New Zealand Wildfire Summary

2022/23 Wildfire Season Update

SCION™
FORESTS ▪ PRODUCTS ▪ INNOVATION

WHAKARATONGA IWI
FIRE EMERGENCY NEW ZEALAND

Ngāti Kuri rohe.

Contents

[Cite As: Gross, S., Aguilar-Arguello, S., Woods, D., Wallace, H., & Clifford, V. April 2025. 2022/2023 New Zealand Wildfire Summary. Fire and Emergency New Zealand Publication.]

Photo courtesy of Craig Rogers, Chief Fire Officer, Kaitaia Fire Brigade.

Summary

The 2022/2023 wildfire year was not as significant in terms of both the number of fires and total area burnt compared to the previous year (2021/2022), which in turn was less significant in both aspects compared to the year before that (2020/2021).

- Districts that experienced an increase in both number of wildfires and area burnt compared to the previous year include: Mid-South Canterbury (A1).
- Districts that experienced a decrease in number of wildfires and an increase in area burnt compared to the previous year include: Nelson Marlborough, Canterbury, Otago (A1).
- Districts that experienced a decrease in both number of wildfires and area burnt compared to the previous year include: Northland, Waitematā, Counties Manukau, Waikato, Bay of Plenty, Tairāwhiti, Taranaki, Hawke's Bay, Manawatū-Whanganui, Wellington, Southland (A1).
- Prevailing climatic conditions for the year were dominated by a rare third consecutive La Niña. In addition, several severe weather events brought damaging rainfall to northern and eastern parts of the North Island (Figure 1).

Introduction

This report summarises wildfires in New Zealand for the 2022/2023 year. It includes an evaluation of climatic conditions and incident statistics over an annular timeframe from 1st of July 2022 to 30th of June 2023. The purpose of this document is to provide a summary of 2022/2023, and a comparison to the previous year (2021/2022), in terms of overall conditions and incidents notified. The intent of this report is to aid in discussions in each district around operational reduction and readiness measures, and to inform opportunities for continual improvement.

Methods

This report summarises wildfire and climatology trends which are presented nationally, by island (North versus South), and by Fire and Emergency New Zealand (FENZ) District. Updated FENZ District boundaries were brought into effect with the official stand-up of Tranche 2 of the Fire and Emergency Service Delivery structure on 27 September 2021. This resulted in several boundary and name changes for Districts around the country. At that time, 17 Districts[1] were created within five Regions to replace the previous 24 urban areas and 18 rural districts. Due to this update, differences in district names and values will be present for reports prior to the 2021/2022 report.

Trends in the number of wildfires, area burnt, and fire causes have been identified using data from two separate sources. Data from the former National Rural Fire Authority (NRFA) was used to cover the period from 1988/1989 through the 2016/2017 fire season. Data from the 2017/2018 fire season through this current report period have been collected from the FENZ fire incident reporting database. The NRFA data were obtained as summarised data, not as individual fire occurrence records. These summary data provide historical data from the 1988/1989 fire year for number of fires, area burnt, and broad causation categories. Data related to locations specific to the North Island versus South Island is available from the 1991/1992 fire year. Data related to district is not available as a summary and therefore these data are only presented from the 2017/2018 fire year. The period of record is noted in the respective graphics.

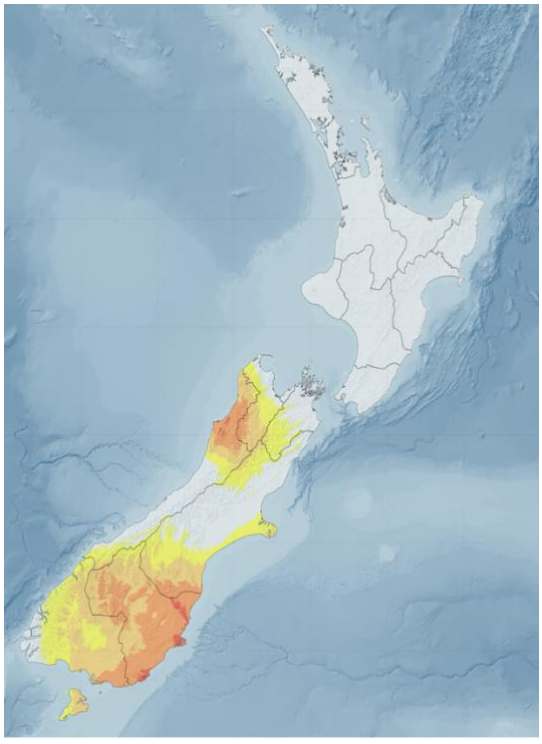

Figure 1. *NIWA's New Zealand Drought Index (NZDI) map for 2023-02-21, which highlights locations experiencing drought or dry conditions during the height of the wildfire season. Dark red indicates severe drought conditions; light red indicates drought; orange indicates extremely dry to very dry conditions; yellow indicates dry conditions.*

Manual adjustments were made to the 2022/2023 FENZ data following a manual validation process undertaken with all districts to identify 'significant fires', where a significant fire was deemed to be any fire with an area burnt of 10 hectares or more. Manual adjustments from previous annual report periods were carried forward from the past report.

The data were filtered to only include Vegetation Fires as identified in the incident type group. When duplicate records existed, these were filtered to only include the entry with the largest area. This dataset does not include vegetation fire non-responses or false alarms that required no action.

New Zealand's fire weather and climatology data have been summarised from the NIWA Fire Weather System as well as from general NIWA climate updates. In the case of the fire weather and climatology database, the list of stations is updated for every annual New Zealand wildfire summary. Due to this, differences in general values (e.g. summary tables in District appendices - Appendix 5 onwards) between this report and the previous annual update are expected.

This summary is the most up-to-date and contains data within figures to compare both the 2021/2022 and 2022/2023 years. This comparison between the two years helps identify patterns that are emerging at the district level, as well as to help determine if risk reduction initiatives are having an impact in terms of reducing the impact of fires. The wildfire annual summary is also intended to provide additional information to support the Monthly Fire Danger Outlooks in terms of analogue seasons for comparison of prevailing conditions.

[1] Chatham Islands is included in the Wellington District, Stewart Island is included in the Southland District

Wildfire statistics

National number of wildfires and area burnt

The 2019/2020 and 1998/1999 years remain the worst on record for number and area burnt, respectively (Figure 2).

The total number of fires in 2022/2023 is below the 2021/2022 values, below the 5-year average, and below the 10-year average, and below the historical (1988-2021) average (Figure 2).

At a national scale, the area burnt in 2022/2023 is below the 2021/2022 total, below the 5-year average, below the 10-year average, and below the historical (1988-2021) average (Figure 2).

- There were 2465 fires and 1928 ha burnt between 1st of July 2022 and 30th of June 2023. This is compared to 4417 fires and 4864 ha burnt during the 2021/2022 fire year.
- The most significant fires based on fire size during the 2022/2023 wildfire season include: Cardrona Valley (Otago), Cape Reinga (Northland) and Waiouru (Manawatū-Whanganui).
- The last 5-year average for total number of wildfires was 4368 and the average area burnt was 7105 ha.
- The last 10-year average for total number of wildfires was 4256 and the average area burnt was 5557 ha.
- The historical average (1988-2021) for total number of wildfires was 3391 and the average area burnt was 5691 ha.

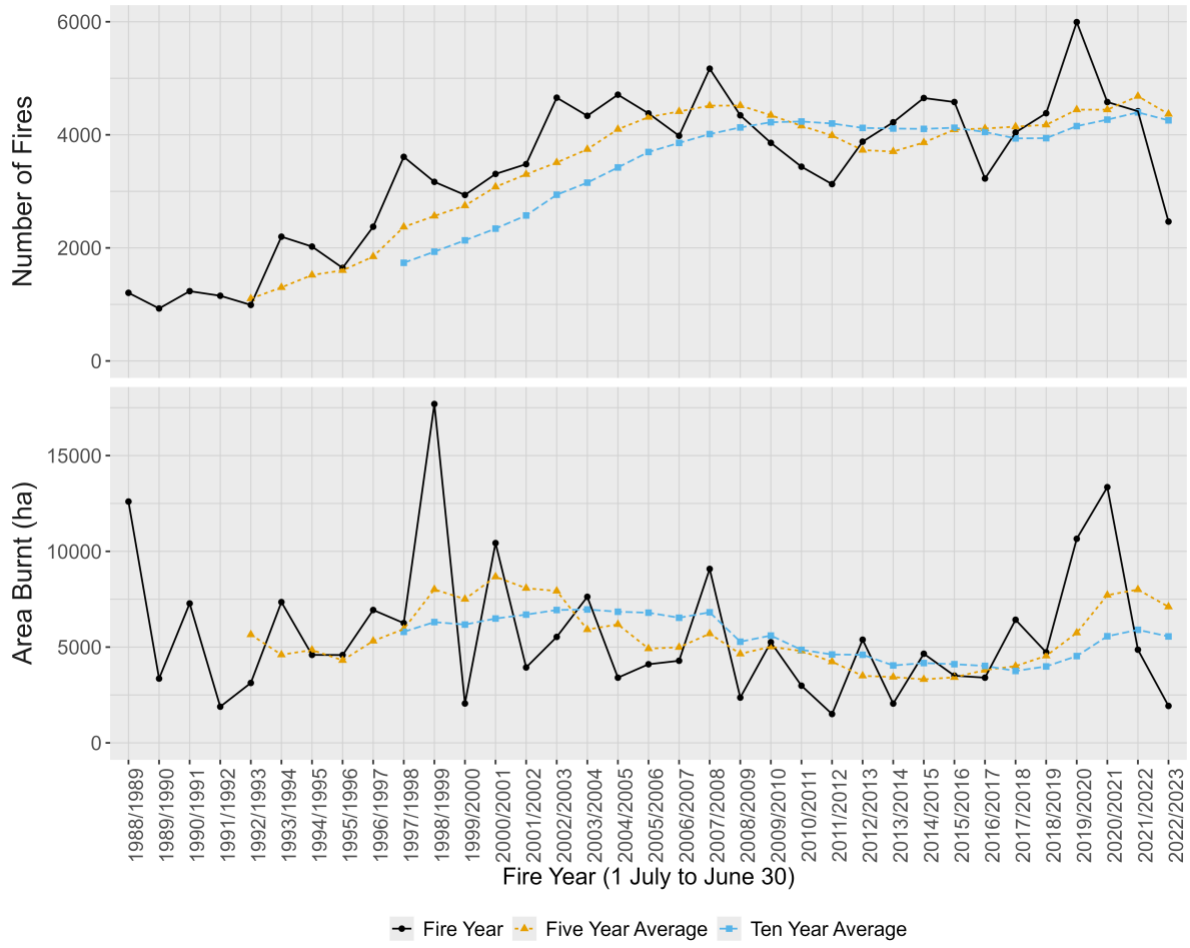

Figure 2. Total number of wildfires (top) and area burnt (bottom) for the last 35 years of wildfire records. Note: this dataset does not include vegetation fire non-responses or false alarms that required no action.

Number of wildfires and area burnt by District and Island

District breakdowns for the total number of wildfires and area burnt are detailed in the Appendices [2].

For the 2022/2023 year:

- The North Island accounted for most of the country's wildfires (58%) (Figure 3). This is consistent with the patterns seen across the 29-year historical record (Figure 5).
- The South Island accounted for most of the country's area burnt by wildfires (65%) (Figure 4). This is consistent with the patterns seen across the 29-year historical record (Figure 5).
- Northland had the highest number of wildfires in the North Island (214) and Canterbury had the highest number in the South Island (337) (Figure 3).
- Northland (343 ha) and Otago (771 ha) Districts experienced the greatest area burnt on the North and South Island, respectively (Figure 4).
- Districts that experienced an increase in both number of wildfires and area burnt compared to the previous year include: Mid-South Canterbury.
- Districts that experienced a decrease in number of wildfires and an increase in area burnt compared to the previous year include: Nelson Marlborough, Canterbury, Otago.
- Districts that experienced a decrease in both number of wildfires and area burnt compared to the previous year include: Northland, Waitematā, Counties Manukau, Waikato, Bay of Plenty, Tairāwhiti, Taranaki, Hawke's Bay, Manawatū-Whanganui, Wellington, Southland.
- Districts that experienced a decrease in number of wildfires with no change in area burnt compared to the previous year include: Auckland (A1).
- Districts that experienced no change in number of wildfires and an increase in area burnt compared to the previous year include: West Coast (A1).
- One district experienced no change, 1 experienced an increase, and 15 experienced a decrease in the total number of wildfires compared to the previous year (A1).
- One district experienced no change, 5 experienced an increase and 11 experienced a decrease in area burnt compared to the previous year (A1).

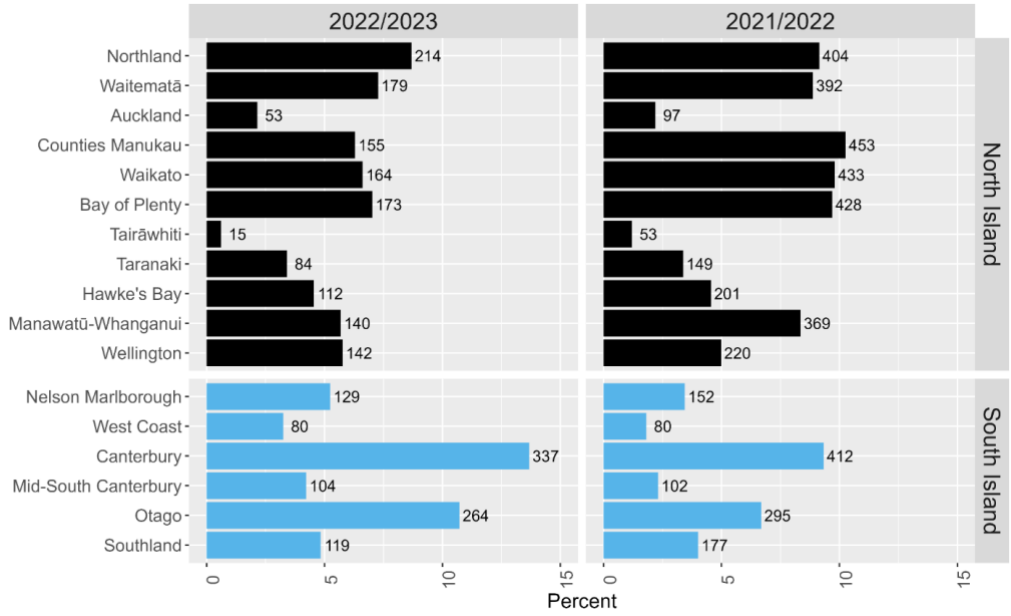

Figure 3. Percent of the number of wildfires by District for North Island (black bars) and South Island (blue bars). Data is presented for 2022/2023 (left) and 2021/2022 (right). The number of wildfires is noted to the right of the bar.

2 Area burnt is considered to have increased/decreased when the change is +/- 1 ha. This buffer was added due to the quality of data.

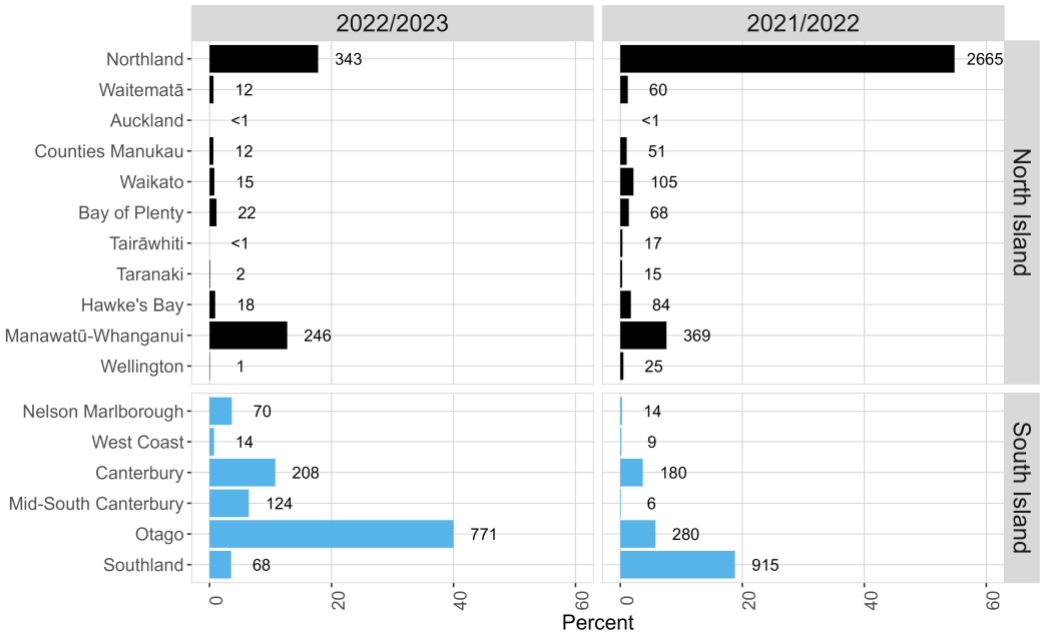

Figure 4. Percent area burnt by District for North Island (black bars) and South Island (blue bars). Data is presented for 2022/2023 (left) and 2021/2022 (right). The total area burnt (ha) is noted to the right of the bar.

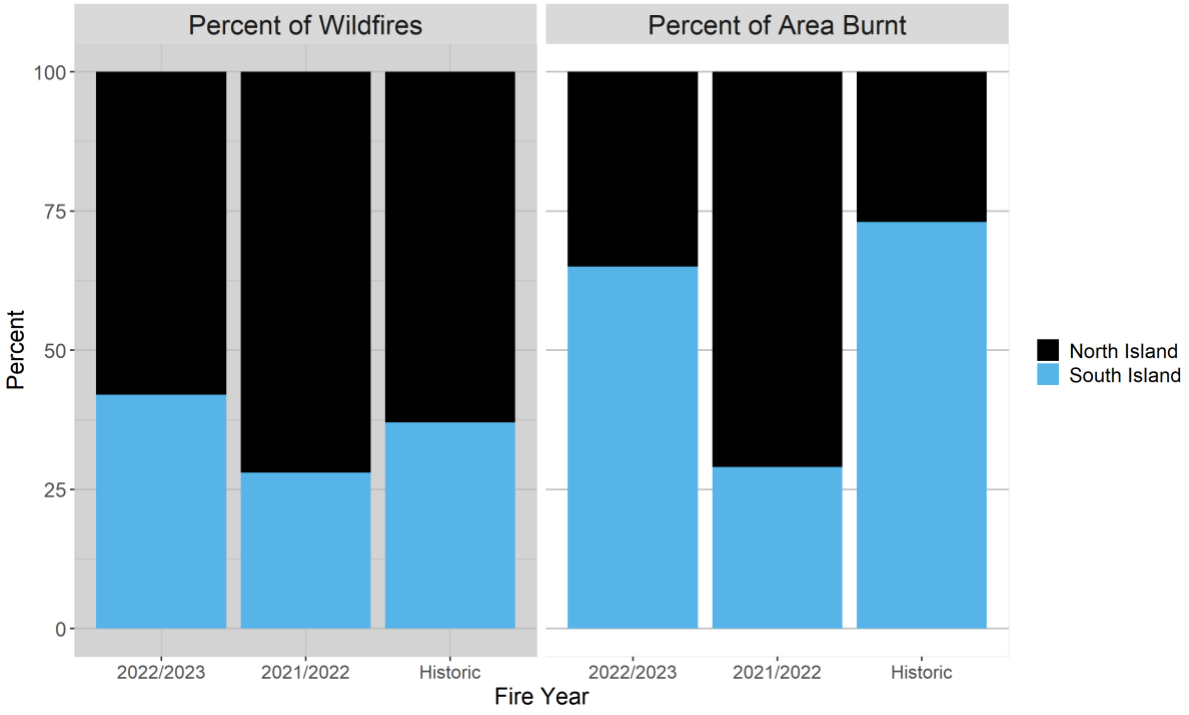

Figure 5. Overall percent of wildfires and percent of area burnt for North Island and South Island. Data is presented for the 2022/2023, 2021/2022, and 29-year historic record starting in 1991/1992 (not including 2022/2023 and 2021/2022).

Cause categories

There are 46 individual heat source categories used in the fire incident reporting database for the 2022/2023 annual wildfire analysis. These were merged and grouped into 12 broad cause categories to simplify illustration of the data (Appendix 2). Cause statistics by District are summarised in the Appendices.

- Pile Burn and Cigarettes, Matches, Candles, were the top two broad causes of wildfires in both 2022/2023 and 2021/2022 (Figure 6).
- For 2022/2023, the top two broad causes contributing to the total area burnt were Pile Burn and Explosives, Fireworks, compared to Pile Burn and Unclassified in 2021/2022 (Figure 7).

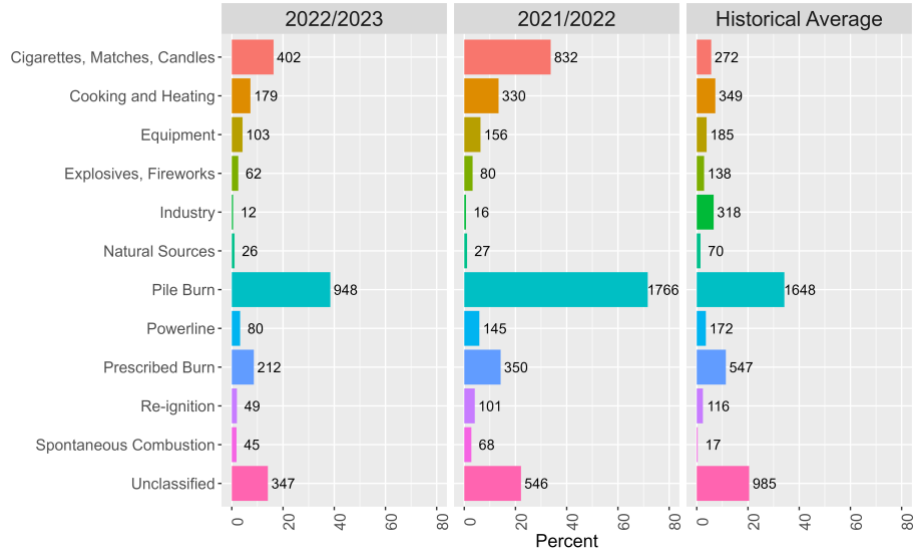

Figure 6. Percent of wildfires by cause for the 2022/2023 (left), 2021/2022 (middle), and 33-year historical average (right) from 1988/1989 (not including 2022/2023 and 2021/2022). The total number of wildfires is noted to the right of the bar. Note that powerlines were included as a new category in 2021/2022 report. Data related to powerlines has been included starting from the 2019/2020 fire year, therefore the powerline average is limited to the years that this category was considered.

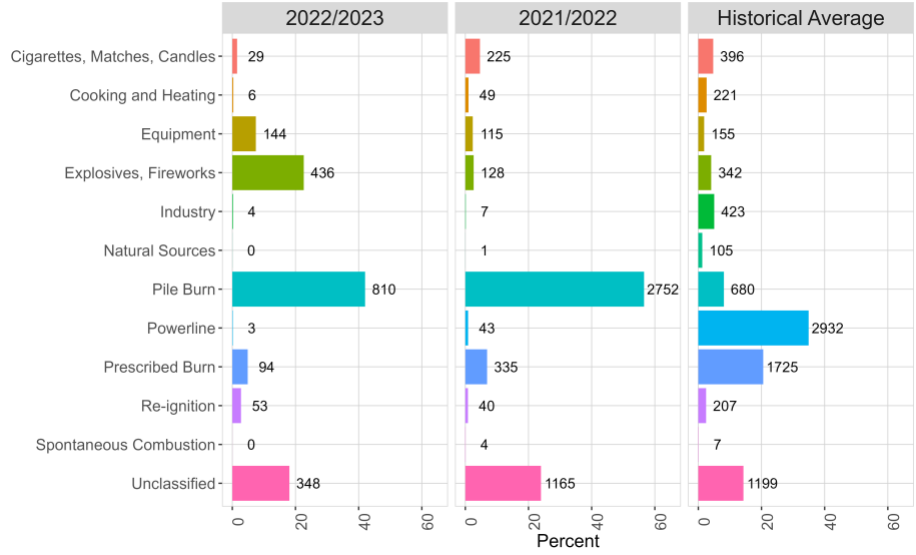

Figure 7. Percent of area burnt by cause for the 2022/2023 (left), 2021/2022 (middle), and 33-year historical average (right) from 1988/1989 (not including 2022/2023 and 2021/2022). The total area burnt (ha) is noted to the right of the bar. Note that powerlines were included as a new category in 2021/2022 report. Data related to powerlines has been included starting from the 2019/2020 fire year, therefore the powerline average is limited to the years that this category was considered

Review of climate and weather for 2022/2023

Summaries for the period July 2022 through June 2023 are presented, therefore two winter summaries are included in this report. There was a myriad of climate drivers that contributed to the unusual warmth and wetness in the 2022/2023 season. The primary driver was La Niña, marked by warmer than average ocean temperatures in the western equatorial Pacific which resulted in marine heatwave conditions around Aotearoa New Zealand. Along with other climate drivers, it also contributed to significant rainfall events. Heavily moisture-laden air originating from the tropics had a major influence on rainfall totals, with many regions experiencing damaging flood events.

Winter 2022

Winter 2022 was the warmest winter on record in Aotearoa New Zealand, surpassing winter 2021 that set the record just last year. Temperatures were well above average (>1.20°C above average) for the North Island as well as parts of the West Coast, Tasman, Nelson, Marlborough and Canterbury. In addition, it was an exceptionally wet season with the vast majority of the country observing above normal (120-149% of normal) or well above normal (>149% of normal) rainfall. A significant atmospheric river extending from the tropics impacted the country with a long-duration heavy rainfall event that brought widespread severe flooding in Nelson. At the end of winter, soil moisture levels were near normal for a majority of the country.

Spring 2022

Spring 2022 was characterised by more northeasterly winds than normal, bringing moist air from the tropics and sub-tropics across Aotearoa New Zealand, resulting in periods of wet and warm weather. As a result, there were above average or average temperatures across the country. On the other hand, it was a very wet season in much of the North Island, with above normal (120-149% of normal) or well above normal (>149% of normal) rainfall observed in most regions, along with parts of central and southern Canterbury. At the end of spring, soil moisture levels were above normal to well above normal across most of the North Island, northern Tasman, Marlborough Sounds, northern and central Canterbury, and parts of Southland.

Summer 2022/2023

It was the third-warmest summer on record. Temperatures were above average (0.51-1.20°C above average) or well above average (>1.20°C above average) across the west and south of the South Island, as well as parts of the western North Island. It was exceptionally wet for the North Island, with unprecedented levels of rainfall across large parts of the upper and eastern North Island due to the impacts of Ex-Tropical Cyclones Hale and Gabrielle, as well as the Auckland Anniversary Weekend severe weather event. Auckland, Northland, Bay of Plenty and Hawke's Bay each had their wettest summer on record. In the South Island, well-above normal soil moisture levels were seen for mid and upper Canterbury, Kaikoura and eastern Marlborough, while well below normal soil moisture levels were seen across Southland, southern Otago, and the upper West Coast. Near normal soil moisture levels were observed elsewhere.

Autumn 2023

The season saw a transition from a long-term La Niña pattern to an ENSO-neutral state, allowing for some variability in the monthly air flow patterns. Autumn temperatures were above average (+0.51°C to +1.20°C of average) or well above average (>1.20°C of average) across nearly all of Aotearoa New Zealand. Recorded temperatures were the warmest on record for May. It was a wet season for large swathes of the country, with above normal (120-149% of normal) or well above normal (>149% of normal) rainfall observed in much of Northland, Auckland, parts of Bay of Plenty and the Central Plateau, Taranaki, coastal Manawatū-Whanganui, parts of Wellington-Wairarapa, much of Marlborough, Nelson, Tasman, the West Coast, central Canterbury, Otago, and interior Southland. Soil moisture levels were near normal or above normal across a large majority of New Zealand. However, below normal soil moisture was only observed in coastal South Canterbury.

Winter 2023

Winter 2023 began on a warm note, with Aotearoa New Zealand observing its 5th-warmest June on record. Temperatures were above average (+0.51°C to +1.20°C of average) or well above average (>1.20°C of average) for many parts of the

country, with the exception of parts of the southern Mackenzie Basin and Central Otago which were below average (-0.51°C to -1.20°C of average). Rainfall was below normal (50-79% of normal) or well below normal (<50% of normal) for inland, western, and southern parts of the North Island, and the majority of the South Island. Rainfall was above normal (120-149% of normal) or well above normal (>149% of normal) for eastern and northern parts of the North Island. At the end of winter, soil moisture levels were near normal for most of the country, with only parts of Canterbury and Otago showing lingering pockets of above normal soil moisture.

Fuel moisture status and Fire Danger

Weather is the most powerful factor driving vegetation fire behaviour. Weather factors (temperature, relative humidity, windspeed and rainfall) directly affect vegetation fuel conditions and whether a fire will start and spread. Areas that experience below normal soil and fuel moisture dryness are at an increased risk of having a higher number of fires and larger area burnt. The Drought Code (DC) and Buildup Index (BUI) as derived from the New Zealand Fire Weather Index (FWI) System are useful indicators of seasonal drought effects and the amount of fuel available for combustion.

The higher the rating for DC and BUI, the drier the subsurface, medium, and heavy fuels are, and therefore, the more difficult and extended fire control will be. District summaries on how dry conditions were during this fire season are highlighted in the Appendices.

Graphs are also available on the Scion website for those who are interested in comparing how individual weather stations are tracking for BUI and DC, as well as Cumulative Daily Severity Ratings (CDSR), over the current and previous fire season and against historical averages: https://www.scionresearch.com/rural-fire-research/tools/trends

North Island

Across the North Island, average fuel moisture (BUI and DC) values were below or on trend with the previous year, with 2022/2023 fire season (October to April) averages falling significantly below historical averages and winter (July to September and May to June) averages matching historical low values. No dry conditions were identified in the New Zealand Drought Index (NZDI) reporting across any of the North Island Districts during 2022/2023.

- 2022/2023 fire season average DC values fell below historical values for all months, though the difference is most pronounced from December onwards as historical values moved into higher fire danger classes while the 2022/2023 values remained in the low categories. Of note, while historically February tends to have the highest DC values, February 2022/2023 had one of the lowest DC fire season values. When averaged over the entire year and compared to 2021/2022, all districts were below trend except for Wellington which was similar to the previous year (Appendix 1). A new maximum DC of 182 was observed in Waikato in September 2022.
- DC trends observed at individual representative weather stations on the North Island during 2022/2023 were similarly below average. Compared to the historical data, the Taranaki (Waverley Raws) and Wellington (Stony Creek Raws) exceeded historic values in November and November/December respectively, with the Taranaki station rising above the historic value again in July, but overall the values were typically below both the 2022/2023 and historic values throughout. Hawkes Bay (Ongaonga Raws) was the only station to match or exceed the 2021/2022 trend, and this was only for the 3 months from April to June (Figure 9).

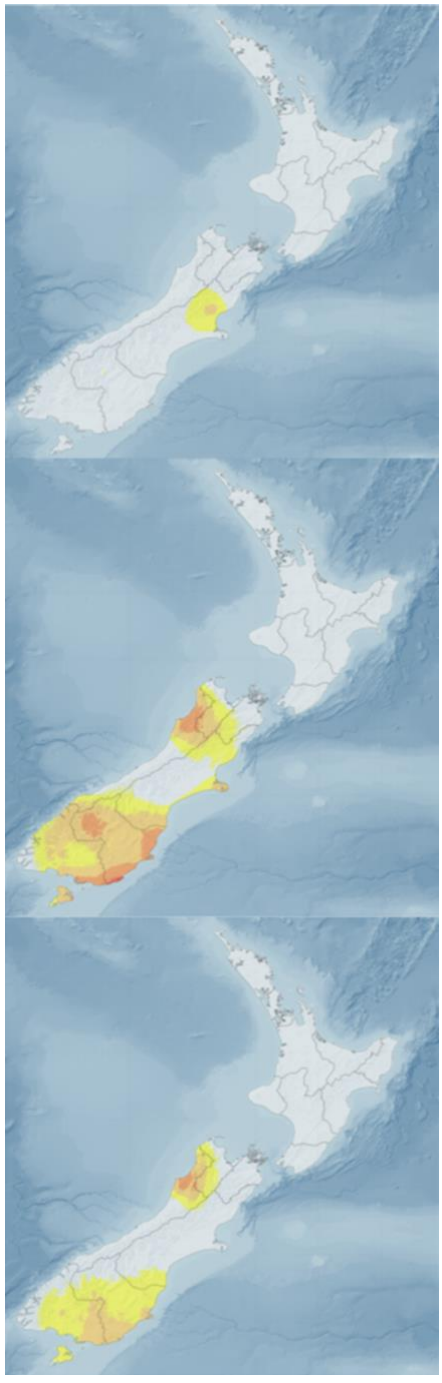

Figure 8. NIWA's New Zealand Drought Index (NZDI) maps, which highlights locations experiencing drought or dry conditions throughout the wildfire season (top: 2022-11-13, middle: 2023-02-14, bottom: 2023-03-14). Dark red indicates severe drought conditions; light red indicates drought; orange indicates extremely dry to very dry conditions; yellow indicates dry conditions.

- 2022/2023 fire season average BUI values also fell below historical values for all months except October and never exceeded low fire danger categories. As with the 2022/2023 DC values, while February typically has the highest BUI of the year, for 2022/2023 it was instead the lowest of the fire season. In 2022/2023 new maximum BUI's were observed in Waikato in September (59) and Bay of Plenty in July (89).
- Based on the NZDI, there was no recorded seasonal dryness during 2022/2023 in any North Island District (Figure 8, Appendix 1).

South Island

Across the South Island, average fuel moisture (BUI and DC) values tracked between well above to below trend with the previous year but was generally slightly below the historical average. The exception to this was in January and February when both DC and BUI for 2022/2023 exceeded historical averages. Seasonal dryness (NZDI) conditions ranged from dry in Mid-South Canterbury to drought in Southland during 2022/2023.

- 2022/2023 average DC value trends followed the same pattern as historical averages for the entire South Island, with a steady ramping up from September through to February (Appendix 1). 2022/2023 DC values peaked above historic values in January and February before declining more rapidly than usual. No new DC maximums were observed in 2022/2023 for the South Island.
- DC trends observed at individual weather stations on the South Island during 2022/2023 were highly variable. While most of the stations exhibited similar trends to both the previous year and the historic trend for most of the reporting period, there were notable exceptions. Canterbury (Ashley Raws) was well below the historical average from December to July, whereas Otago (Traquair Raws) was above or well above the historical average from July to March before a sharp decline. Both the West Coast (Hokitika Aws) and Mid-South Canterbury (Tekapo Raws) stations periodically experienced peak values above both the 2021/2022 and historical values during the fire season (Figure 10).
- 2022/2023 average BUI values also roughly followed the historical trend with a gradual increase in BUI from July through to February. While a major weather event in December knocked BUI back for that period, it did not seem to have an effect on the overall trajectory of the 2022/2023 BUI which ultimately peaked above the historical average in February. After February 2022/2023 BUI declined rapidly, well below historical rates. January 2023 saw a new maximum BUI of 86 observed on the West Coast and Southland's BUI matched the historic maximum of 114.
- Based on the NZDI, the highest category reached during 2022/2023 was drought in Southland, with dry to extremely dry in two District's (Canterbury and Otago), very dry in one District (Nelson Marlborough), extremely dry in one District (West Coast), and dry in Mid-South Canterbury (Figure 8, Appendix 1).

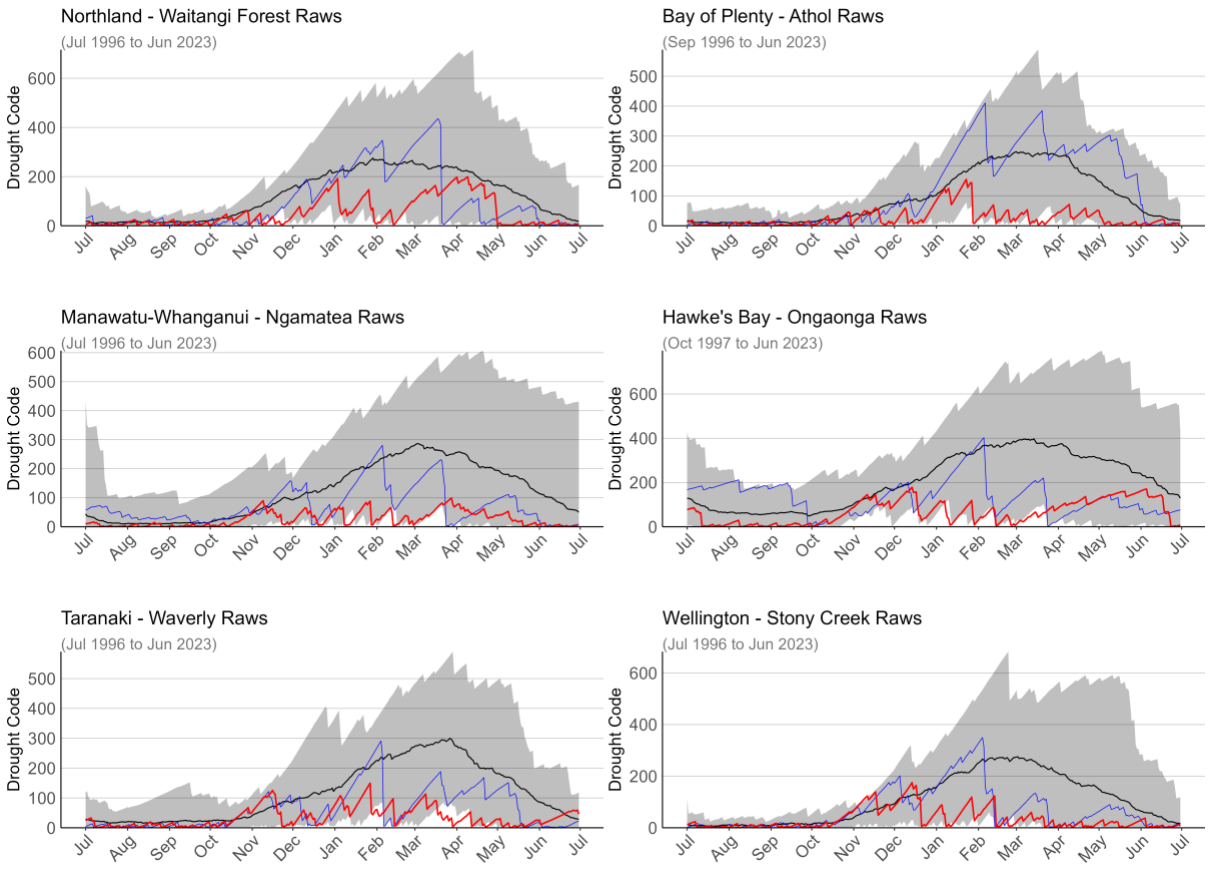

Figure 9. Daily Drought Code (DC) trends for a selection of representative stations across the North Island. 2022/2023 is represented by the red line, 2021/2022 is represented by the blue line, the historical average is represented by the black line and the grey shaded area represents the historical minimum/maximum values over the length of the entire weather station record as noted below the station name. Note the y-axis scale varies between stations.

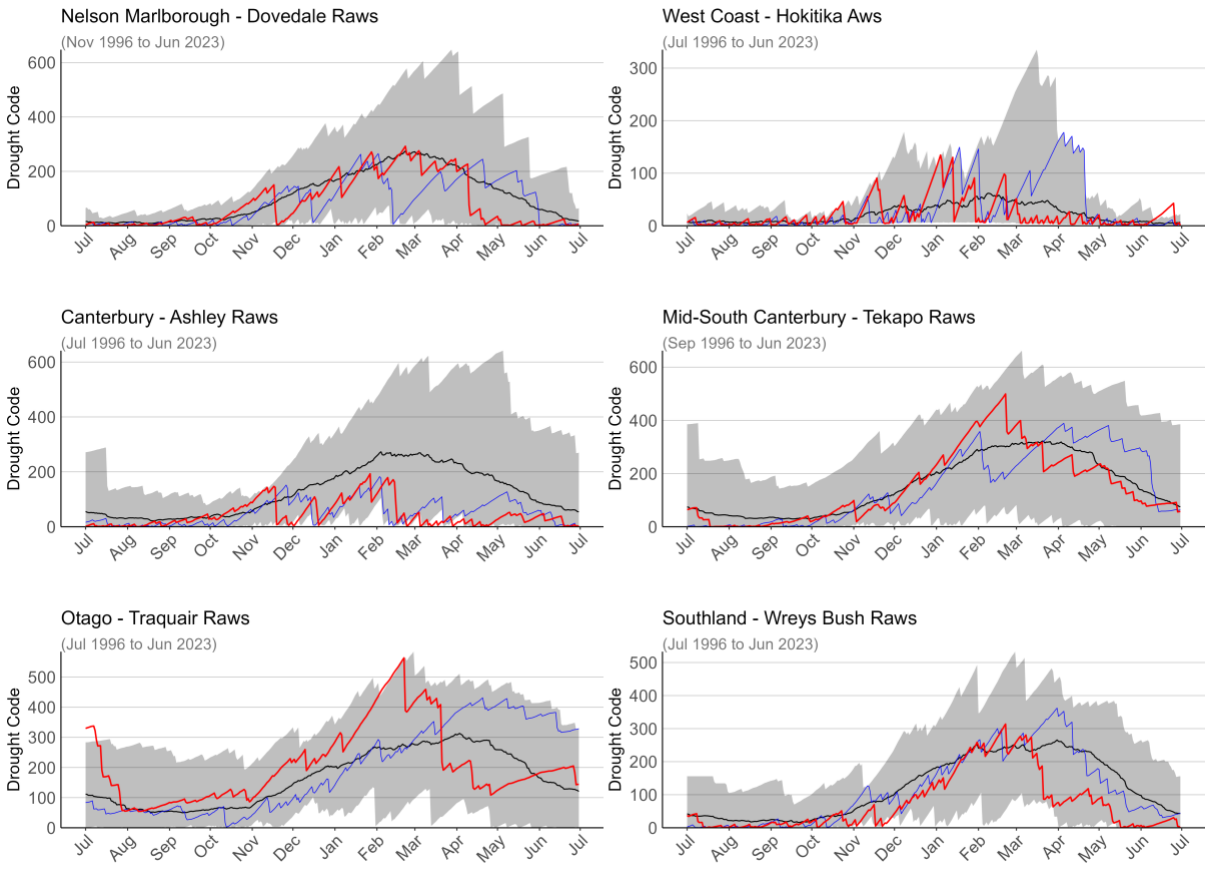

Figure 10. Daily Drought Code (DC) trends for a selection of representative stations across the South Island. 2022/2023 is represented by the red line, 2021/2022 is represented by the blue line, the historical average is represented by the black line and the grey shaded area represents the historical minimum/maximum values over the length of the entire weather station record as noted below the station name. Note the y-axis scale varies between stations.

Appendices

Appendix 1 2022/2023 and 2021/2022 incident wildfire statistics and fire weather indices/codes.

District	Number	% (#)	Trend (#)	Top causes (#)	Ha	% (Ha)	Trend (Ha)	Top causes (Ha)	BUI	DC	CDSR	Drought (NZDI)
Northland	214	9	Decrease	Pile Burn	343	18	Decrease	Unclassified	Below	Below	Below	None
Waitematā	179	7	Decrease	Pile Burn	12	1	Decrease	Prescribed Burn	Below	Below	Below	None
Auckland	53	2	Decrease	Unclassified	< 1	< 1	No Change	Cigarettes, Matches, Candles	*	*	*	None
Counties Manukau	155	6	Decrease	Pile Burn	12	1	Decrease	Pile Burn	Below	Below	Below	None
Waikato	163	7	Decrease	Pile Burn	15	1	Decrease	Prescribed Burn	Below	Below	Below	None
Bay of Plenty	173	7	Decrease	Pile Burn	22	1	Decrease	Cigarettes, Matches, Candles	Below	Below	Below	None
Tairāwhiti	15	1	Decrease	Cigarettes, Matches, Candles	< 1	< 1	Decrease	Cigarettes, Matches, Candles	Below	Below	Below	None
Taranaki	84	3	Decrease	Pile Burn	2	< 1	Decrease	Pile Burn	Below	Below	Below	None
Hawke's Bay	112	5	Decrease	Pile Burn	18	1	Decrease	Pile Burn	Below	Below	Below	None
Manawatū-Whanganui	140	6	Decrease	Pile Burn	246	13	Decrease	Explosives, Fireworks	Below	Below	Below	None
Wellington	142	6	Decrease	Pile Burn	1	< 1	Decrease	Equipment	Below and Similar	Similar	Below	None
Nelson Marlborough	129	5	Decrease	Pile Burn	70	4	Increase	Re-ignition	Below	Slightly Below and Well Above	Slightly Below	Very Dry

District	Number	% (#)	Trend (#)	Top causes (#)	Ha	% (Ha)	Trend (Ha)	Top causes (Ha)	BUI	DC	CDSR	Drought (NZDI)
West Coast	80	3	No Change	Cigarettes, Matches, Candles	14	1	Increase	Pile Burn	Above	Slightly Above and Well Above	Above	Extremely Dry
Canterbury	337	14	Decrease	Pile Burn	208	11	Increase	Explosives, Fireworks	Below and Slightly Above	Similar	Similar	Dry to Extremely Dry
Mid-South Canterbury	104	4	Increase	Pile Burn	124	6	Increase	Equipment	Similar	Similar	Below, Similar and Slightly Above	Dry
Otago	264	11	Decrease	Pile Burn	771	40	Increase	Pile Burn	Below	Similar	Similar	Dry to Extremely Dry
Southland	119	5	Decrease	Pile Burn	68	4	Decrease	Prescribed Burn	Below and Similar	Below	Similar	Very Dry to Drought

BUI, DC and CDSR comparisons are based on current year percentage of deviation compared to the deviation of the previous year average. 'Well Above' >= 95%, 'Above' is between 35% and 95%, 'Slightly Above' between 15% and 35%, 'Similar' between 15% and -15%, 'Slightly Below' between -15% and -35%, 'Below' between -35% and -95%, 'Well Below' < -95%. Comparisons were done per day and month, to identify the most frequent result per month and subsequently the most common result among the 12 months. More than one result is displayed in the table when more than one result had the same frequency.

*The change in FENZ districts has resulted in only one station representing the Auckland District (Auckland MOTAT Ews) from NIWA data. This station was setup in February 2022, therefore there is only data from Feb 2022 to June 2023).

Appendix 2 Broad wildfire cause categories and the underlying individual heat source categories used for analysis of the 2021/2022 and 2020/2021 incident statistics.

Cause Group	HeatSource
Cigarettes, Matches, Candles	Cigarette, Cigar or Smoking materials
	Cigarettes, matches and candles – Other
	Matches or Lighters (Suspicious)
Cooking and Heating	BBQ
	Embers, Ashes
	Outside fire for cooking
	Outside fire for warmth / Campfire
	Umu / Hangi
Equipment	Birds nest
	Chainsaws
	Exhaust heat / Spark
	Farm machinery
	Malfunction
	Motorbike, Truck or Car
	Mowers and slashers
	Welding, grinding, cutting
Explosives, Fireworks	Explosives, fuses, and associated equipment
	Fireworks / Pyrotechnics
	Flare: Warning, Safety, Boat
	Incendiary devices, Molotov cocktail
	Tracer ammunition
Industry	Bee-Keeping smoking tool
	Earthwork or forestry machinery
	Electrical Fence
	Maintenance crews
	Oil and gas exploration
Natural Sources	Animals
	Geothermal Activity
	Lightning discharge
	Solar heat: Sun (magnified through glass etc)
Pile Burn	Debris burning
	Outside bonfire
	Refuse burning
	Windrow / slash pile
Powerline	Clashing / Arching power lines
	Trees
Prescribed Burn	Broadcast slash burn
	Crop burn
	Deliberate – scrub and tussock
	Scrub and tussock burn
Re-ignition	Re-ignition, Rekindle from previous fire
Spontaneous Combustion	Bark or sawdust spontaneous ignition
	Hay/silage spontaneous ignition
	Skid site spontaneous ignition

Cause Group	HeatSource
	Spontaneous ignition
Unclassified	Exposure Fire – unable to classify
	Information not recorded/Unknown

Appendix 3 Average Monthly Fire Season Severity Ratings (MSR) for the 2022/2023 and 2021/2022 wildfire season (October through April).

Monthly Severity Rating (MSR) is the monthly average of the Daily Severity Rating (DSR) values from the Fire Weather Index System. DSR is a function of the FWI value, developed for use in comparing different years and weather stations. DSR and MSR capture the effects of both wind and fuel dryness on potential fire intensity and therefore control difficulty and the amount of work required to suppress a fire. It allows the comparison of fire weather severity between years.

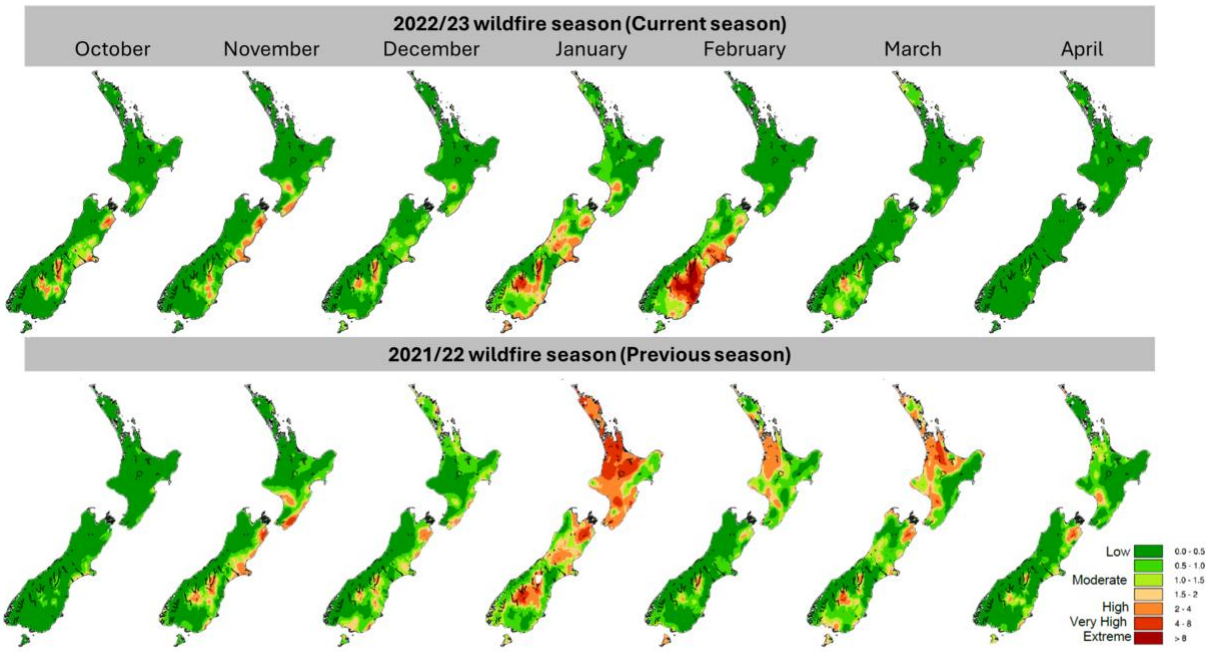

Figure A3. Monthly Severity Rating (MSR) across the country for 2022/2023 (top) and 2021/2022 (bottom).

Appendix 4 Average Monthly Drought Code (DC) values for the 2022/2023 and 2021/2022 wildfire seasons (October through April).

The DC is a rating of the average moisture content of deep, compact, organic soil layers. It is a useful indicator of the dryness of large woody material, seasonal drought effects on forest fuels and the amount of smouldering in deep duff layers and large logs. Little mop-up needs to happen with low values (white), whereas mop-up will be difficult and extensive with values over 300 points (dark brown colouration).

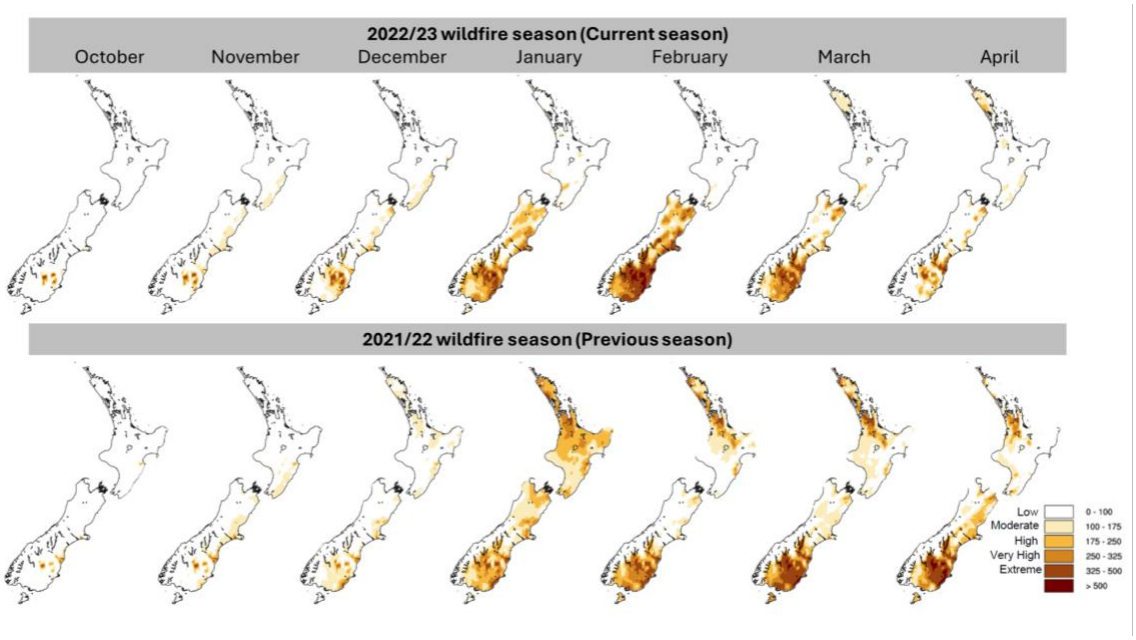

Figure A4. Monthly Drought Code (DC) across the country for 2022/2023 (top) and 2021/2022 (bottom).

Appendix 5 District Appendices

The following appendices contain District specific summaries. For each District, information is provided on:

1. Number of wildfires and area burnt (ha) by district and by broad cause categories,
2. Drought Code (DC) values (maximum and mean), and
3. Buildup Index (BUI) values (maximum and mean).

To view individual fuel moisture station trends, visit: https://www.scionresearch.com/rural-fire-research/tools/trends

- The Drought Code (DC) is a rating of the average moisture content of deep, compact, organic soil layers. A colour scale is used as a visual indicator of high (red, orange, and yellow) and low (blue) DC values (A5.1).
- The Buildup Index (BUI) combines the Duff Moisture Code (DMC) and Drought Code (DC) to represent the total amount of fuel available for combustion. A colour scale is used as a visual indicator of high (red, orange, and yellow) and low (blue) BUI values (A5.1).
- The number of weather stations and years of station record for Drought Code and Buildup Index data varies by District. A true comparison between historic and current cannot be made because information presented is based on all available data at the time of the report. Over the length of the record stations are both added and discontinued.

Table A5.1 Colour scale used as a visual indicator of high and low DC and BUI values.

DC	Mop-up Needs		BUI	Level of difficulty for controlling a fire		Fire Danger
0-100	Little mop-up needs		0-15	Easy Control		Low
101-175	Moderate		16-30	Not Difficult		Moderate
176-250	Difficult		31-45	Difficult		High
251-300	Difficult & Extended		46-59	Very Difficult		Very High
301+	Extreme & Extensive		60+	Extremely Difficult		Extreme

Appendix 6 Northland.

Wildfire Statistics

- During the 2022/2023 wildfire season, Northland accounted for 9% of the total number of wildfires in the country and 18% of the area burnt (Figure 3 & 4, Appendix 1, Table A6.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Unclassified.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values followed historical trends for the first four months of the reporting period. For the remainder of the year, including summer months, they were significantly lower than historical mean values. Maximum DC peaked into the “Extreme” category in January and April, but for the remainder of the period between December and May the maximum DC was typically within the "High" to “Very High” range. No new maximum DC values were observed. (Table A6.2)
- Mean Buildup Index (BUI) values were below the historical trend for the period November to May and notably remained in the “Low” category for all months except March, which increased to “Moderate”. Maximum BUI values demonstrated more variation, however remained in lower categories than historical maximums for all months except for July where both were in the “Moderate” category. No new maximum values were observed. (Table A6.3)

Table A6.1 Number of wildfires and area burnt (ha) in Northland for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	18	7	8	2	1	2	114	10	25	0	0	27	214
	2021/2022	56	12	11	6	2	6	197	17	45	6	1	45	404
Area Burnt (ha)	2022/2023	1	0	3	0	0	0	50	0	2	0	0	287	343
	2021/2022	143	0	5	0	0	0	2,402	1	108	2	0	3	2,664

Table A6.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Northland District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	23	136	73	40	94	94	189	328	220	272	321	215	28
	2021/2022	19	102	43	36	44	139	264	477	514	567	496	347	246
	Historic	19	320	335	355	400	511	617	630	718	798	791	708	484
Mean	2022/2023	23	17	14	12	32	24	61	79	50	143	151	13	8
	2021/2022	19	14	10	7	13	47	135	292	240	255	136	103	35
	Historic	19	16	13	19	40	91	167	247	281	269	217	140	46

Table A6.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Northland District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	23	22	24	13	23	24	46	46	31	53	53	9	8
	2021/2022	19	30	22	11	15	44	73	133	100	107	48	25	13
	Historic	19	30	32	59	75	95	140	167	213	223	147	132	38
Mean	2022/2023	23	4	4	4	8	6	12	13	10	23	12	2	2
	2021/2022	19	3	3	2	4	11	25	58	28	40	17	8	2
	Historic	19	2	3	5	10	19	29	43	43	32	19	8	3

Appendix 7 Waitematā

Wildfire Statistics

- During the 2022/2023 wildfire season, Waitematā accounted for 7% of the total number of wildfires in the country and 1% of the area burnt (Figure 3 & 4, Appendix 1, Table A7.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Prescribed Burn.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were consistently below the historical trend throughout the year, remaining in the "Low" category except for April when it increased to "Moderate". Maximum DC values remained considerably below historic maximums for all months, though there was a slight increase through January and March to May with monthly peaks in the "High" category. No new maximum values were observed. (Table A7.2)
- Mean Buildup Index (BUI) mean values were below the historical trend for the period December to April and remained consistently in the "Low" category across the year, with only modest increases in January and March to "Moderate". Maximum BUI values showed some response to fire season conditions, with a gradual increase starting in October and a modest peak in January before declining again. Maximum BUI values were considerably below the historic trend with no months reaching historic maximum categories. No new maximum values were observed. (Table A7.3)

Table A7.1 Number of wildfires and area burnt (ha) in Waitematā for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	28	10	8	10	0	0	70	13	9	0	2	29	179
	2021/2022	77	23	12	15	2	1	156	25	24	2	3	52	392
Area Burnt (ha)	2022/2023	0	1	0	0	0	0	3	0	8	0	0	0	12
	2021/2022	1	29	4	0	0	0	15	1	9	0	0	2	61

Table A7.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Waitematā District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023		82	28	34	96	94	145	179	74	211	215	197	30
	2021/2022		198	49	20	44	127	219	420	458	464	275	252	199
	Historic		555	601	550	307	310	410	599	648	720	688	655	707
Mean	2022/2023		8	9	10	32	25	51	86	29	84	108	19	9
	2021/2022		41	15	7	12	51	111	266	222	239	143	153	40
	Historic		24	21	20	34	77	134	207	262	258	211	116	41

Table A7.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Waitematā District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023		6	8	11	26	24	40	46	20	44	45	7	8
	2021/2022		12	15	11	9	37	56	108	121	94	43	35	5
	Historic		44	62	61	51	92	112	114	155	137	157	180	154
Mean	2022/2023		1	2	5	9	7	12	16	7	16	12	2	2
	2021/2022		2	3	3	3	13	23	72	41	43	16	14	1
	Historic		3	3	5	9	15	22	33	38	31	16	7	3

Appendix 8 Auckland.

Wildfire Statistics

- During the 2022/2023 wildfire season, Auckland accounted for 2% of the total number of wildfires in the country and < 1% of the area burnt (Figure 3 & 4, Appendix 1, Table A8.1)
- There has been a Decrease in the number of wildfires and No Change in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Unclassified.
- The primary cause that contributed to the total area burnt was Cigarettes, Matches, Candles, although the area was very small (<1 ha).

Fuel Moisture Status

- There only one weather station included in NIWA's Fire Weather System representing the Auckland District. This station was setup in February 2022. Two more years will be required for a historical average to be generated.
- 2022/2023 Drought Code (DC) mean values were generally in the "Low" category throughout the year, with only April reaching "High". Maximum DC values varied but generally remained in the "Low" to "Moderate" categories, except for April when they reached "High". (Table A8.2)
- Mean Buildup Index (BUI) values were in the "Low" and "Moderate" categories throughout the year. Maximum BUI values ranged from "Low" to "High", peaking in January but typically only showing modest values throughout the fire season period (October to April). (Table A8.3)

Table A8.1 Number of wildfires and area burnt (ha) in Auckland for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	15	2	1	2	0	0	6	1	2	2	6	16	53
	2021/2022	63	1	3	3	1	0	7	1	2	0	7	9	97
Area Burnt (ha)	2022/2023	0	0	0	0	0	0	0	0	0	0	0	0	0
	2021/2022	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A8.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Auckland District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. The historic period starts February 2021 and therefore it was not possible to identify the historical trend due to the very short period of available data.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	1	14	16	23	111	53	114	144	59	144	209	129	41
	2021/2022	1								139	247	156	208	138
	Historic	1												
Mean	2022/2023	1	5	8	12	51	22	49	72	25	91	177	28	17
	2021/2022	1								96	144	123	187	36
	Historic	1												

Table A8.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Auckland District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. The historic period starts February 2021 and therefore it was not possible to identify the historical trend due to the very short period of available data.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	1	4	6	10	36	19	35	42	19	34	31	11	11
	2021/2022	1								41	81	41	33	4
	Historic	1												
Mean	2022/2023	1	2	2	6	17	8	14	15	7	22	21	3	4
	2021/2022	1								30	44	26	21	2
	Historic	1												

Appendix 9 Counties Manukau

Wildfire Statistics

- During the 2022/2023 wildfire season, Counties Manukau accounted for 6% of the total number of wildfires in the country and 1% of the area burnt (Figure 3 & 4, Appendix 1, Table A9.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires and area burnt was Pile Burn.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values remained in the “Low” category except for April when it increased to “Moderate”. These values were well below historic mean DC values for the duration of the fire season. Maximum DC values remained considerably lower than historical values, peaking in January at “High”. No new maximum values were observed. (Table A9.2)
- Mean Buildup Index (BUI) values remained in the “Low” category for most of the year, with only slight increases to “Moderate” in January and March, which were still considerably lower than historic values. Maximum BUI values were more varied with some “High” values, with January being the peak at “Very High”. No new maximum values were observed. (Table A9.3)

Table A9.1 Number of wildfires and area burnt (ha) in Counties Manukau for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	45	4	5	5	1	1	55	5	8	1	0	25	155
	2021/2022	136	23	10	7	0	0	175	18	24	11	6	43	453
Area Burnt (ha)	2022/2023	0	0	0	0	0	0	11	0	0	0	0	0	11
	2021/2022	0	0	1	0	0	0	34	0	12	1	2	1	51

Table A9.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Counties Manukau District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	5	18	31	38	104	68	122	223	73	155	174	107	47
	2021/2022	5	26	25	22	30	110	200	402	440	496	397	406	168
	Historic	5	524	540	181	179	257	367	565	752	796	812	773	523
Mean	2022/2023	5	5	9	12	39	25	44	83	28	82	103	17	13
	2021/2022	5	8	10	8	12	42	121	285	234	278	229	239	34
	Historic	5	28	18	19	35	82	142	223	287	278	235	146	63

Table A9.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Counties Manukau District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	5	4	9	12	32	19	39	46	21	31	32	9	13
	2021/2022	5	7	8	9	11	29	51	118	120	100	51	45	5
	Historic	5	40	32	33	41	61	90	137	198	168	146	72	80
Mean	2022/2023	5	1	3	5	11	7	12	16	8	17	13	2	3
	2021/2022	5	2	3	3	5	11	26	73	40	53	28	19	1
	Historic	5	3	3	5	10	18	24	38	44	36	21	9	4

Appendix 10 Waikato.

Wildfire Statistics

- During the 2022/2023 wildfire season, Waikato accounted for 7% of the total number of wildfires in the country and 1% of the area burnt (Figure 3 & 4, Appendix 1, Table A10.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Prescribed Burn.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were in the “Low” category across the entire year with no exceptions. These universally “Low” values fall significantly below the historic mean from November to June. Maximum DC values were much more varied throughout the year with a new maximum value of 182 observed in September compared to the historic maximum of 151 for the same month. Despite this new maximum in September, overall maximums were generally much lower than historic maximums for each month. (Table A10.2).
- Mean Buildup Index (BUI) values were in the “Low” category across the entire year with no exceptions. This differs from historic values that generally trend upwards from December to March, before dropping back to “Low” in May. Maximum values were much more varied, with a new maximum of 59 in September compared to the historic maximum of 48 for the same month. The maximum categories matched historic maximums from August through to November, before dropping back to well below historic for the remainder of the year. (Table A10.3).

Table A10.1 Number of wildfires and area burnt (ha) in Waikato for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	29	6	1	2	0	1	77	1	20	2	0	25	164
	2021/2022	57	21	15	6	2	3	195	15	41	8	10	60	433
Area Burnt (ha)	2022/2023	1	0	0	0	0	0	2	0	8	0	0	4	15
	2021/2022	2	0	41	0	6	0	35	0	3	12	1	4	104

Table A10.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Waikato District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	23	75	105	182	193	246	141	230	80	153	193	186	43
	2021/2022	20	123	45	27	103	281	283	482	527	604	543	518	227
	Historic	21	347	141	151	259	319	359	579	747	809	812	667	421
Mean	2022/2023	23	6	11	15	30	34	41	69	31	69	75	17	10
	2021/2022	20	18	9	7	17	62	121	282	197	241	223	185	24
	Historic	21	14	10	14	30	65	114	198	263	263	204	135	42

Table A10.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Waikato District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	23	8	32	59	62	63	34	45	23	35	32	20	9
	2021/2022	20	10	9	10	26	76	56	133	128	120	92	70	5
	Historic	21	26	43	48	67	87	91	139	203	169	153	155	58
Mean	2022/2023	23	1	3	5	9	8	9	14	7	11	9	2	2
	2021/2022	20	2	2	3	5	14	19	65	34	49	28	16	1
	Historic	21	2	2	4	8	14	20	36	45	34	17	9	2

Appendix 11 Bay of Plenty.

Wildfire Statistics

- During the 2022/2023 wildfire season, Bay of Plenty accounted for 7% of the total number of wildfires in the country and 1% of the area burnt (Figure 3 & 4, A1, Table A11.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Cigarettes, Matches, Candles.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were in the “Low” category across the entire year with no exceptions, being below or well below the historic mean for all months except October. Maximum DC values were more reflective of historic trends, with consistently elevated maximum values starting in October and “Extreme” maximums each month from December to February, before gradually declining back through to June. The maximum DC values were significantly below the historic maximum throughout the year. No new maximum values were observed. (Table A11.2)
- Mean Buildup Index (BUI) values were consistently in the “Low” category across the entire year, except for January which increased to “Moderate”. Mean BUI values remained below to well below the historic trend from November to April. Maximum BUI values reached the “Extreme” category each month from November to April, as well as July. July is a new maximum BUI value of 89, compared to the historic maximum of 23 for the same month. (Table A11.3)

Table A11.1 Number of wildfires and area burnt (ha) in Bay of Plenty for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	30	12	2	8	1	3	61	3	17	1	3	32	173
	2021/2022	85	28	21	6	1	6	143	10	38	2	9	79	428
Area Burnt (ha)	2022/2023	10	0	0	0	0	0	5	0	5	0	0	1	21
	2021/2022	23	0	7	0	0	0	30	1	4	1	0	3	69

Table A11.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Bay of Plenty District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	35	338	58	50	138	187	315	483	496	260	269	213	38
	2021/2022	29	113	65	54	131	299	373	486	510	495	278	303	327
	Historic	30	412	168	165	207	299	476	573	734	758	762	644	538
Mean	2022/2023	35	7	9	8	33	25	39	89	37	52	65	10	10
	2021/2022	29	15	11	8	19	77	116	245	184	171	102	103	26
	Historic	30	13	11	15	33	75	125	195	244	231	183	113	41

Table A11.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Bay of Plenty District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	35	89	23	17	49	64	62	68	70	69	69	17	10
	2021/2022	29	10	19	18	42	74	84	142	130	93	56	83	88
	Historic	30	23	26	45	60	77	108	142	162	157	189	81	70
Mean	2022/2023	35	2	2	3	10	6	9	16	7	10	10	2	2
	2021/2022	29	2	3	3	6	16	19	60	29	34	16	14	5
	Historic	30	2	3	5	9	16	22	35	42	30	17	8	3

Appendix 12 Tairāwhiti.

Wildfire Statistics

- During the 2022/2023 wildfire season, Tairāwhiti accounted for 1% of the total number of wildfires in the country and < 1% of the area burnt (Figure 3 & 4, A1, Table A12.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant causes of wildfires were Cigarettes, Matches, Candles; Explosives, Fireworks, and Unclassified.
- The primary cause that contributed to the total area burnt was Cigarettes, Matches, Candles, although the area was very small (<1 ha).

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were in the “Low” category across the entire year with no exceptions, with values significantly below the historic mean from September onwards. Maximum DC values did show a slight increase from November through to a peak in January but remained well below historic maximum values. No new maximum values were observed. (A12.2)
- Mean Buildup Index (BUI) values were in the “Low” category across the entire year with no exceptions, with values below or well below the historic mean from September onwards. Maximum BUI values intermittently reached the “Very High” category in February, May and June, though all months were well below the historical maximums. No new maximum values were observed. (Table A12.3)

Table A12.1 Number of wildfires and area burnt (ha) in Tairāwhiti for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	3	1	0	3	0	1	2	0	2	0	0	3	15
	2021/2022	9	6	1	2	0	1	17	0	4	1	0	12	53
Area Burnt (ha)	2022/2023	0	0	0	0	0	0	0	0	0	0	0	0	0
	2021/2022	12	0	0	0	0	0	5	0	0	0	0	0	17

Table A12.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Tairāwhiti District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023		103	66	55	82	150	235	266	172	142	167	178	191
	2021/2022		40	55	50	91	190	314	485	527	419	139	163	130
	Historic		357	363	407	213	385	610	866	910	769	831	695	614
Mean	2022/2023		15	20	12	27	48	76	57	39	54	59	31	13
	2021/2022		10	15	11	30	56	113	225	131	137	35	60	20
	Historic		21	18	21	45	80	140	227	263	208	148	102	44

Table A12.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Tairāwhiti District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023		13	19	14	29	43	39	29	46	28	33	48	52
	2021/2022		9	19	16	27	43	53	81	66	62	20	27	18
	Historic		52	42	66	75	134	197	278	291	144	160	70	79
Mean	2022/2023		3	5	4	8	10	10	7	8	11	9	6	2
	2021/2022		2	5	4	8	13	23	40	20	23	7	9	3
	Historic		3	4	7	13	19	27	40	41	23	14	11	5

Appendix 13 Taranaki.

Wildfire Statistics

- During the 2022/2023 wildfire season, Taranaki accounted for 3% of the total number of wildfires in the country and < 1% of the area burnt (Figure 3 & 4, A1, Table A13.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires and total area burnt was Pile Burn.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were in the “Low” category across the entire year with no exceptions and were well below historic mean values from November to May. Maximum DC values showed a more definite trend, with monthly maximum values increasing from November, peaking in January, then declining through to April. January was the only month where the maximum values fell in the same category as the historical maximum values (“Extreme”), but all months were well below historic maximums. No new maximum values were observed. (Table A13.2)
- Mean Buildup Index (BUI) values were in the “Low” category across the year except for January where they increased slightly to “Moderate”. Values closely followed historic trends, although they peaked earlier in January (compared to February) before dropping again. Maximum BUI values were in lower categories than historic values for the entire year except for January where they reached the “Extreme” category. No new maximum values were observed. (Table A13.3)

Table A13.1 Number of wildfires and area burnt (ha) in Taranaki for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	12	3	1	2	0	0	45	1	4	5	1	10	84
	2021/2022	19	13	2	5	2	1	60	2	28	5	2	10	149
Area Burnt (ha)	2022/2023	0	0	0	0	0	0	1	0	0	0	0	0	1
	2021/2022	8	0	1	0	0	0	3	0	1	2	0	0	15

Table A13.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Taranaki District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	12	33	21	24	77	125	183	371	247	158	97	97	59
	2021/2022	11	18	22	31	62	187	183	319	356	285	398	423	25
	Historic	11	125	134	152	107	222	425	536	589	689	692	527	269
Mean	2022/2023	12	7	6	7	25	33	41	98	49	61	33	11	24
	2021/2022	11	6	7	7	17	70	48	174	83	128	131	76	6
	Historic	11	11	10	12	22	57	96	164	225	220	153	85	26

Table A13.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Taranaki District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	12	7	7	8	23	27	35	81	22	31	18	13	11
	2021/2022	11	7	7	10	18	39	28	78	79	73	87	94	6
	Historic	11	22	35	45	33	54	108	112	101	123	118	66	23
Mean	2022/2023	12	1	2	2	7	6	9	20	10	10	6	2	4
	2021/2022	11	2	2	3	5	13	8	40	19	32	23	13	1
	Historic	11	2	2	4	5	11	15	25	30	24	12	7	2

Appendix 14 Hawke's Bay.

Wildfire Statistics

- During the 2022/2023 wildfire season, Hawke's Bay accounted for 5% of the total number of wildfires in the country and 1% of the area burnt (Figure 3 & 4, A1, Table A14.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires and the total area burnt was Pile Burn.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were in the "Low" category across the entire year, except for December when they increased to "Moderate", remaining below historic mean values throughout. Maximum DC values were varied, with values in the "Extreme" category from November to January. Generally maximum values began to increase in September, peaked in January, then dropped again, with another notable climb from March through to June. No new maximum values were observed. (Table A14.2)
- Mean Buildup Index (BUI) values roughly followed historic trends, though they were lower than historic from January through April. Maximum BUI values gradually increased from September, peaked in the "Extreme" category from November to January, followed by a sharp decline in February. Except for November to January, no maximum values are in the same category as historical maximum values. No new maximum values were observed. (Table A14.3)

Table A14.1 Number of wildfires and area burnt (ha) in Hawke's Bay for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	14	15	4	2	0	1	54	2	11	1	1	7	112
	2021/2022	14	22	12	1	0	0	102	2	16	10	4	18	201
Area Burnt (ha)	2022/2023	0	0	1	1	0	0	15	0	1	0	0	1	19
	2021/2022	0	10	5	0	0	0	51	11	5	1	0	1	84

Table A14.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Hawke's Bay District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	35	248	87	109	200	351	542	717	201	145	205	254	267
	2021/2022	31	259	295	295	304	337	394	526	635	407	321	404	410
	Historic	34	668	422	429	379	424	559	760	896	1,005	892	900	813
Mean	2022/2023	35	24	15	11	33	78	106	95	47	52	78	75	48
	2021/2022	31	82	83	62	58	91	124	225	119	104	69	97	46
	Historic	34	41	34	33	49	101	159	236	280	262	206	170	95

Table A14.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Hawke's Bay District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	35	29	28	31	55	95	134	152	48	33	34	37	41
	2021/2022	31	24	40	49	48	62	76	120	134	66	59	72	69
	Historic	34	45	50	68	92	101	181	190	224	236	152	122	100
Mean	2022/2023	35	5	5	4	10	18	16	13	9	11	10	7	4
	2021/2022	31	6	10	8	10	17	21	44	22	18	12	14	4
	Historic	34	4	6	8	13	22	28	38	42	33	19	14	6

Appendix 15 Manawatū-Whanganui.

Wildfire Statistics

- During the 2022/2023 wildfire season, Manawatū-Whanganui accounted for 6% of the total number of wildfires in the country and 13% of the area burnt (Figure 3 & 4, A1, Table A15.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Explosives, Fireworks.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were in the “Low” category across the entire year with no exceptions and were well below the historic mean values throughout. Maximum DC values showed some variation, reaching the “Very High” category in November, January, March, and April. However, all months fell below historical maximums by at least one category. No new maximum values were observed. (Table A13.2)
- Mean Buildup Index (BUI) values were in the “Low” category across the entire year except for January which made a modest increase to “Moderate”. Mean values were below or well below the historical mean from August to May. Maximum BUI’s were well below historical maximums, with no months except January being in the same category as the historic maximums. No new maximum values were observed. (Table A15.3)

Table A15.1 Number of wildfires and area burnt (ha) in Manawatū-Whanganui for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	12	11	2	3	0	1	57	9	10	3	4	28	140
	2021/2022	76	18	12	5	2	0	144	12	34	7	2	57	369
Area Burnt (ha)	2022/2023	0	0	0	241	0	0	1	0	3	0	0	0	245
	2021/2022	18	0	23	126	1	0	51	0	124	0	0	26	369

Table A15.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Manawatū-Whanganui District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023		74	42	57	157	254	179	300	250	259	278	176	158
	2021/2022		220	99	52	94	168	182	372	406	348	405	433	282
	Historic		433	300	315	390	502	620	765	951	1,077	915	757	484
Mean	2022/2023		10	7	8	25	50	45	97	54	82	78	35	33
	2021/2022		43	13	9	21	78	71	192	126	155	132	103	13
	Historic		31	23	23	34	73	116	186	252	266	209	139	65

Table A15.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Manawatū-Whanganui District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023		12	9	15	36	57	29	66	36	38	28	16	23
	2021/2022		12	8	15	21	41	34	110	118	97	81	63	18
	Historic		50	64	122	88	105	144	148	203	237	127	64	59
Mean	2022/2023		2	2	3	7	10	9	18	8	10	8	3	6
	2021/2022		2	2	3	5	14	10	47	24	35	19	13	2
	Historic		2	3	5	8	14	18	29	37	30	14	8	3

Appendix 16 Wellington.

The Wellington District includes the Chatham Islands. In future iterations we are considering creating a sub-district specifically for the Chatham Islands because both fire occurrence and climate are different compared to the larger district.

Wildfire Statistics

- During the 2022/2023 wildfire season, Wellington accounted for 6% of the total number of wildfires in the country and < 1% of the area burnt (Figure 3 & 4, A1, Table A16.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Equipment.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were generally in the “Low” category throughout the year, with a slight increase to “Moderate” from January to March. The increase between January and March broadly followed historical trends, however the increases were considerably lower than historical increases. Maximum DC values did reach “Extreme” from January to April, but all maximum values were considerably lower than historical maximums. No new maximum values were observed. (Table A16.2)
- Mean Buildup Index (BUI) values were in the “Low” category throughout the year except for January where there was only a modest increase to “Moderate”. All values were below or well below the historic mean from July to May. Maximum BUI values gradually increased from October, peaked in January and February, then declined. No new maximum values were observed. (Table A16.3)

Table A16.1 Number of wildfires and area burnt (ha) in Wellington for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	19	28	4	3	0	1	46	6	15	4	1	15	142
	2021/2022	40	39	9	4	0	2	82	6	8	5	4	21	220
Area Burnt (ha)	2022/2023	0	0	1	0	0	0	0	0	0	0	0	0	1
	2021/2022	1	0	3	0	0	0	3	0	0	0	17	0	24

Table A16.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Wellington District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	26	239	43	53	89	168	244	343	417	393	384	282	245
	2021/2022	24	141	90	63	113	268	299	416	451	394	396	275	238
	Historic	26	554	592	622	434	475	636	657	766	805	862	867	648
Mean	2022/2023	26	23	9	15	29	78	88	112	124	112	72	46	42
	2021/2022	24	25	10	14	29	110	102	224	115	127	123	123	49
	Historic	26	41	30	27	42	91	152	242	301	298	218	165	82

Table A16.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Wellington District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	26	14	14	15	29	48	52	60	64	33	19	21	23
	2021/2022	24	11	9	21	34	80	82	88	95	63	47	56	19
	Historic	26	74	97	111	82	80	117	138	176	170	141	139	63
Mean	2022/2023	26	2	2	4	8	15	13	17	13	10	5	3	4
	2021/2022	24	2	2	4	7	21	14	39	16	23	14	14	2
	Historic	26	3	4	6	9	18	24	35	42	35	17	11	4

Appendix 17 Nelson/Marlborough.

Wildfire Statistics

- During the 2022/2023 wildfire season, Nelson/Marlborough accounted for 5% of the total number of wildfires in the country and 4% of the area burnt (Figure 3 & 4, A1, Table A17.1).
- There has been a Decrease in the number of wildfires and an Increase in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Re-ignition.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values did not peak as high as the historical mean but generally followed historic trends, with a gradual increase in values starting in December, peaking January through March, then declining through until June. Maximum DC reached the “Extreme” category for December through June, which matches historical maximum categories, however the actual monthly values were significantly below historical values for every month. No new maximum values were observed. (Table A17.2)
- Mean Buildup Index (BUI) values roughly followed historical trends with increases starting in October, increasing (except for December) to a peak in January, before declining through to May. The actual values were lower across all months except October and June when compared against the historic values. There was a gradual increase in monthly maximum BUI values beginning in August, reaching “Extreme” from October to February, before gradually declining back through to June. No new maximum values were observed. (Table A17.3)

Table A17.1 Number of wildfires and area burnt (ha) in Nelson/Marlborough for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	14	16	7	3	1	3	50	2	5	3	14	11	129
	2021/2022	17	26	7	2	0	2	68	1	12	2	3	12	152
Area Burnt (ha)	2022/2023	2	2	1	2	3	0	1	0	1	45	0	14	71
	2021/2022	0	3	5	0	0	0	5	0	0	0	0	0	13

Table A17.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Nelson/Marlborough District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	28	256	57	86	178	224	368	412	496	488	520	497	383
	2021/2022	25	196	79	31	82	236	271	451	481	271	359	385	294
	Historic	27	628	541	562	590	521	708	922	1,120	1,186	1,167	1,089	933
Mean	2022/2023	28	19	7	20	50	82	120	192	229	193	147	78	63
	2021/2022	25	25	7	8	20	93	93	228	110	138	195	171	48
	Historic	27	48	36	37	49	98	155	220	278	283	220	155	76

Table A17.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Nelson/Marlborough District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	28	12	23	29	64	60	70	85	79	58	45	44	25
	2021/2022	25	15	9	17	23	78	87	124	134	76	82	75	13
	Historic	27	37	47	65	97	150	168	213	264	268	191	161	73
Mean	2022/2023	28	2	2	7	17	17	15	31	25	17	10	4	5
	2021/2022	25	2	2	4	6	21	16	52	18	31	33	17	2
	Historic	27	4	5	8	12	22	28	40	50	39	22	13	5

Appendix 18 West Coast.

Wildfire Statistics

- During the 2022/2023 wildfire season, West Coast accounted for 3% of the total number of wildfires in the country and 1% of the area burnt (Figure 3 & 4, A1, Table A18.1).
- There has been No Change in the number of wildfires and an Increase in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Cigarettes, Matches, Candles.
- The primary cause that contributed to the total area burnt was Pile Burn.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were in the “Low” category throughout the year except for a modest increase in January and February when they exceeded historic values at “Moderate”. Maximum DC values largely followed historic maximums, though at much lower levels. Maximum DC values were in the “Low” category throughout the year except for December to March where they jumped from “Moderate” to “Extreme” and held for three months before returning to “Low”. No new maximum values were observed. (Table A18.2)
- Mean Buildup Index (BUI) values were in the “Low” category throughout the year except for a modest increase to “Moderate” in January and February. Mean BUI values were greater than historic values during January and February while most of the year trended near or just below the historic mean. Maximum BUI values gradually increased from October, peaked in January and February with “Extreme” values, before dropping through to May. This roughly follows historic trends albeit over a shorter period. January produced a new maximum value of 86 compared to the historic maximum of 85 for the same month. (Table A18.3)

Table A18.1 Number of wildfires and area burnt (ha) in West Coast for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	28	10	1	0	0	0	22	0	5	1	0	13	80
	2021/2022	30	11	1	0	0	0	24	0	8	1	0	5	80
Area Burnt (ha)	2022/2023	5	0	0	0	0	0	8	0	0	0	0	0	13
	2021/2022	3	0	0	0	0	0	0	0	6	0	0	0	9

Table A18.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all West Coast District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	15	30	19	23	57	91	140	352	362	356	57	24	48
	2021/2022	13	15	13	23	41	82	88	265	273	204	224	95	18
	Historic	13	87	64	120	193	204	316	371	427	422	310	214	57
Mean	2022/2023	15	4	5	7	13	28	44	133	124	62	10	5	11
	2021/2022	13	4	3	5	10	24	22	117	35	84	75	8	3
	Historic	13	7	6	8	13	32	52	75	78	65	33	10	6

Table A18.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all West Coast District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	15	5	6	9	19	27	39	86	67	59	11	7	16
	2021/2022	13	5	3	7	14	27	21	70	65	60	51	6	5
	Historic	13	24	25	33	53	63	90	85	84	101	53	23	18
Mean	2022/2023	15	1	1	3	5	7	10	28	18	7	2	1	3
	2021/2022	13	1	1	2	3	7	5	24	9	21	12	1	1
	Historic	13	2	2	3	4	8	11	14	13	11	5	2	2

Appendix 19 Canterbury.

Wildfire Statistics

- During the 2022/2023 wildfire season, Canterbury accounted for 14% of the total number of wildfires in the country and 11% of the area burnt (Figure 3 & 4, A1, Table A19.1).
- There has been a Decrease in the number of wildfires and an Increase in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Explosives, Fireworks.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values broadly followed historical mean values, although with a reduced and earlier peak in February and all months except November being below the historical mean. Mean DC values increased to “Moderate” in November and peaked in February at “Very High”. By comparison, historical mean DC values generally peak and remain in “Extreme” between February and April before declining through to June. Maximum DC values reached “Extreme” for every month of the year except August and September but were all well below the historic maximum values. No new maximum values were observed. (Table A19.2)
- Mean Buildup Index (BUI) values broadly followed historical trends and peaked at “High” in January and February, before declining suddenly in March. Historical trends generally peak in February at “Very High”, then gradually decline through to June. Maximum BUI values were “Extreme” from October through to March, with all months showing below historic maximums. No new maximum values were observed. (Table A19.3)

Table A19.1 Number of wildfires and area burnt (ha) in Canterbury for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	77	22	13	14	3	4	118	9	14	12	7	44	337
	2021/2022	105	35	14	12	0	0	155	14	18	13	4	42	412
Area Burnt (ha)	2022/2023	2	2	0	189	0	0	7	1	1	3	0	3	208
	2021/2022	3	4	18	0	0	0	103	27	1	20	0	3	179

Table A19.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Canterbury District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	44	576	233	261	345	427	424	611	720	660	641	603	483
	2021/2022	36	221	225	208	252	347	408	417	448	454	554	591	618
	Historic	37	622	485	453	479	536	640	781	862	891	853	826	704
Mean	2022/2023	44	76	21	40	78	133	129	244	288	177	149	139	118
	2021/2022	36	60	34	46	59	147	132	196	115	160	222	241	193
	Historic	37	83	63	64	79	127	196	271	339	354	323	271	147

Table A19.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Canterbury District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	44	31	29	35	68	95	75	112	141	114	47	42	40
	2021/2022	36	19	21	35	35	67	65	117	129	72	93	106	65
	Historic	37	47	52	64	95	120	169	237	239	203	178	191	85
Mean	2022/2023	44	4	5	12	20	29	20	39	37	15	9	9	7
	2021/2022	36	5	4	10	12	28	18	35	17	32	32	24	10
	Historic	37	6	8	12	18	27	34	44	51	45	31	22	7

Appendix 20 Mid-South Canterbury.

Wildfire Statistics

- During the 2022/2023 wildfire season, Mid-South Canterbury accounted for 4% of the total number of wildfires in the country and 6% of the area burnt (Figure 3 & 4, A1, Table A20.1).
- There has been an Increase in the number of wildfires and an Increase in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Equipment.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values were generally lower than historic mean values except for February and exhibited a shorter peak season starting in December compared to October for the historic trend. The season peaked in February before declining through to June, whereas historic mean DC generally only begins to decline in May. Maximum DC values fell in the same "Extreme" category for July and January through to June, but all months were well below the historical maximum. August and September notably experienced maximums in the "Low" category. No new maximum values were observed. (Table A20.2)
- Mean Buildup Index (BUI) values roughly followed historic trends but they peaked over a shorter period and with a higher mean in February than typically observed in historic values. Except for January and February, all months showed lower mean values than the historic. Maximum BUI values varied in terms of category, with July to November and April to June falling well below the historic maximum, while December to March were "Extreme" which matched the historic category. No new maximum values were observed. (Table A20.3)

Table A20.1 Number of wildfires and area burnt (ha) in Mid-South Canterbury for 2022/2023 and 2021/2022 fire years by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	15	7	12	0	1	2	32	2	20	4	2	7	104
	2021/2022	12	11	3	1	2	1	37	7	9	9	1	9	102
Area Burnt (ha)	2022/2023	1	0	55	0	1	0	50	0	17	0	0	0	124
	2021/2022	0	0	1	0	0	0	1	0	2	0	0	1	5

Table A20.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Mid-South Canterbury District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	29	372	76	79	131	214	279	464	590	503	539	563	563
	2021/2022	28	265	245	251	247	293	268	343	358	370	389	406	424
	Historic	29	617	521	443	477	464	598	771	890	958	778	731	670
Mean	2022/2023	29	65	7	25	48	82	104	201	292	225	194	175	150
	2021/2022	28	72	64	69	84	128	102	177	109	162	204	209	172
	Historic	29	115	93	90	103	132	174	226	264	278	262	218	151

Table A20.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Mid-South Canterbury District weather stations. The colour scale is a visual indicator of high (red and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	29	29	9	27	39	58	62	124	166	106	44	54	41
	2021/2022	28	19	22	34	44	54	40	84	84	82	89	59	55
	Historic	29	54	65	93	107	122	134	163	171	163	157	95	73
Mean	2022/2023	29	3	2	9	15	16	16	33	47	16	11	9	8
	2021/2022	28	4	5	10	13	17	11	29	15	23	20	17	12
	Historic	29	8	9	14	17	21	26	33	36	31	23	16	10

Appendix 21 Otago.

Wildfire Statistics

- During the 2022/2023 wildfire season, Otago accounted for 11% of the total number of wildfires in the country and 40% of the area burnt (Figure 3 & 4, A1, Table A21.1).
- There has been a Decrease in the number of wildfires and an Increase in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires and the total area burnt was Pile Burn.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values roughly followed historic mean values, although August and September were anomalous in that they were slightly lower than historic mean and dropped to the “Low” category. The January through March period increased to “Extreme” one month earlier than the historic trend, peaking in February as opposed to the historic mean of April, but also declined a month earlier. January to March were all above the historic mean. Maximum values across all months for 2022/2023 and historic were “Extreme”. No new maximum values were observed. (Table A21.2)
- Mean Buildup Index (BUI) values roughly followed historic trends but the peak in February was much higher than the historic mean, reaching “Extreme” when historical trends plateau at “High”. While the values for January and February were much higher than historic, the period of elevated values was shorter compared to the historic mean (December to April). Mean values were lower than historical values for the remainder of the year (except October which was the same). Maximum BUI matched historical maximums at “Extreme” from October through to March. Only August maximums fell below “High”. No new maximum values were observed. (Table A21.3)

Table A21.1 Number of wildfires and area burnt (ha) in Otago by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition	Spontaneous Combustion	Unclassified	Total
Number of Wildfires	2022/2023	34	16	25	3	3	3	95	10	25	6	4	40	264
	2021/2022	25	30	16	3	1	4	109	10	23	14	12	48	295
Area Burnt (ha)	2022/2023	7	1	77	3	0	0	654	2	9	0	0	19	772
	2021/2022	4	0	2	2	0	0	9	0	26	0	1	236	280

Table A21.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Otago District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	33	520	350	359	371	403	477	664	812	584	536	516	525
	2021/2022	32	489	395	377	330	390	413	612	619	600	640	660	648
	Historic	35	573	576	591	621	665	810	1,017	922	891	865	855	692
Mean	2022/2023	33	169	75	97	123	161	237	361	471	359	275	219	174
	2021/2022	32	161	136	128	121	169	194	308	253	320	374	365	314
	Historic	35	155	128	127	138	175	238	291	321	350	355	287	212

Table A21.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Otago District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	33	58	15	50	80	73	89	158	183	112	49	49	38
	2021/2022	32	15	33	51	56	94	54	133	116	108	115	94	92
	Historic	35	71	73	80	133	139	171	205	217	202	178	137	79
Mean	2022/2023	33	4	4	14	20	25	26	53	76	30	14	9	7
	2021/2022	32	3	7	14	17	23	20	45	21	38	38	27	18
	Historic	35	6	9	16	20	27	34	40	39	40	31	16	9

Appendix 22 Southland.

The Southland district includes Stewart Island.

Wildfire Statistics

- During the 2022/2023 wildfire season, Southland accounted for 5% of the total number of wildfires in the country and 4% of the area burnt (Figure 3 & 4, A1, Table A22.1).
- There has been a Decrease in the number of wildfires and a Decrease in the total area burnt during 2022/2023 compared to 2021/2022.
- The dominant cause of wildfires was Pile Burn.
- The primary cause that contributed to the total area burnt was Prescribed Burn.

Fuel Moisture Status

- 2022/2023 Drought Code (DC) mean values roughly followed historical mean DC values, though the period of elevated values was shorter (January to March) compared to the historic DC mean values (December to April). Mean values for January and February were higher than historical values, with the remainder of the year lower than historical values. Maximum DC values were significantly lower than historic maximum monthly values from July to December and April to June. Maximum DC values from January to March were on par with historic values in the “Extreme” category. No new maximum values were observed. (Table A22.2)
- Mean Buildup Index (BUI) values across the season were in the “Low” category with a modest increase to “Moderate” in January and February. These represent a similar but shorter season to the historic trend, which shows “Moderate” values from December to March. The mean values for January and February were higher than the historic, while the remainder of the year was either at or below the historic mean. Maximum BUI matched historic trends for January through to March at “Extreme” but was otherwise significantly lower than historic maximums. January’s maximum BUI (114) matched the historic maximum BUI. (Table A22.3)

Table A22.1 Number of wildfires and area burnt (ha) in Southland by broad cause categories.

Value	Fire Year	Cigarettes, Matches, Candles	Cooking and Heating	Equipment	Explosives, Fireworks	Industry	Natural Sources	Pile Burn	Powerline	Prescribed Burn	Re-ignition Spontaneous Combustion		Unclassified	Total
Number of Wildfires	2022/2023	9	9	9	0	1	3	44	6	20	4	0	15	120
	2021/2022	11	11	7	2	1	0	95	5	16	5	1	23	177
Area Burnt (ha)	2022/2023	0	0	5	0	0	0	2	0	38	5	0	17	67
	2021/2022	7	0	0	0	0	0	3	1	35	0	0	869	915

Table A22.2 Drought Code (DC) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Southland District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) DC values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	25	104	39	35	75	111	250	478	485	423	179	171	63
	2021/2022	23	32	25	33	66	131	210	324	395	458	469	255	181
	Historic	25	261	195	179	191	251	334	502	533	514	488	444	310
Mean	2022/2023	25	10	5	9	18	36	78	183	220	161	64	25	8
	2021/2022	23	5	4	7	18	61	97	189	162	197	160	53	18
	Historic	25	13	11	13	22	52	103	151	170	179	158	84	32

Table A22.3 Buildup Index (BUI) values (maximum and mean) for 2022/2023, 2021/2022 and the historical average, based on values averaged across all Southland District weather stations. The colour scale is a visual indicator of high (red, orange, and yellow) and low (blue) BUI values. Fuel moisture data covers the last 26 years of data. The historic period is from 1996 through June 2021.

Statistic	Period	Stations	July	August	September	October	November	December	January	February	March	April	May	June
Max	2022/2023	25	9	9	12	22	25	50	114	116	103	15	14	7
	2021/2022	23	4	7	12	22	39	37	62	49	55	61	32	11
	Historic	25	22	24	38	49	78	89	114	123	95	92	56	21
Mean	2022/2023	25	1	1	3	5	8	11	30	23	15	4	2	1
	2021/2022	23	1	1	2	5	11	14	22	15	26	14	3	1
	Historic	25	1	2	4	6	11	16	20	19	16	9	3	1


WHAKARATONGA IWI
FIRE
EMERGENCY
NEW ZEALAND