New Zealand Seasonal Fire Danger Outlook 2017/18

ISSUE: South Island, December 2017

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Current fire danger situation & outlook:

The fire season has arrived, with some regions experiencing an increase in fire activity. Marlborough, Kaikoura, coastal North and South Canterbury, Mackenzie, Waitaki and Central Otago are experiencing, on average, High to Very High fire danger and fire weather severity. The elevated fire dangers across the South Island are the result of continued warm temperatures and an extended dry period for many areas. Low fire danger and severity exists elsewhere across the south (Fig. 1 & 5).

The above listed areas are currently experiencing, on average, High to Extreme FWI, BUI, DC, DMC & FFMC values (Figures 5-6 & 7-8). This indicates that a fire could start easily and be difficult to suppress (in terms of control and mop-up). However, if low ISIs continue, this results in lower spread rates, and an ease in controlling fires that do start and slowly spread. Areas of low grass curing (green) would also help suppression efforts by slowing or stopping a spreading fire.

The drier than normal conditions have resulted in soil moistures becoming depleted across the South Island (Figure 3). Soils are dry along the east coast, and in some places, soils are very dry. Parts of Tasman, West Coast and Southland are experiencing drier than normal soils (Figure 4). The only exceptions are Central Otago, Dunedin and coastal Waitaki, where soil dryness is relatively dry, but is about normal for this time of the year.

The El Niño-Southern Oscillation (ENSO) state has recently been declared as La Niña. International climate models suggest La Niña thresholds will likely be met in December 2017 through until at least February (possibly into April) 2018. Historically, late-developing and weak La Niña events have had mixed impacts on rainfall and temperature for New Zealand. During a La Niña, north-easterly and easterly winds are typically more frequent, warmer than normal temperatures are experienced, and rainfall is reduced in the south-west of the South Island.

The climate outlook for the next three months is for high pressure to continue to dominate our weather patterns, especially for the south, with lower pressure to the north of the island. Temperatures are forecast to be above average for all regions. Near normal rainfall is forecast for the west of the South Island, with below or near normal rainfall for the east.

Looking ahead, warm temperatures are likely to continue into December, and it is expected that dry conditions will continue over the month for many areas across the South. As a result, fire dangers and fire weather severities for December are expected to continue to be elevated along the east coast (Figures 1 & 5). The fire season years of 2016/17, 2013/14, 2012/13 & 2008/09 are potentially good indicators for what to expect this coming fire season (Figure 9).

As the weeks ahead become drier and hotter, fire activity will continue to creep up, especially as grasslands begin to cure off. However, any major rain events will provide some relief and keep the fire danger and severity generally low for the West Coast. Regions to watch for increased fire activity are Otago, North and South Canterbury, Kaikoura and Marlborough. Central Otago and North Canterbury are currently experiencing, on average, Very High to Extreme fire severity, DC and BUI values and, in the absence of significant rain, these conditions are likely to continue.

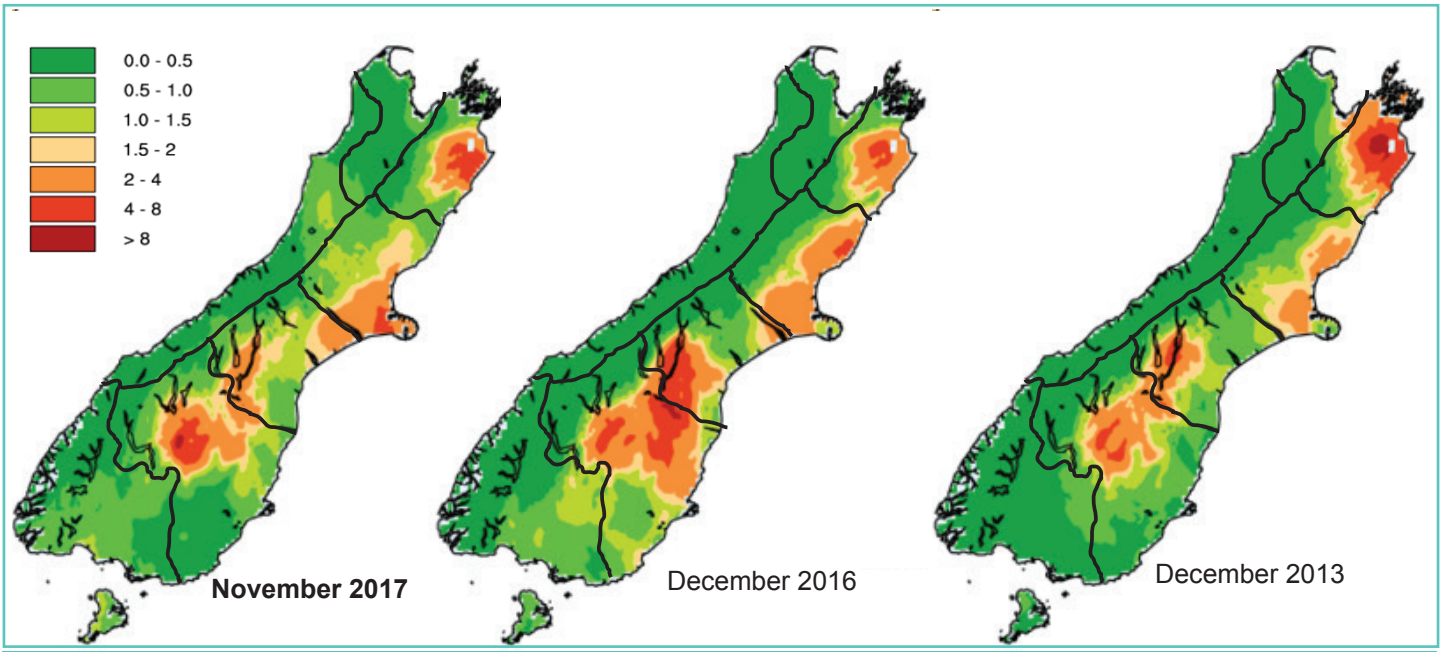

Figure 1. Monthly average Severity Rating for: current (left), last year (middle), 2013/14 Neutral year followed by a weak La Niña (right).

EXPECTED CLIMATE OUTLOOK:

The ENSO Outlook has been raised from Neutral to La Niña. The tropical Pacific Ocean and overlying atmosphere have reached La Niña thresholds. International agencies have indicated that La Niña thresholds have been or are close to being met. International climate models suggest La Niña will likely continue through until at least April 2018. These models suggest that if an event does occur this year, it is likely to be weak and short-lived. It should be noted that the impacts of La Niña are not always proportional to its intensity. The models then predict a transition back to ENSO neutral conditions over the March – May 2018 period (72% chance).

This month: December 2017

Across the country, December is expected to have well above average temperatures. High pressures are expected to continue to favour southern and central New Zealand. It will likely be drier than usual for most regions, but we could see a change to more reliable rainfall for Nelson by mid-month.

Below-average December rainfall is forecast across most of the South Island. Near-normal rainfall is signalled for Nelson, due to more frequent northeasterly wind flows

Further ahead: December 2017 – February 2018

New Zealand is expected to be dominated by higher pressure than normal to the south and southeast of the country, and lower pressure than normal to the north. This pressure pattern is expected to be associated with easterly to northeasterly flow anomalies, a pattern which is consistent with regional conditions typically observed during La Niña events.

For the next three months (Dec 2017 – Feb 2018):
Temperatures are forecast to be above average for all (60% to 70% chance).

Near normal rainfall amounts are most likely for the north of the South Island (40% chance). Below normal rainfall is most likely for the west of the South Island (45% chance). Rainfall totals for the next three months are about equally likely to be below normal (35% chance) or near normal (40% chance) for the east of the South Island.

In the north of the South Island soil moisture levels and river flows are most likely to be in the near normal range (40% chance), with below normal soil moisture levels and river flows most likely (55% chance) for the east and west of the South Island.

Breakdown (Figure 2):

Temperatures are most likely to be:

- above average (65% chance) for Tasman, Nelson, Marlborough & Buller.
- above average (70% chance) for West Coast, Alps and foothills, inland Otago, Southland, coastal Canterbury & eastern Otago.

Rainfall totals are most likely to be:

- near normal (40% chance) for Tasman, Nelson, Marlborough & Buller.
- below normal (45% chance) for West Coast, Alps and foothills, inland Otago & Southland.
- normal range (40% chance) or below normal range (35% chance) for coastal Canterbury & eastern Otago.

Soil moisture levels are most likely to be:

- near normal (40% chance) for Tasman, Nelson, Marlborough & Buller.
- below normal range (55% chance) for West Coast, Alps and foothills, inland Otago, Southland, coastal Canterbury & eastern Otago.

Last month: November 2017

Looking back, November was a month of extremes. Temperatures swung from unusually warm at the start, to cold, then back to warm by the end of the month. Western areas of both Islands saw unsettled westerlies and rainfall for the first 10 days of the month. After that, blocking high pressure systems dominated our weather, resulting in an extended dry run for all regions.

It was a very dry November for many areas of New Zealand: Christchurch (1.3mm of rainfall), Oamaru and Ashburton (with 6mm of rain) all recorded their driest November on record, while Timaru had its 3rd driest November.

What does Neutral mean for New Zealand?

The El Niño-Southern Oscillation (ENSO) is a key natural cycle influencing New Zealand's climate. It operates over the Pacific Ocean and beyond, and causes fluctuations in the prevailing trade winds and in the strength of the subtropical high-pressure belt. Although ENSO events have an important influence on New Zealand's climate, they still only account for less than 25% of the year to

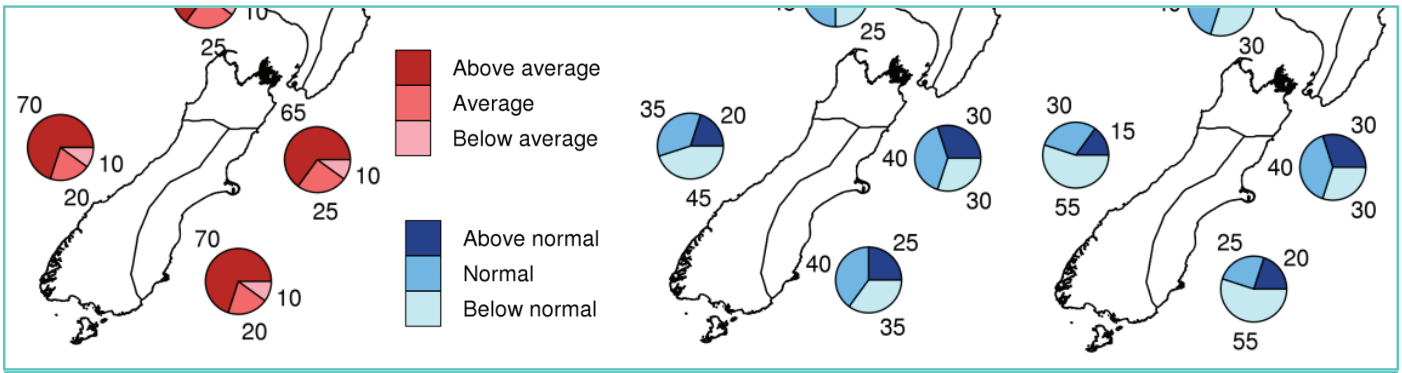

Figure 2. Outlook for Dec 2017- Fen 2018: air temperature (left), rainfall (middle), available soil moisture (right). Source: NIWA.

year variance in seasonal rainfall and temperature. When neither El Niño nor La Niña are present, weather patterns are said to be in a “neutral” or normal state. Neutral conditions encourage far more variability in weather patterns for New Zealand, whereas El Niño or La Niña tend to have more predictable patterns.

What would La Niña mean for New Zealand?

La Niña tends to warm the ocean surrounding New Zealand, which encourages frequent lows and sub-tropical storms for the north, occasionally stretching down as far as Canterbury. During a La Niña, north-easterly and easterly winds are more frequent, resulting in the risk of heavy rain and flooding. New Zealand is typically warmer than average during a La Niña, although there are regional and seasonal exceptions.

For the South Island, this means the south and west of the country tends to dry out and have spectacular summers. Coastal Marlborough and Canterbury can be cloudier and cooler, with a chance of more rain than in non-La Niña years. During a La Niña summer, anticyclones are more frequent over southern New Zealand, bringing dry weather. Areas such as Central Otago and South Canterbury can experience drought in both El Niño and La Niña. .

It’s important to note that ENSO events have an important influence on New Zealand’s climate, but account for less than 25% of seasonal rainfall and temperatures. With a weak La Niña expected, it means our ‘local’ climate players (the Southern Ocean southerlies and Tasman Sea lows) will continue to take turns ruling our weather. This is a good reminder that local climate patterns (blocking Highs over or near New Zealand, Lows over the Tasman Sea or to the north of the country, and the southern ocean storms) generally ‘trump’ climate patterns such as El Niño and La Niña.

Grass growth:

As we transition into early summer, now is the time to be prepared, as the potential for a fire to ignite and spread is increased as the curing process kicks off in these fuels (formation of seed heads and loss of seeds).

With rising temperatures, strong winds grasslands will be drying out. Some areas would have experienced abundant grass growth over the last month, increasing the fuel loading. Some landscapes may already start to form a mixture of green and brown as grasses begin the curing phase. Areas experiencing a lack of rainfall for several weeks will likely have a cured landscape already.

The finer details:

Typically, grasses undergo curing in late spring/early summer, where the plant dies or becomes dormant following flowering and seed drop. As grasses cure, the amount of dead material increases, heightening the potential for fire to ignite and spread. When grasses cure and fuel moisture content decreases, there is less heat required to ignite the grass. As a result, more heat is released as it combusts. Burning under these conditions can produce large to very high flame heights (2 m+) and fires can spread quickly, be very intense and much more difficult to suppress.
In areas that are still favouring grass growth (mild temperatures and high soil moistures), they will typically remain green lush landscapes. Normally, if a fire started in these fuels, fire spread would be difficult. Any burning will produce small flame heights and low intensities for easy suppression. However, caution should be taken for some areas, as the presence of dead matted material from the previous season’s growth (thatch) can contribute to the ease of a fire starting and spreading. This material is often hidden underneath lush green grass that appears to have low curing (30 - 50%). However, thatch can increase the ability of grass fuels to carry and sustain a fire. These fires will typically produce small flame heights and spread in a patchy manner.

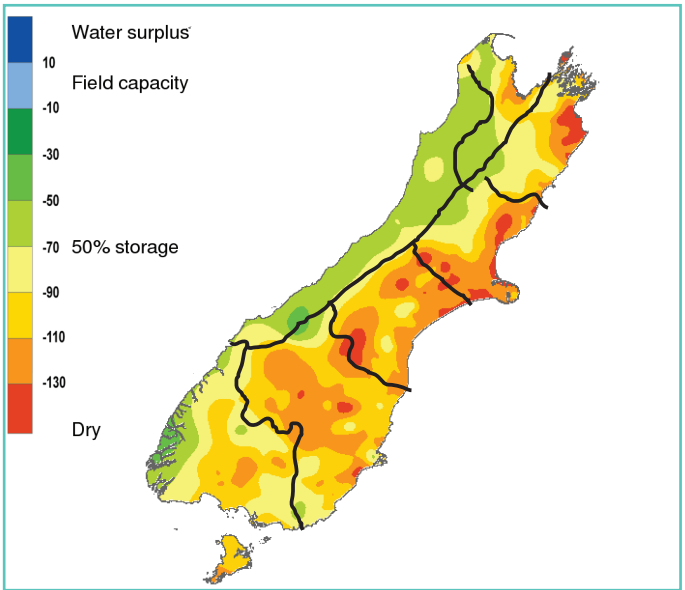

Figure 3. Soil moisture deficits as of 30/11/2017.
Source: NIWA.

Note: Soil moisture deficit means the amount of water needed to bring the soil moisture content back to field capacity, which is the maximum amount of water the soil can hold.

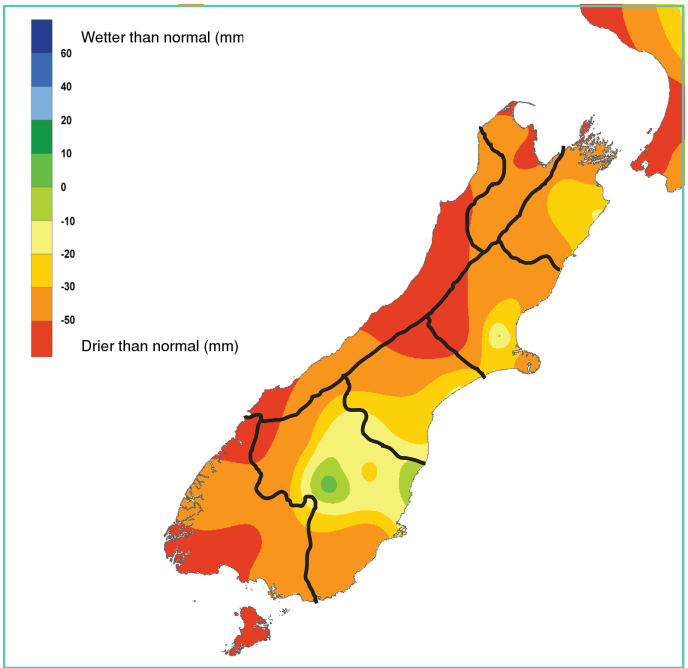

Figure 4. Soil moisture anomaly as of 30/11/2017.
Source: NIWA.

Note: Soil moisture anomaly means the difference between the historical normal soil moisture deficit (or surplus) for a given time of year and actual soil moisture deficits.

Background info

The intention of these monthly outlooks is to provide a heads up on current and potential fire danger for the North and South Islands. This is not a detailed fire seasonal outlook for specific localities, nor does it summarise fire potential (which depends on fuel conditions (i.e. grass curing), risks of ignitions, recent fire history and fire management resources available in an area as well as weather and climate).

It should be used as a prompt for local and regional discussions/debates on fire potential, and where things are at, where it is heading, and to drive awareness about what this might mean in your patch and for your neighbours. Now is the chance to carry out your pre-planning if you haven't done so already.

Fine Fuel Moisture Code (FFMC)

An indicator of the relevant ease of ignition and flammability of fine fuels.

0 - 74	Difficult
75 - 84	Moderately easy
85 - 88	Easy
89 - 91	Very easy
92 +	Extreme easy

Duff Moisture Code (DMC) A rating of the average moisture content of loosely compacted organic soil layers (duff/humus) of moderate depth, and medium-sized woody material

0 - 10	Little mopup needs
11 - 20	Moderate
21 - 30	Difficult
31 - 40	Difficult & extended
41 +	Difficult & extensive

Drought Code (DC) A rating of the average moisture content of deep, compact, organic soil layers, and a useful indicator of seasonal drought effects on forest fuels and amount of smouldering in deep duff layers and large logs.

0 - 100	Little mopup needs
101 - 175	Moderate
176 - 250	Difficult
251 - 300	Difficult & extended
301 +	Difficult & extensive

Buildup Index (BUI)

Combines the DMC and DC, and represents the total amount of fuel available for combustion.

0 - 15	Easy control
16 - 30	Not difficult
31 - 45	Difficult
46 - 59	Very difficult
60 +	Extremely difficult

Initial Spread Index (ISI) Combines the effect of wind speed and the FFMC, providing a numerical rating of potential fire spread rate.

0 - 3	Slow rate of spread
4 - 7	Moderate fast
8 - 12	Fast
13 - 15	Very fast
16 +	Extremely fast

Fire Weather Index (FWI)

Combines the ISI and BUI to indicate the potential head fire intensity of a spreading fire (on level terrain).

0 - 5	Low fire intensity
6 - 12	Moderate
13 - 20	High
21 - 29	Very High
30 +	Extreme

Daily Severity Rating (DSR) A numerical rating of the daily fire weather severity at a particular station, based on the FWI. It indicates the increasing amount of work and difficulty of controlling a fire as fire intensity increases. The DSR can be averaged over any period to provide monthly or seasonal severity ratings.

Monthly Severity Rating (MSR) is the average of the DSR values over the month. DSR and MSR captures 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 for comparison of the severity of fire weather from one year to another.

0 - 1	Low fire behaviour potential
1 - 3	Moderate fire potential
3 - 7	High to very high fire potential
7 +	Extreme fire behaviour potential

Acknowledgements:

Fire Danger interpretation was from information gathered from the Average Monthly Maps for: Severity Rating, FWI, BUI, ISI, DC, DMC, FFMC. These maps were obtained from the National Rural Fire Authority Fire Weather System powered by Eco Connect.

Information on the Expected Climate Outlook was gathered from:

- MetService, Rural Monthly outlooks: www.metservice.com/rural/monthly-outlook
- NIWA, Seasonal Climate outlook: www.niwa.co.nz/climate/sco
- Australian Bureau of Meteorology Climate outlooks http://www.bom.gov.au/climate/ahead/?ref=ftr

Front Cover Image:
2017 Mt Prospect fire, Southland. (Connor Moffat).

If you are keen to submit a weather and fire related photo that will appear on the front page, please email:

- a high resolution image(s)
- with details on the location and the photographer's name and organisation.
- to: Veronica.Clifford@scionresearch.com

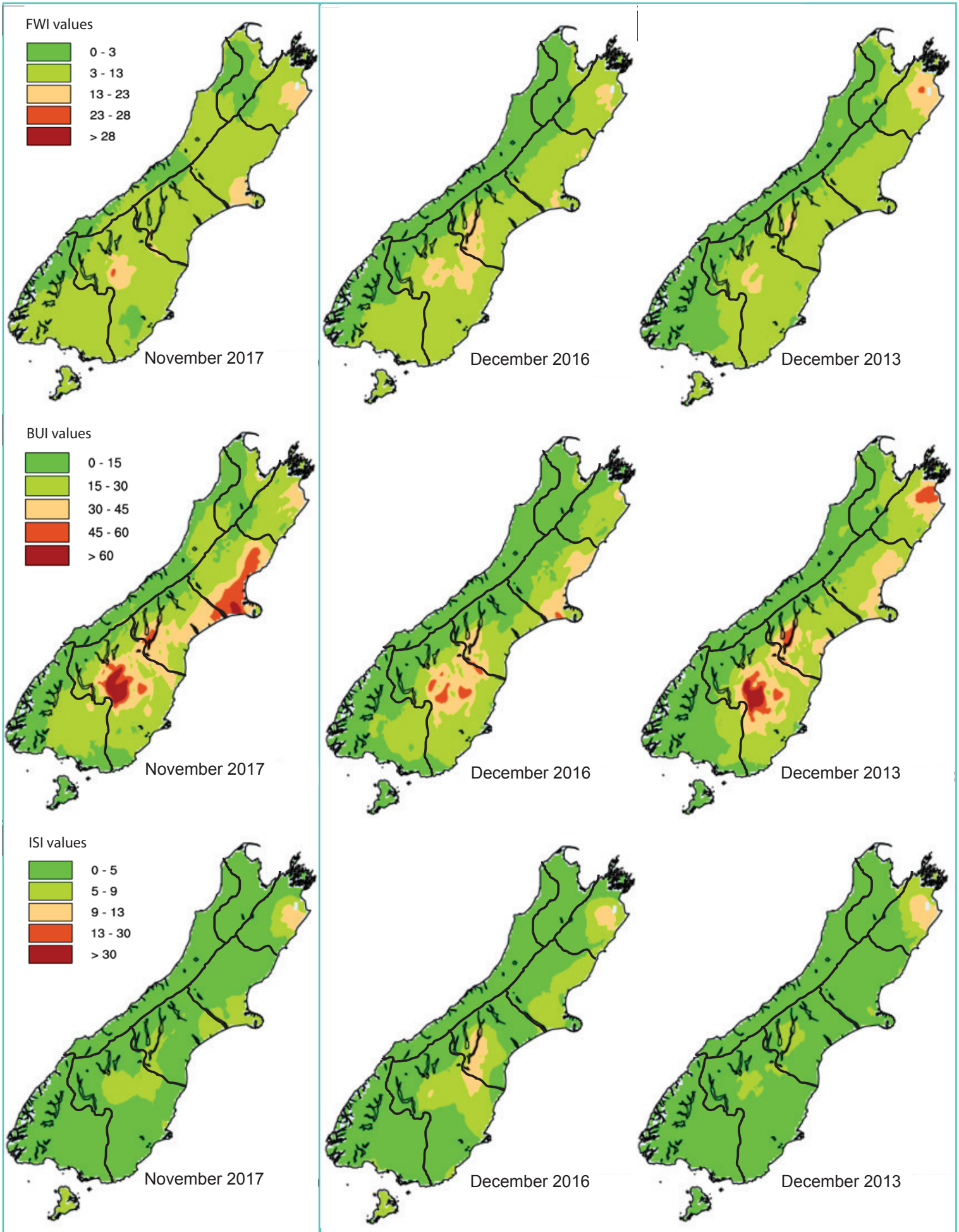

Figure 5. Current Monthly Average for the: Fire Weather Index (top), Buildup Index (middle) and Initial Spread Index (below).

Figure 6. Average Monthly values of: Fire Weather Index (top), Buildup Index (middle) and Initial Spread Index (below); for the previous year and during the 2013/14 Neutral year followed by a weak La Niña year.

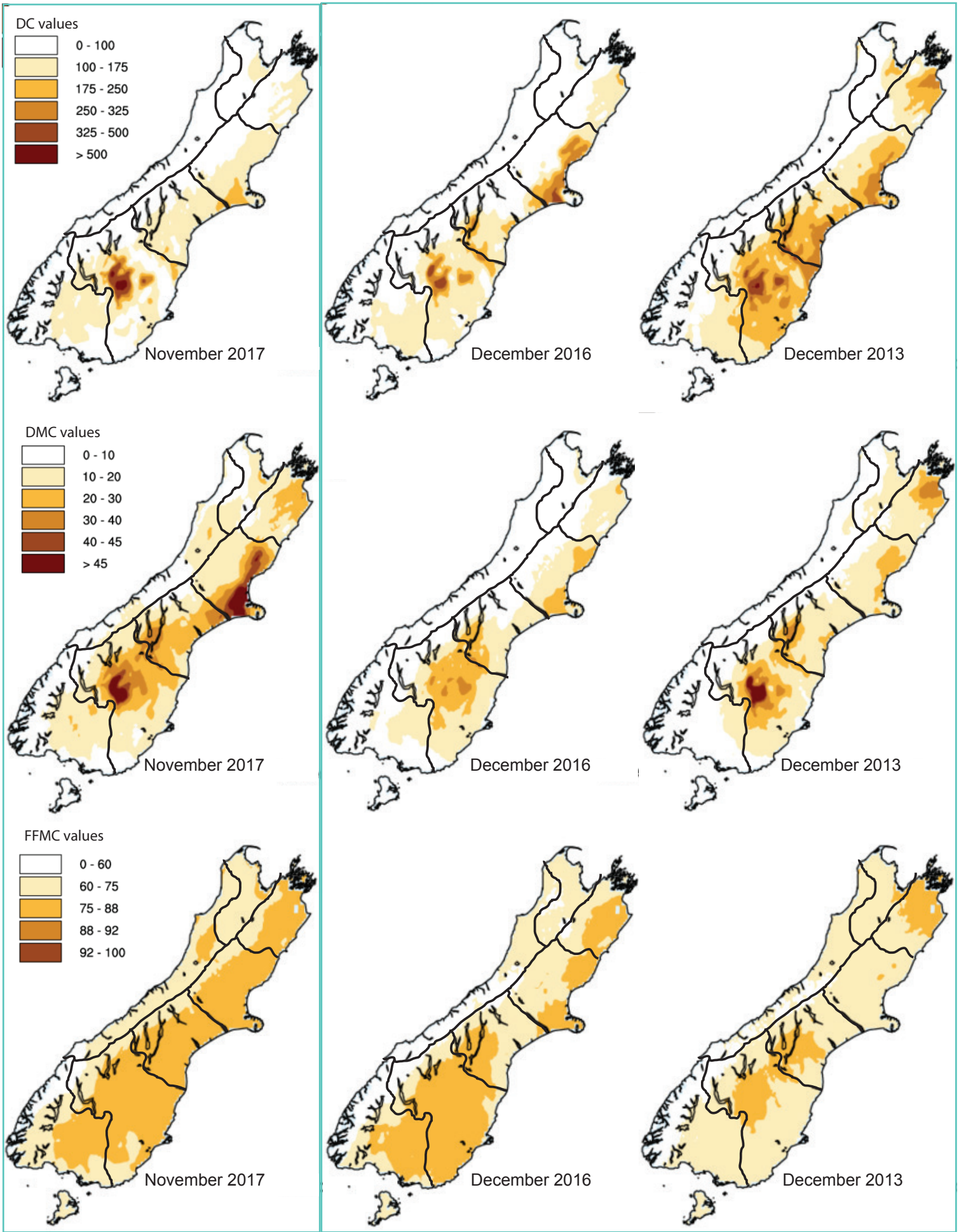

Figure 7. Current monthly average for the: Drought Code (top), Duff Moisture Code (middle) and the Fine Fuel Moisture Code (below).

Figure 8. Average monthly values of: Drought Code (top), Duff Moisture Code (middle) and Fine Fuel Moisture Code (below); for the previous year, and the 2013/14 Neutral year followed by a weak La Niña year.

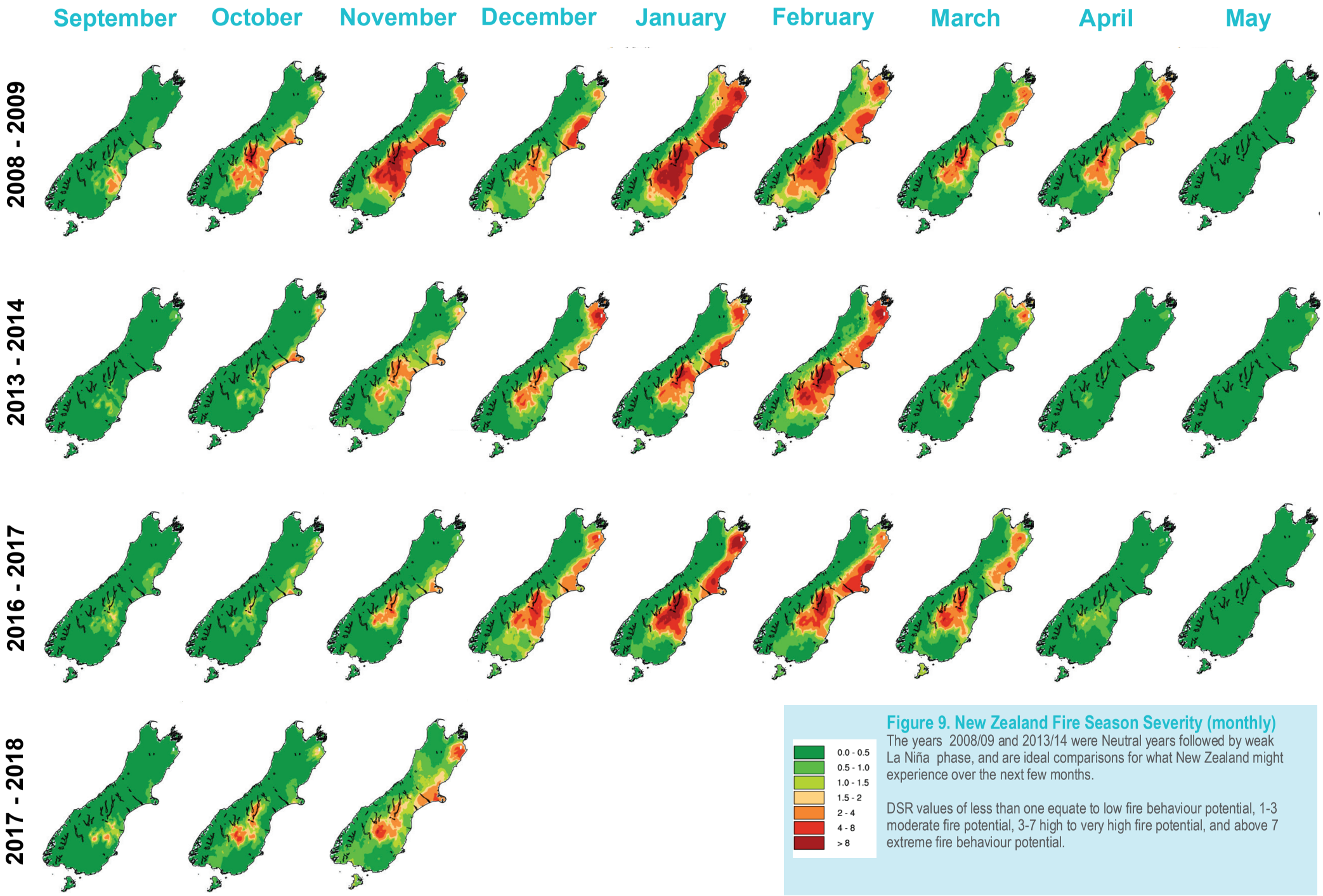

Figure 9. New Zealand Fire Season Severity (monthly)

The years 2008/09 and 2013/14 were Neutral years followed by weak La Niña phase, and are ideal comparisons for what New Zealand might experience over the next few months.

DSR values of less than one equate to low fire behaviour potential, 1-3 moderate fire potential, 3-7 high to very high fire potential, and above 7 extreme fire behaviour potential.

Tracking of trends in BUI, DC and CDSR:

Comparisons of fire dangers for individual indicator stations for different regions are shown overleaf due to increasing fire activity and an increasing likelihood for fire danger and severity across the country. This is in tabular format.

Trends for Drought Code (DC), Buildup Index (BUI) and Cumulative Daily Severity Rating (CDSR) are provided for all stations in a PDF format. For those who are interested in tracking fire season trends for all your weather stations on a more frequent basis (as opposed to the monthly analysis done here), you can download the summary PDF graphs and Excel sheets, and R scripts (to make the pdfs) using the link to the right: **(or click here)**

Link: https://www.dropbox.com/sh/1qy0b1rauv0t6g4/AAC4ziYCv9FUP6a5o7R-HHjna?dl=0

The more detailed regional outlooks highlight where Buildup Index (BUI), Drought Code (DC) and Cumulative Daily Severity Rating (CDSR) values sit in comparison with previous fire seasons. The graphs display:

- Bold red line is the current fire season
- Bold black line is the long-term average
- Light grey shaded areas indicate the range based on historical max and mins
- We've also colour coded the 2013/14 Neutral year followed by a weak La Niña season blue.

Northern South Island:

Nelson-Tasman

Soil moisture:

- Soil moisture deficits (Figure 3) are generally at 50% capacity, being wetter in southern locations but showing signs of drying in the north (Nelson).
- This is much drier than the same time last year, as shown in the soil moisture anomaly map (Figure 4) where soils are drier than normal across the region.

Fire weather codes and indices:

- Stations to watch are: Nelson Aero (Raws & Aws), Hira
- However, as with this time last year, any major rain events will provide some added relief.

- BUIs are climbing for some stations, and currently range between 10 - 50. This indicates that heavy and medium fuels are starting to become available for combustion, and that the control of any fires will be moderate to difficult.
- Maximum BUIs typically peak between 110 – 160 in late February or March.
- Hill and high country stations are recording BUI values below the historical average. Coastal stations are above the average, and above thhose observed during the weak La Niña fire season of 2013/14.

- DC's are climbing for some, but are currently generally around 25 – 250, indicating little to some difficulty for mop-up.
- Maximum DC values typically reach a peak (350) near the end of February or March.
- DC values in the hill and high country are generally below the historical average, but above those observed during the weak La Niña fire season of 2013/14. Coastal stations are above average.

- CDSRs are generally trending below the average and mostly on trend with the 2013/14 fire season.
- Current fire severity (Figure 1) and fire danger (Figure 5) are, on average, Low to Moderate for the region.
- With forecasted warmer temperatures and normal rainfall for December, expect fire dangers and fire climate severity to increase across the Nelson-Tasman region over the next few months.

Station Name	BUI trends		DC trends		CDSR trends	
	vs. average	vs. 2013/14	vs. average	vs. 2013/14	vs. average	vs. 2013/14
Hill and High country						
Big Pokororo 2 raws	NA	NA	NA	NA	NA	NA
Dovedale raws	on trend	slightly above	above	above	slightly below	on trend
Western Boundary raws	below	slightly above	slightly below	slightly above	on trend	slightly above
Murchison raws	slightly below	on trend	slightly below	slightly below	slightly below	on trend
St Arnaud raws	below	on trend	below	slightly below	below	below
Coastal						
Takaka Aerodrome raws	NA	NA	NA	NA	NA	NA
Hira raws	slightly above	above	slightly above	above	below	below
Nelson Creek raws	well above	well above	well above	well above	well above	well above
Nelson Aero aws	slightly above	above	above	above	slightly below	on trend

Marlborough-Kaikoura

Soil moisture:

- Soil moistures levels (Figure 3) are drying out across the region. Soils are dry for Blenheim and Kaikoura, and at about 50% storage in the Sounds and inland localities.
- The soil moisture anomaly map (Figure 4) shows soils are drier than normal across the Marlborough and Kaikoura regions.

Fire weather codes and indices:

- Stations to watch are: Rai Valley
- However, as with this time last year, any major rain events will provide some added relief.

- BUIs are beginning to climb across the region. Currently, they range between 10 and 60. This indicates medium and heavy fuels are becoming available for combustion, and control will be moderate to difficult.
- Stations across the region typically peak at BUI values of 110 – 260 in February or March.
- Stations in the Sounds, plains and coastal areas are recording BUI values above the historical average, and most are above the conditions seen in the weak La Niña fire season of 2013/14. Stations in the hill and high country are generally below the average.

- DC's have continued to climb since the last outlook, and are currently ranging between 150 and 200, indicating some difficulty for mop-up.
- Maximum DC values typically reach a peak (600 - 1200) near the end of February or March.
- DC values across the region range from above or below the historical averages.

- CDSRs are below or trending with the long term average and the levels seen in 2013/14 in the region.
- Fire severity and danger (Figure 1 & 5) are currently, on average, High to Extreme, except for the Sounds and the hill and high country (where they are either Low or Moderate).
- With warmer temperatures and normal rainfall predicted for December, expect fire dangers and fire severity to continue to increase this month

Station Name	BUI trends		DC trends		CDSR trends	
	vs. average	vs. 2013/14	vs. average	vs. 2013/14	vs. average	vs. 2013/14
Sounds						
Keneperu Head raws	slightly above	above	above	above	slightly below	on trend
Rai Valley raws	above	above	slightly above	above	slightly below	on trend
Koromiko raws	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Opua Bay raws	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Hill and High country						
Onamalutu raws	above	above	on trend	above	below	below
Landsdowne raws	well below	#N/A	below	#N/A	well above	#N/A
Tor Darroch raws	below	#N/A	above	#N/A	slightly below	#N/A
Ward raws	slightly above	#N/A	slightly above	#N/A	well below	#N/A
Mid Awatere Valley raws	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Molesworth raws	below	on trend	below	on trend	below	on trend
Upper Clarence raws	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Glenveigh Kaikoura raws	below	#N/A	above	#N/A	well below	#N/A
Plains						
Lower Wairau raws	on trend	#N/A	on trend	#N/A	#N/A	#N/A
Blenheim Aero aws	slightly above	above	slightly above	above	below	on trend
Awatere Valley raws	slightly above	above	slightly below	slightly above	below	below
Coastal						
Cape Campbell SYNOP	above	above	slightly below	slightly above	below	on trend
Kaikoura SYNOP	above	above	slightly above	above	below	below

Central South Island:

West Coast

Soil moisture:

- Soil moistures (Figure 3) are at 50% field capacity for the region.
- The soil moisture anomaly (Figure 4) shows soils are much drier than normal for the entire region.

Fire weather codes and indices:

- Stations to watch are: Haast, Hokitika, Nelson Creek, Reefton, Westport

- BUIs have increased since last month, and are ranging between 30 and 55. This indicates that heavy and medium fuels are becoming readily available for combustion, and the control of any fires will generally be difficult.
- Maximum BUIs typically peak in early March, reaching values of 40 - 100.
- Most BUI levels are well above the historical average, and also above the levels observed during the 2013/14 weak La Niña fire season.

- DCs have climbed since the last outlook, and are ranging between 100 and 150, indicating little mop-up requirement.
- Maximum DC values typically reach a peak (325 - 425) near the end of January and February.
- DC values are well above the historical average, and the levels seen in 2013/14 for the same time of year.

- CDSRs are above normal levels for this time of the year.
- Fire severity and danger for this region are currently, on average, Low to Moderate (Figure 1 & 5).
- However, if La Niña conditions do strengthen, fire dangers and fire climate severity could increase over the next few months due to lower than normal rainfalls in the west.

Station Name	BUI trends		DC trends		CDSR trends	
	vs. average	vs. 2013/14	vs. average	vs. 2013/14	vs. average	vs. 2013/14
Hill and High country						
Reefton ews	above	above	above	above	slightly above	on trend
Nelson Creek raws	well above	well above	well above	well above	well above	well above
Coastal						
Westport Aero aws	well above	well above	above	above	above	slightly above
Hokitika Aero SYNOP	well above	well above	well above	well above	above	slightly below
Haast SYNOP	well above	well above	well above	well above	on trend	below
Charleston raws	NA	NA	NA	NA	NA	NA

Canterbury

(includes Selwyn, Christchurch, Waimakariri and Hurunui).

Soil moisture:

- Soils are dry for Canterbury, and at 50% capacity in the high country (Figure 3).
- The soil moisture anomaly map (Figure 4) indicates that soils are drier than normal in the high country and across the plains.

Fire weather codes and indices:

- Stations to watch are: Hanmer, Ashley, Oxford

- BUIs are typically ranging between 25 and 90. The higher values indicate that medium and heavy fuels are readily available for combustion. Difficulty of control for any fire outbreaks will range from moderately to extremely difficult.
- BUIs usually peak around January - February (170).
- In general, BUI levels are above the historical average, and above levels observed in the weak La Niña fire season of 2013/14.

- DC's have continued to climb since last month, and are generally ranging between 150 and 250. These values indicate that deep organic layers and heavy fuels are drying out, and there will be moderately difficult mop-up requirements.
- Maximum DC values typically reach a peak (600 - 800) near the end of February or March.
- DC vales are generally above the historical average and values during the 2013/14 season for the same time of year.

- CDSRs are generally below the historical average. The exceptions are Snowdon & Bottle Lake Forest.
- Fire severity and danger (Figure 1 & 5) are currently, on average, Moderate to Very High.
- With forecasted warmer temperatures and average or below average rainfall for December, expect fire dangers and fire climate severity to continue to increase over the next month.

Station Name	BUI trends		DC trends		CDSR trends	
	vs. average	vs. 2013/14	vs. average	vs. 2013/14	vs. average	vs. 2013/14
Northern Canterbury						
Hanmer Forest ews	well above	well above	well above	well above	on trend	slightly above
Balmoral raws	above	above	on trend	slightly above	below	on trend
Ashley raws	above	above	well above	above	on trend	slightly above
Hill and High country						
Lees Valley raws	above	above	above	above	below	on trend
Oxford raws	well above	well above	above	above	slightly below	slightly above
Snowdon raws	well above	well above	above	above	well above	well above
Plains						
Forest Plains raws	above	above	above	above	below	slightly above
Christchurch Aero SYNOP	above	above	on trend	on trend	below	on trend
McLeans raws	NA	NA	NA	NA	NA	NA
Burnham raws	above	above	above	slightly above	slightly below	slightly below
Coastal						
Bottle Lake Forest raws	on trend	slightly above	below	below	above	well above
Motukarara raws	well above	well above	above	above	slightly below	on trend
Le Bons Bay aws Aero	on trend	on trend	slightly above	on trend	below	well below
Leeston raws	above	above	slightly above	slightly above	below	on trend
Diamond Harbour raws	NA	NA	NA	NA	NA	NA
Godley Head raws	NA	NA	NA	NA	NA	NA

South Canterbury

(Includes the Rakaia river south (i.e. Ashburton & SCRFA).

Soil moisture:

- Soils are dry across the region (Figure 3).
- The soil moisture anomaly map (Figure 4) shows soils are drier than normal in the high country and slightly drier along the east coast.

Fire weather codes and indices:

- Stations to watch are: Mt Cook, Ashburton, Timaru, Cannington, Waihaorunga

- BUIs across the region currently range from 5 – 70. This indicates that, in some places, medium and heavy fuels will be available for combustion and there will be a level of difficulty for control of any fires that occur.
- Maximum BUIs typically peak near the end of Feb and March (some in January), reaching values of 40 - 150.
- BUI levels across the region are generally above the historical average for this time of year.

- DC values have steadily climbed across the region since last month, and currently range between 100 and 260. This indicates that deep organic layers and heavy fuels are drying in some locations. The higher values indicate there will be moderate to difficult mop-up requirements.
- Maximum DC values typically peak during February or March (225 - 900).
- Across the region, DC values are generally either above or below the historical average.

- CDSRs are generally below the historical average for this time of year.
- Fire severities and danger for South Canterbury (Figure 1 & 5) are currently, on average, Moderate to High. The exceptions are the Mackenzie and Waitaki basins where High to Very High values persist.
- With forecasted warmer temperatures and normal or below average rainfall for December, expect fire dangers and fire severity to continue to rise this month.

Station Name	BUI trends		DC trends		CDSR trends	
	vs. average	vs. 2013/14	vs. average	vs. 2013/14	vs. average	vs. 2013/14
Hill and High country						
Glenaan station raws	above	NA	slightly below	NA	below	NA
Hakatere raws	slightly below	below	on trend	slightly below	below	on trend
Mount Somers raws	slightly above	slightly above	slightly above	slightly above	below	below
Mt Cook ews	well above	well above	well above	well above	well above	well above
Clayton raws	NA	NA	NA	NA	NA	NA
Tekapo raws	slightly above	slightly above	above	above	below	below
Geraldine forest raws	well above	NA	well above	NA	well below	NA
Pukaki Aero raws	below	slightly below	below	on trend	below	on trend
Cattle Creek raws	slightly below	NA	below	NA	well below	NA
Waihaorunga raws	above	above	on trend	on trend	well below	well below
Plains						
Ashburton Plains 2 raws	NA	NA	NA	NA	NA	NA
Ashburton Aero raws	well above	NA	slightly above	NA	below	NA
Cannington raws	well above	well above	on trend	above	below	on trend
Waimate forest raws	well above	NA	well above	NA	well below	NA
Coastal						
Timaru Coastal raws	well above	NA	slightly below	NA	below	NA
Timaru Aero SYNOP	well above	well above	slightly above	slightly above	below	below

Lower South Island:

Otago

Soil moisture:

- Soils are dry across the region (Figure 3).
- The soil moisture anomaly map (Figure 4) shows drier than normal soils for the Clutha and Queenstown Lakes regions, and about normal soils for this time of the year in Central Otago.

Fire weather codes and indices:

- Stations to watch are: Cromwell, Clyde, Butchers Dam & Waipahi

- Current BUI values across the region are ranging from 50 to 60. These indicate that medium and heavy fuels will be available for combustion and there will be a level of difficulty for control.
- Maximum BUIs typically peak around the end of February or March (some locations January or April), reaching values of 60 – 200.
- BUI values across the region are above the historical average and also the 2013/14 weak La Niña fire season.

- Current DC values across the region range between 50 - 630. These indicate that, for some locations, there are very dry deep organic layers and heavy fuels that would require difficult and extended mop-up.
- DCs typically peak during February or March (300 - 800).
- DC values observed across the Otago region are generally above average levels for this time of year.

- CDSRs are generally below the historical average across the region, the exceptions being Queenstown, Cromwell, Clyde, Butchers Dam, and Waipahi.
- Fire severities and fire danger (Figure 1 & 5) across the region currently range, on average, from High to Very High.
- Expect fire dangers and severity to continue to increase this month with forecasted warm temperatures and below normal rainfall.

Station Name	BUI trends		DC trends		CDSR trends	
	vs. average	vs. 2013/14	vs. average	vs. 2013/14	vs. average	vs. 2013/14
Waitaki						
Tara Hills aws	on trend	slightly above	slightly below	slightly above	below	on trend
Windsor ews	slightly above	slightly above	on trend	on trend	below	on trend
Oamaru aws	slightly above	above	slightly below	slightly below	below	below
Oamaru Aero aws	above	above	slightly below	slightly below	below	slightly below
Herbert raws	well above	well above	above	above	below	on trend
Macrae s raws	above	above	slightly above	slightly above	below	on trend
Queenstown lakes						
Wanaka Aero aws	slightly above	slightly above	slightly above	above	on trend	slightly above
Hawera Flats raws	NA	NA	NA	NA	NA	NA
Queenstown Aero S	slightly above	above	above	above	above	above
Queenstown Aero R	NA	NA	NA	NA	NA	NA
Central Otago						
Naseby Forest raws	above	above	above	above	slightly below	slightly above
Otematata raws	NA	NA	NA	NA	NA	NA
Cromwell ews	slightly above	slightly above	well above	well above	above	above
Dansey Pass raws	slightly below	slightly below	below	slightly below	below	on trend
Lauder ews	above	above	above	above	on trend	slightly above
Ranfurly ews	above	above	above	above	on trend	slightly above
Clyde 2 ews	above	on trend	well above	well above	well above	well above
Butchers Dam raws	above	above	well above	well above	above	above
Rock and Pillar raws	slightly below	on trend	below	slightly below	below	slightly below
Glendhu raws	above	above	slightly above	below	below	slightly above
Dunedin						
Bucklands raws	slightly above	above	on trend	slightly above	below	below
Traquair raws	above	above	above	above	below	on trend
Dunedin Aero SYNOP	above	above	on trend	on trend	slightly below	slightly above
Clutha						
Tapanui raws	well above	well above	slightly above	slightly above	slightly below	slightly above
Waipahi raws	well above	NA	well above	NA	well above	NA
Glenledi raws	above	slightly above	on trend	slightly below	well below	below
Nugget Point aws	above	above	above	slightly above	below	below

Southland

Soil moistures:

- Soil moisture levels are at 50% capacity in the west and east and Steward Island, and even drier in central and inland parts of the region (Figure 3).
- The soil moisture anomaly map (Figure 4) shows drier than normal levels across the region.

Fire weather codes and indices:

- Stations to watch are: Garston, Lumsden

- Currently, BUI values are ranging between 10 and 60. This indicates that there is drying of the medium and heavy fuels for some locations, and difficulty of control will be moderate to difficult.
- Max BUIs typically reach between 40 and 125 during late January or February.
- BUIs recorded across this region are well above the historical average for this time of year, and those observed during the 2013/14 weak La Niña season.

- Current DC values across the region range between 100 and 200. These indicate that, for some locations, deep organic layers and heavy fuels are dry, likely resulting in more difficult mop-up.
- DCs typically peak during February and March (200 – 500).
- DC values are generally well above the average and for the 2013/14 weak La Niña fire season for this time of the year.

- CDSRs are generally on trend or above the historical average for this time of the year.
- Fire severity and fire danger (Figure 1 & 5) across the region are, on average, Moderate to Low.
- With expected warm temperatures and below average rainfall, fire danger and severity will continue to increase, especially as soils continue to dry in central locations.

Station Name	BUI trends		DC trends		CDSR trends	
	vs. average	vs. 2013/14	vs. average	vs. 2013/14	vs. average	vs. 2013/14
Eastern Southland						
Gore aws	well above	well above	above	above	slightly above	slightly above
Slopedown raws	well above	well above	above	slightly above	on trend	above
Central Southland						
Garston raws	well above	well above	well above	well above	on trend	above
Barnhill raws	well above	well above	well above	well above	slightly below	slightly above
Lumsden aws	well above	well above	well above	well above	slightly above	above
Otama raws	NA	NA	NA	NA	NA	NA
Tanner Road raws	well above	NA	well above	NA	above	NA
Wreys Bush raws	well above	well above	well above	well above	on trend	slightly above
Tuatapere raws	well above	well above	above	above	slightly below	below
Invercargill Aero SYNOP	well above	well above	well above	well above	slightly above	above
Tisbury raws	well above	NA	well above	NA	well above	NA
Western Southland						
Secretary Island SYNOP	Decommissioned					
Wilderness raws	well above	NA	well above	NA	well above	NA
Manapouri Aero aws	slightly above	above	above	above	above	above
Blackmount raws	well above	well above	well above	well above	well above	well above
Stewart Island						
Stewart Island raws	NA	NA	NA	NA	NA	NA
South West Cape SYNOP	well above	well above	above	above	above	slightly below