel, and **1000L of water under pressure with 60m of hose, available within 2 minutes.**	**No mowing, forestry operations, small motors, scrub bars, chainsaws, or other mechanised equipment that may cause a spark.** **For all other activities, restricted hours of work. No work between 1pm and 7pm, or if wind speed is above 15km/hr. (Equivalent to FWI 30. Extreme). This can be found on the website listed under how to use this guide.** Ensure engine compartments are clean. Ensure bearings and other moving parts are greased and in good condition. *(Check periodically throughout the activity).* Have an observer behind the operation or where all work can be seen where dry or dead grass/scrub is present. No smoking. Refuel equipment and store fuel away from operating sites. Don't park vehicles, motorbikes etc on dry grass. Events to require a robust fire plan detailing location of fire extinguishers, designated smoking areas, evacuation routes/safety zones and other mitigation specific to the hazards generated by the event and its activities. **Limit Activities and Events to before 1pm. Activity/event restriction/closure when FWI greater than 30 restriction/closure when wind speed is above 15km/hr. (Equivalent to FWI 30. Extreme) (exemptions may be sought if further mitigation actions are provided, i.e., helicopter on site).**
Forestry operations, including harvesters and thinning.			
Land preparation and earthworks including tractors and implements that strike or move through the ground.			
Tracked machine operation (excludes rubber tracks).			
Exhaust and hot engine type operations (vehicles, generators, small motors, motorbikes etc). Spark arrestors to be fitted.			
Use of scrub bars, chainsaws, chippers (excludes non steel blades).			
High public use/events that may involve the following: cigarettes/campfires/gas cookers/BBQ/vehicles.			
LOW RISK ACTIVITIES			
General recreation the excludes motorised items. (walking, biking).			Extreme Fire Danger signage to be present. **In conjunction with the Reserve Closure Guidelines, it is likely that reserves will be closed.**

Case Studies of potential closure days

Based on historical Data (1st December 2018 to 15 March 2023)

Table 1 – Hotworks: Days per year that restrictions/“stop work” would have occurred. (FFMC over 84, FWI over 30 and Grass curing over 85%- plus GC 50 – 85%, FFMC over 92 and FWI over 30, plus GC over 85, FFMC over 92).

Year	Queenstown	Wānaka
2019	2	7
2020	6	18
2021	2	10
2022	3	14
2023	11	23
Total average	**5 per year**	**15 per year**

Table 2 – Combined reserve closure and Hotworks: Days per year that restrictions/“stop work” would have occurred. These are the key figures for QLDC contractors and others carrying out activities, and events within high fire risk reserves.

Year	Queenstown	Wānaka
2019	4	7
2020	5	20
2021	2	11
2022	7	16
2023	12	30
Total average	**6 per year**	**17 per year**