Seasonal conditions and erosion risk on agricultural land

November 2022

Government of South Australia
Department for Environment and Water

Ref: DEW [Insert File Ref No]

This report summarises seasonal conditions, land management and erosion risk in the agricultural zone of South Australia for November 2022.

Contents

Plant growth and cover indicators

The **Plant growth index** chart (below) shows annual cumulative plant productivity (or biomass growth). It largely reflects the rainfall pattern and seasonal conditions.

The **Cover index** chart (below) shows annual 'apparent' soil cover and subsequent erosion risk. It reflects seasonal conditions as well as land management practices.

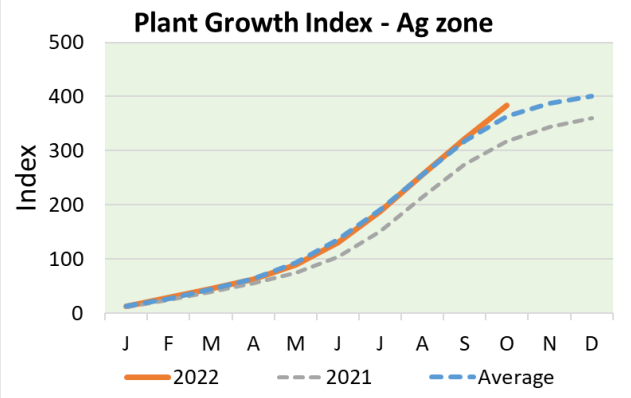


Figure 1: Cumulative plant growth index YTD 2022, with 2021 and average for the agricultural zone

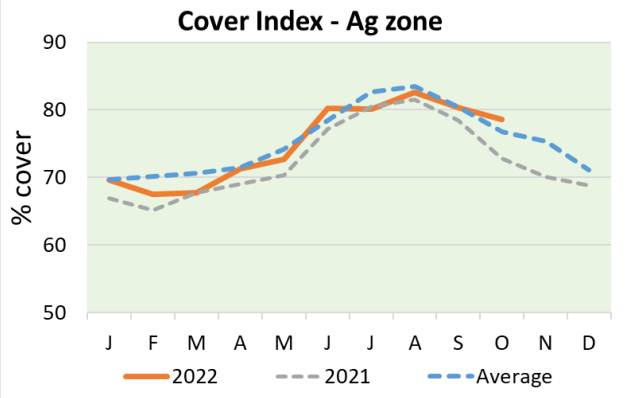


Figure 2: Cover index YTD 2022, with 2021 and average for the agricultural zone

A snapshot of environmental factors and land management practices affecting the condition of the landscape and erosion risk in the Eyre Peninsula, Northern and Yorke, Murraylands and Riverland, and Limestone Coast regions.
The information assists the evaluation and reporting on trends in soil and land condition, and to inform on-going strategies regarding soil protection and management.
This report has been compiled by DEW with information on local knowledge and observations provided by PIRSA/SARDI and landscape region staff, climate information from BOM and satellite data from MODIS Fractional Cover.

Key Points

Seasonal conditions (November)

- Rainfall – above average to highest on record.
- Temperature – below average maximum temperatures; variable minimum temperatures.

Crops and pastures

- Rain and cooler weather has:
  - Extended growth and delayed ripening of crops and pastures.
  - Delayed hay cutting and harvesting of senesced crops, including due to waterlogged soils.
  - Downgraded expectations of hay feed quality.
- Harvest is expected to continue well into the New Year, to February or March in later districts.
- The large amounts of biomass will result in abundant soil surface cover but also a high fuel load and fire risk.
- Livestock feed supplies are ample.
- Plant growth was:
  - Slightly above average for the agricultural zone in October 2022.
  - For January-October 2022 above average on EP and eastern Mallee and South East districts; below average in the Upper North.

Cover and erosion risk

- Surface cover levels are high and mostly adequate for erosion protection.
- Isolated sandy rises in the Murray Mallee are still at risk of erosion.
- Ground cover levels were:
  - Slightly above average for the agricultural zone in October 2022.
  - For January-October 2022 below average in the Upper North; above average in most areas of the Limestone Coast region.
- Modelled erosion risk for October 2022 showed most areas protected, limited areas at risk in Upper North.

Outlook (December 2022 to February 2023)

- BOM outlook is:
  - Average to slightly above average rainfall.
  - Above average maximum and minimum temperatures.
- The above average plant growth should ensure good ground cover levels for erosion protection for this summer-autumn.

State summary

Seasonal conditions

Rainfall

- November rainfall was mostly very much above average across the agricultural zone; highest on record in parts of the Fleurieu-Mt Lofty Ranges, lower North and Mallee; above average in remaining areas (Figure 3).
- This follows above average rainfall in September and October in many areas, making a particularly wet spring.
- Cumulative rainfall for January–November 2022 ranges from very much above average in most of the Mallee, and average to above average elsewhere (Figure 4).

Temperature

- October maximum temperatures were below average to very much below average (Figure 5)
- Minimum temperatures were above average in the lower to upper North; average in most other areas (Figure 6).

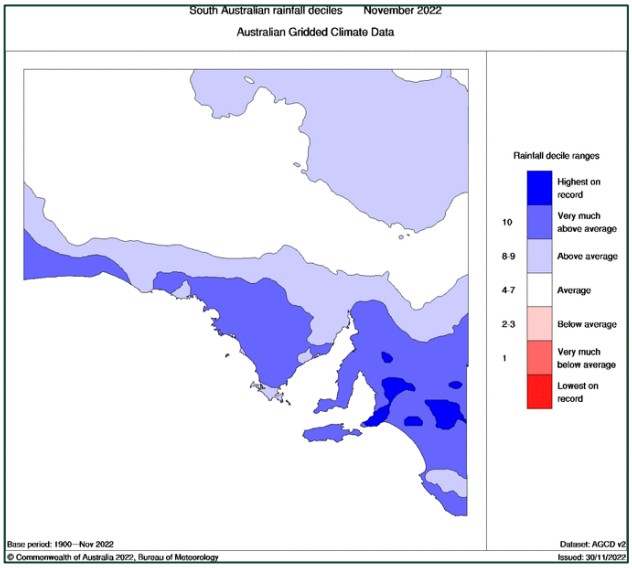


Figure 3: Rainfall deciles Nov 2022

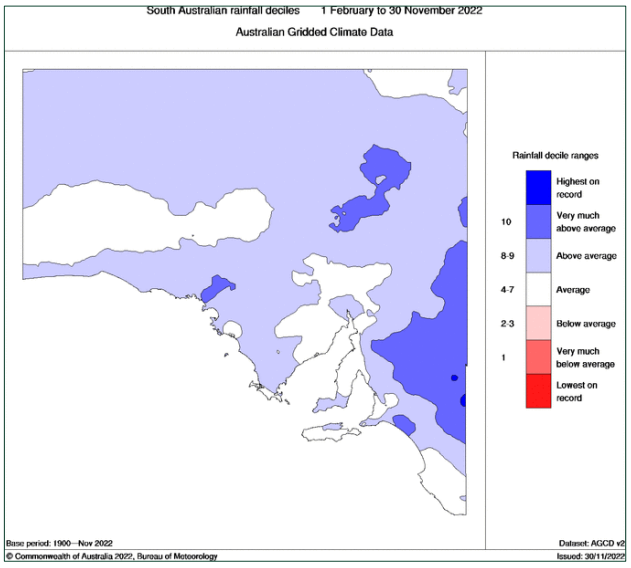


Figure 4: Rainfall deciles Jan–Nov 2022

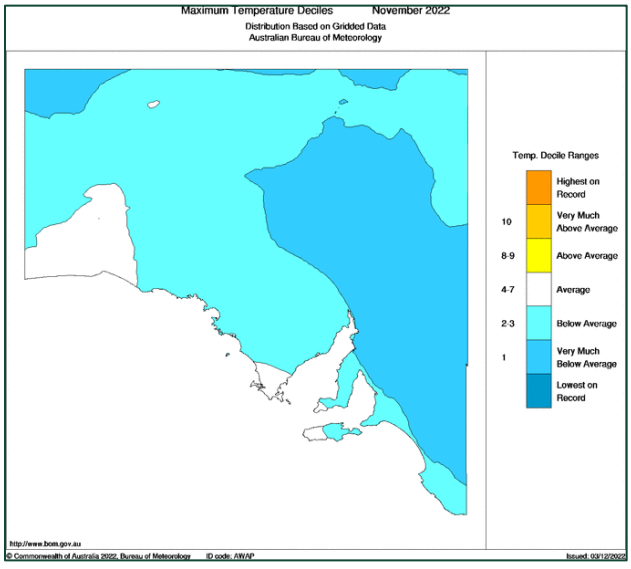


Figure 5: Maximum temperature deciles Nov 2022

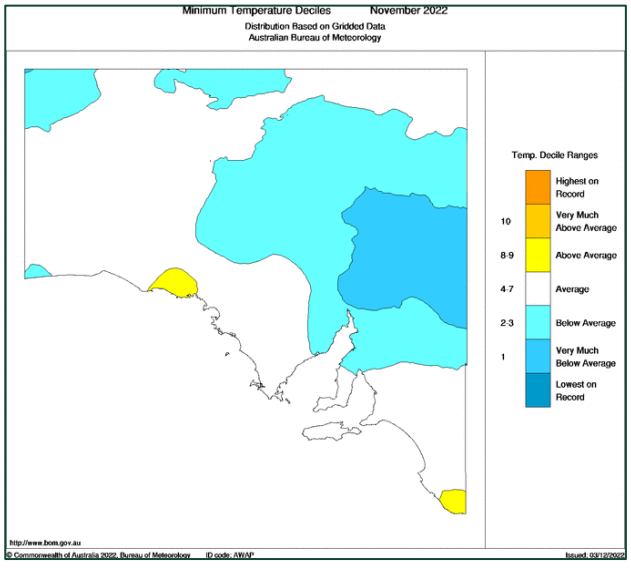


Figure 6: Minimum temperature deciles Nov 2022

Outlook

- The BOM outlook for the agricultural zone for December 2022 to February 2023 is for average to slightly above average chance of above median rainfall in eastern and central areas of the agricultural zone (Figure 7).
- The maximum temperature outlook is for warmer than median in all areas (Figure 8), with a high chance of above median minimum temperatures in all areas (Figure 9).

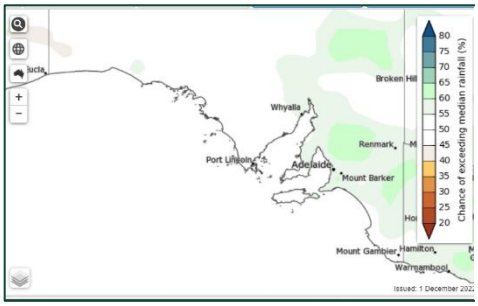


Figure 7: Rainfall outlook Dec 2022-Feb 2023

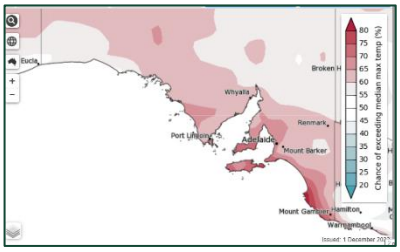


Figure 8: Maximum temperature outlook Dec 2022- Feb 2023

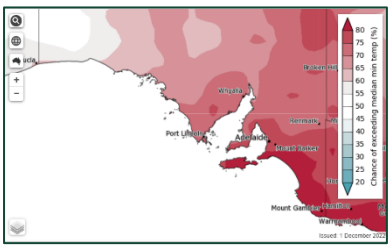


Figure 9: Minimum temperature outlook Dec 2022-Feb 2023

Links to climate maps and updates:

- Bureau of Meteorology Long-range weather and climate (bom.gov.au)
- Agriculture Victoria/GRDC Fast Break South Australia - GRDC and Very Fast Break Grains Research and Development Corporation (GRDC) - YouTube

Crop and pasture growth

- Rain and cooler weather has extended growth of green crops and pastures, and delayed hay cutting and harvesting of senesced crops.
- Even when weather was favourable for hay making or reaping, waterlogged soils and the risk of getting machinery bogged caused delays for many farmers.
- Hay feed quality is expected to be very poor due to persistent rain.
- The production of a very large amount of biomass will result in abundant soil surface cover but also a high fuel load. The intensity of fires is tempered by the presence of soil moisture so it is possible the peak fire risk will occur in February – March.
- Harvest is expected to continue well into the New Year, to February or March in later districts.
- Livestock feed supplies are ample.
- Analysis of MODIS satellite data (Figure 10) shows that plant growth for the period January-October 2022 was above average in most land on EP, and some eastern parts of the Mallee and Upper South East districts, but below average in the mainly permanent grazing lands of northern and eastern parts of the Upper North and far eastern Mid North.
- The mean cover level for the agricultural zone in October 2022 was slightly above average (Figure 1).

Outlook

- Above average yields are anticipated in most areas provided weather conditions are conducive to crop ripening and harvest.

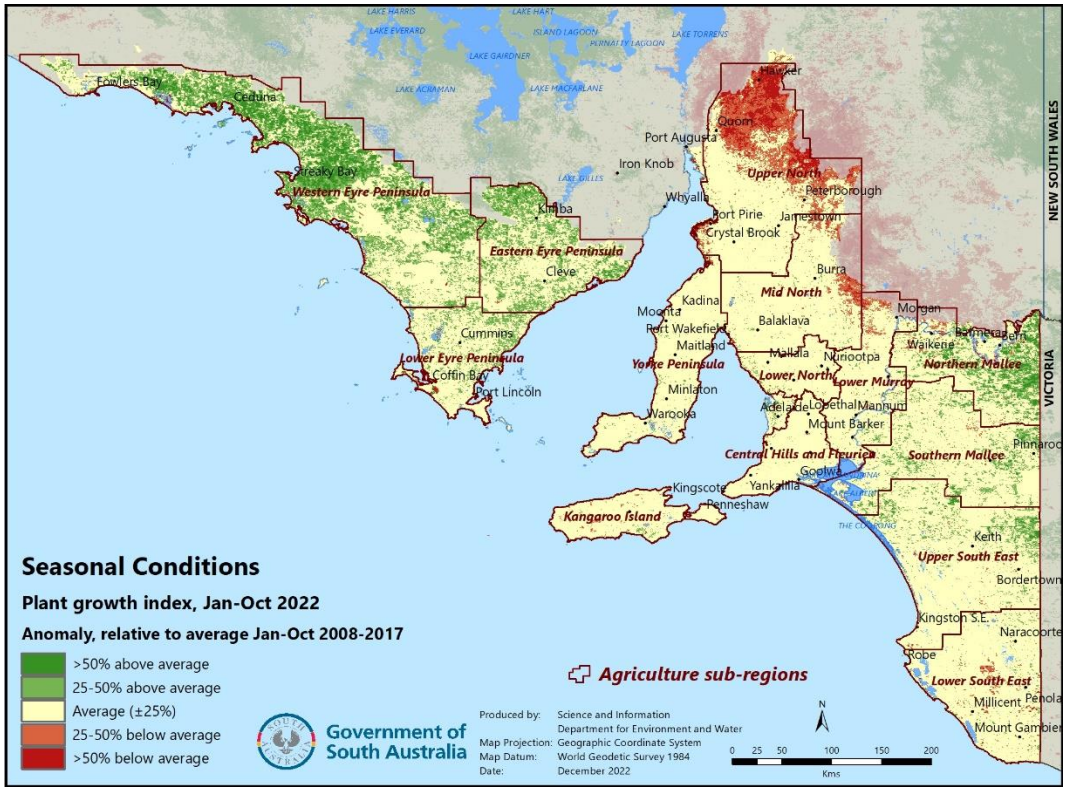


Figure 10: Plant growth index for the agricultural zone, 10 month period January–October 2022

'Plant Growth Index' is average green-ness – this gives an indication of productivity.
The map shows the 'anomaly' of plant growth compared with the 10 year average for the 10 months from January to October (2008–2017 period).
The data is derived from MODIS Fractional Cover satellite data, which can be viewed at GEOGLAM RAPP (geo-rapp.org)

Land management and erosion risk

Cover and erosion risk

- Most areas are well covered and the soil is well protected from erosion with the abundant plant growth this season, however there are a few isolated sandhills and sandy rises in the Mallee that lack adequate cover and are still vulnerable to erosion.
- The high plant biomass may also present a high fuel load for fires this summer.
- Analysis of MODIS satellite data (Figure 11) shows that ground cover for the period January-October 2022 was below average in the northern and eastern parts of the Upper North and a few other small areas, and above average in much of the South East districts.
- Average ground cover for the agricultural zone in October 2022 was slightly above average (Figure 2).
- Modelled soil erosion risk analysis for October (Figure 12) indicates almost all land is protected from erosion apart from some limited areas mainly in northern areas of the Upper North, which have low cover levels.

Outlook

- The well above average crop and pasture growth in most areas should ensure good biomass and ground cover levels for erosion protection through the coming summer-autumn period.

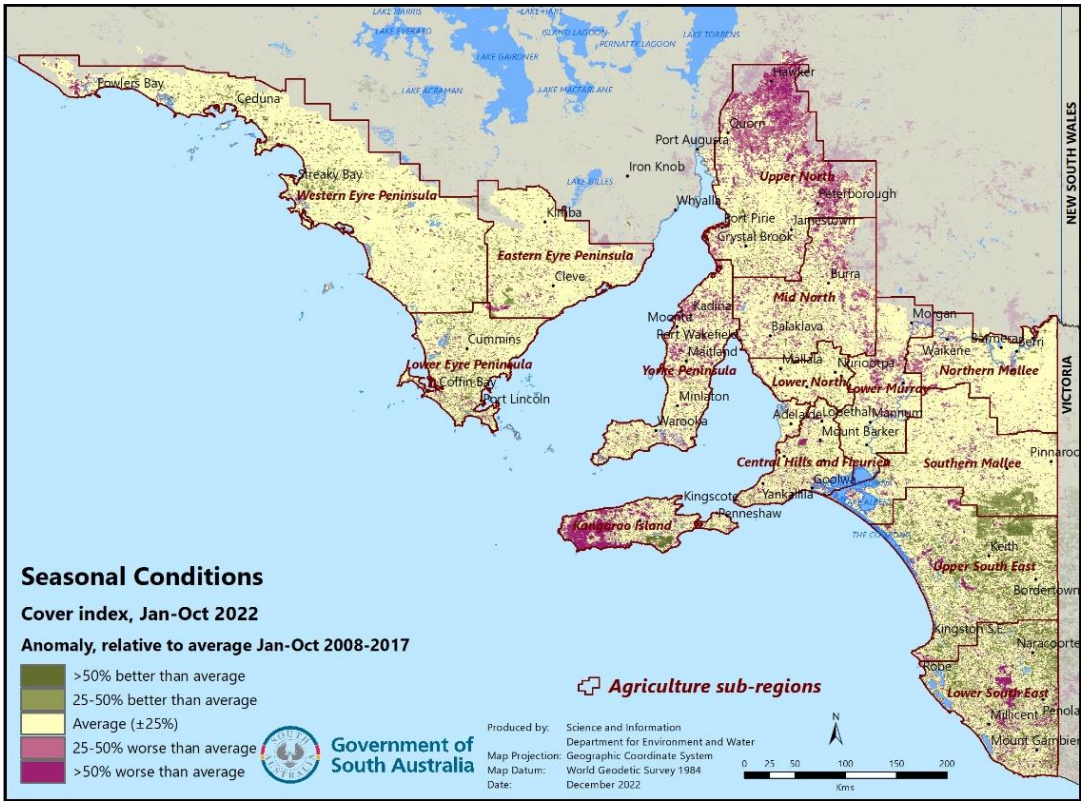


Figure 11: Cover index for the agricultural zone, 10 month period January–October 2022

'Cover Index' is average percentage ground cover.
The map shows the 'anomaly' of cover compared with the 10 year average for the 10 months from January to October (2008–2017 period).
The data is derived from MODIS Fractional Cover satellite data, which can be viewed at GEOGLAM RAPP (geo-rapp.org)

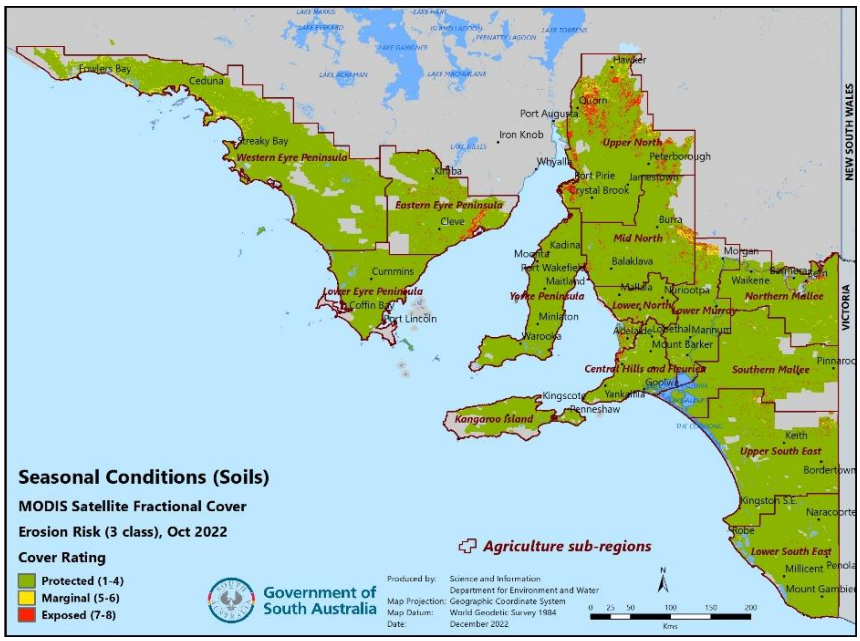


Figure 12: Modelled soil erosion risk on agricultural land, October 2022
Note 'colour wash' in downscaled map makes exposed areas appear more widespread than actual.

'Soil Erosion Risk' is derived from MODIS Fractional Cover satellite data (Guerschman, CSIRO), which has been re-calibrated and modelled using ground cover observations from DEW's erosion protection field surveys (conducted in March, May, June and October each year).
The cover rating scale used in these surveys (i.e. 1 = full cover; 8 = bare soil) is designed to estimate relative risk of wind and water erosion.

Regional details for November 2022

Eyre Peninsula region

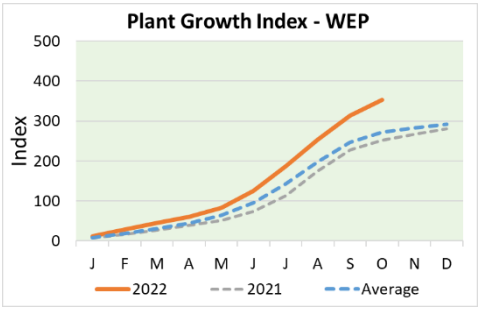
Climatic conditions/events

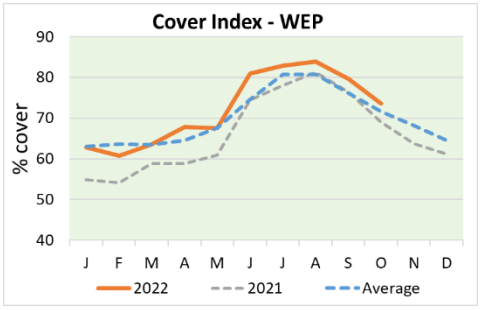
- Above to very much above average amounts of rain fell over Eyre Peninsula's agricultural areas.
- Daily maximum temperatures were around the average in southern parts and below average in the northern part of the region.
- Daily minimum temperatures were mostly above average and very much above average west of Ceduna. Land adjacent to northern Spencer Gulf experienced below average minimum temperatures.

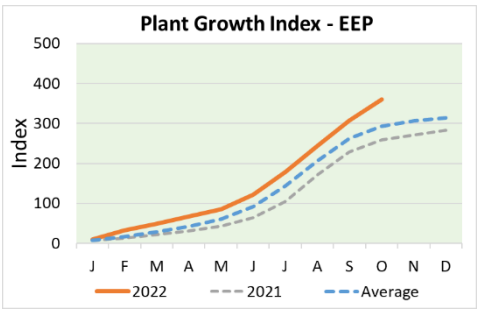
Land management

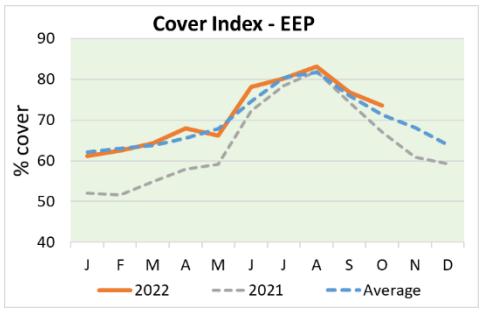
- Good rainfall and mild temperatures slowed crop ripening and further delayed harvest until warmer days in the last week of November.
- Warmer weather caused rapid senescence of crops and annual pastures.
- Canola, pulses and some barley were harvested in Western and Eastern Eyre districts.
- Lower Eyre crops are later so only canola and a small amount of barley was harvested during November.
- Many lentil crops on lower Eyre Peninsula were still green at the end of the month.
- Crops have yielded exceptionally well throughout the region. Their heavy stubbles are providing excellent surface cover for erosion protection.
- Control of summer weeds' germination was undertaken during harvest delays.
- Volunteer growth from grain on the ground will improve surface cover on paddocks of wind-damaged canola and barley crops.
- Regrowth has improved surface cover on paddocks cut for hay.
- Livestock are in excellent condition and pasture paddocks have high amounts of biomass.
- Most farmers have sufficient feed from a combination of heavy stubbles and hay and grain stores to carry livestock into autumn.

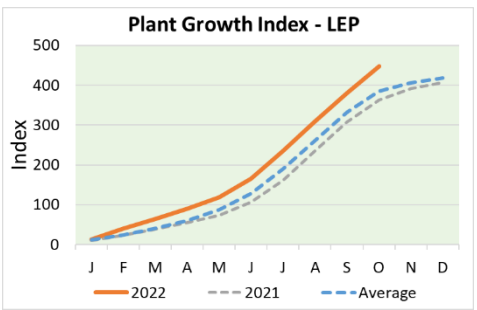
Plant growth index and cover index charts for subregions of Eyre Peninsula: Western Eyre Peninsula (WEP); Eastern Eyre Peninsula (EEP); Lower Eyre Peninsula (LEP). Subregion boundaries shown in Figure 13.

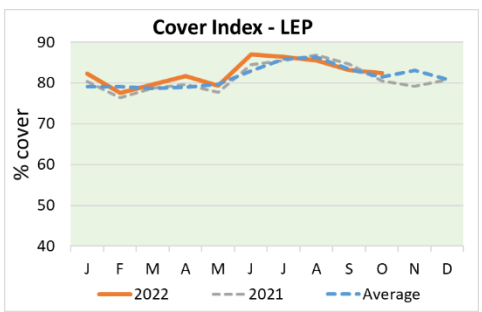












Northern and Yorke region

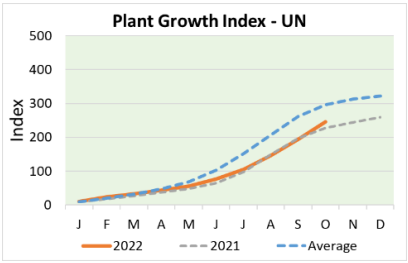
Climatic conditions/events

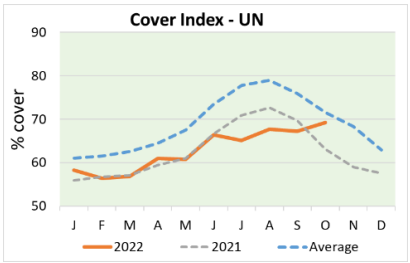
- Highest-on-record rainfalls were observed around Burra and Roseworthy to Stockport. The remainder of the region received falls that were very much above average.
- Daily maximum temperatures were very much below average over the mid, lower and upper North and the coastal plains north of Port Broughton, and below average on Yorke Peninsula.
- Daily minimum temperatures were below average in the mid and upper North, and around the average in the lower North and on Yorke Peninsula.

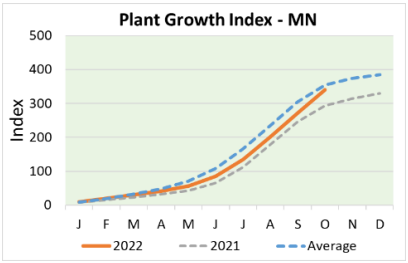
Land management

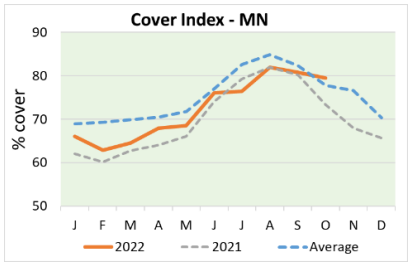
- More rain and cooler weather slowed crop and pasture senescence.
- Mature crops were unable to be reaped for many days because of unfavourable weather and the risk of getting bogged.
- Hay cutting and baling was extremely difficult for similar reasons. Most cut hay was eventually baled and removed from paddocks.
- Where plants were still green, rain promoted growth and filled grain heads.
- Harvest has still not started on some properties and will continue well into January.
- In lower rainfall areas where poor opening rains and dry winter conditions inhibited plant emergence and establishment crops are thinner but have large heads.
- Some pastures have been chemically fallowed so will have less biomass than other pasture paddocks but still enough for protection against erosion.
- Large volumes of biomass have been produced that will become a significant fuel load when they cure. However, soil moisture is reducing the risk of fire amongst this growth.
- There are patches in paddocks of lodged crops and wind, hail or waterlogging damage that will result in grain on the ground after harvest and a possible increase in mouse numbers.
- There is plenty of livestock feed available in pasture and hay cut paddocks which should carry stock until stubbles become available. Livestock remain in good condition.

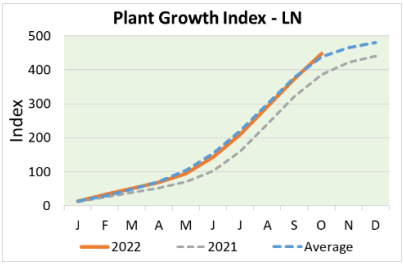
Plant growth index and cover index charts for subregions of Northern and Yorke: Upper North (UN); Mid North (MN); Lower North (LN); Yorke Peninsula (YP). Subregion boundaries shown in Figure 13.

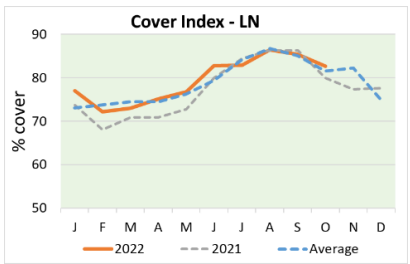


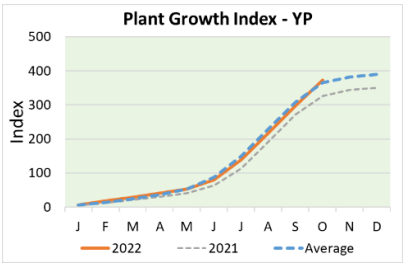


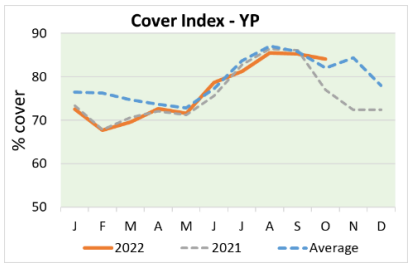












Murraylands and Riverland region

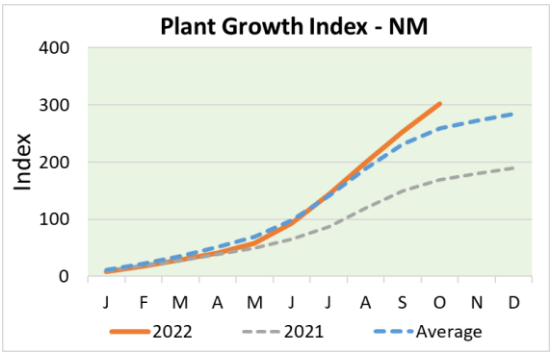
Climatic conditions/events

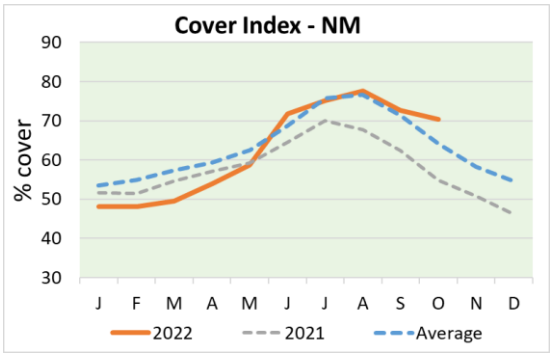
- Most of the region received very much above average rainfalls with highest-on-record falls observed around Loxton and Lameroo.
- Daily maximum temperatures were very much below average while daily minimum temperatures were around the average.

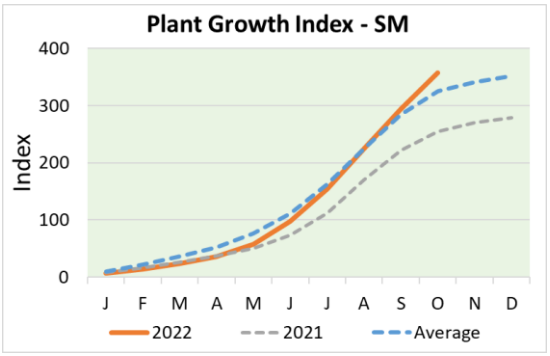
Land management

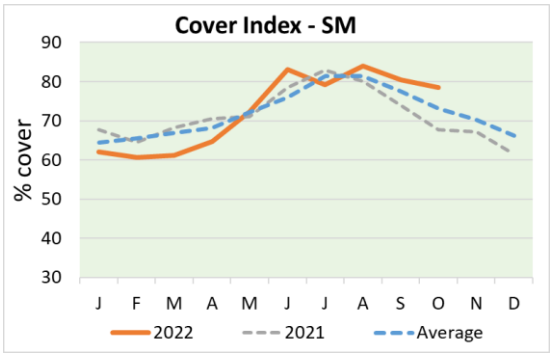
- Harvesting has started but interrupted by wet and cool weather.
- The weather has also slowed ripening of later crops.
- Warmer days towards the end of the month hastened crop ripening and enabled more crops to be reaped.
- Crops are expected to yield very well over most of the region.
- Rain stimulated the growth of weeds which have been controlled by spraying.
- Chemical fallowing of pasture paddocks has been undertaken to manage grassy weeds and conserve soil moisture in preparation for next season's crops.
- Volunteer cereal plants and weeds have sprung up on paddocks cut for hay, providing extra soil surface cover.
- Siliceous sandy rises of low soil fertility and poor surface cover remain as the land most vulnerable to wind erosion in the region.
- Livestock feed supplies are good, with plenty of pasture feed for livestock and the prospect of heavy stubbles available for grazing after harvest.

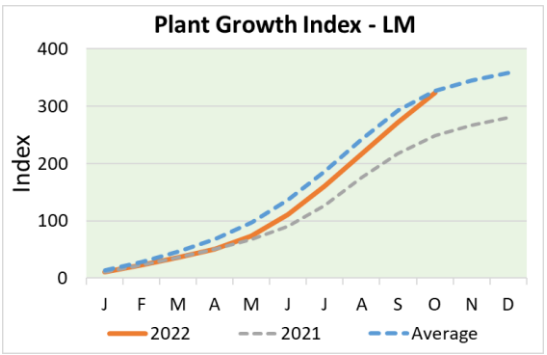
Plant growth index and cover index charts for subregions of Murraylands and Riverland: Northern Mallee (NM); Southern Mallee (SM); Lower Murray (LM). Subregion boundaries shown in Figure 13.

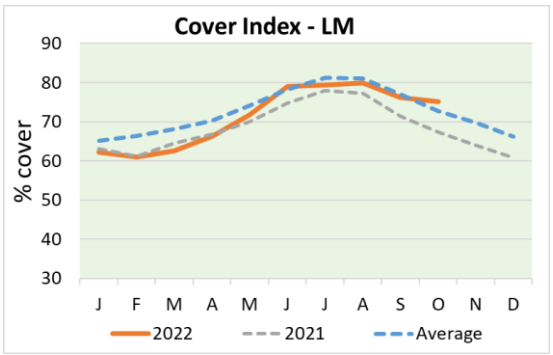












Limestone Coast region

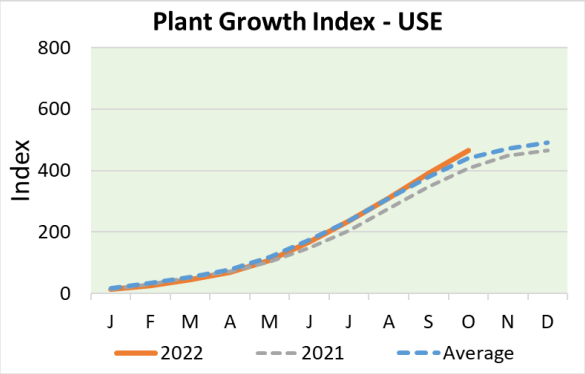
Climatic conditions/events

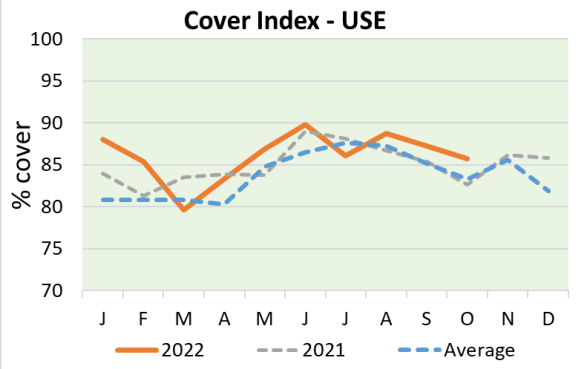
- Northern and southern-most parts of the region received very much above average rainfalls and highest-on-record falls were observed at Cooke Plains. An area around Robe to Penola recorded above average rainfall.
- Daily maximum temperatures were very much below average north of a line from Tilley Swamp to Penola, and below average south of this line.
- Daily minimum temperatures were above average in the south-eastern-most part of the region and around the average elsewhere.

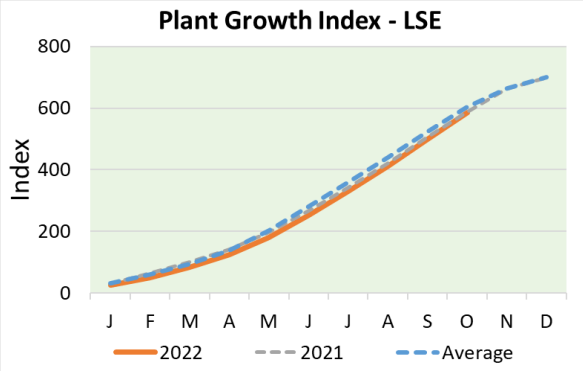
Land management

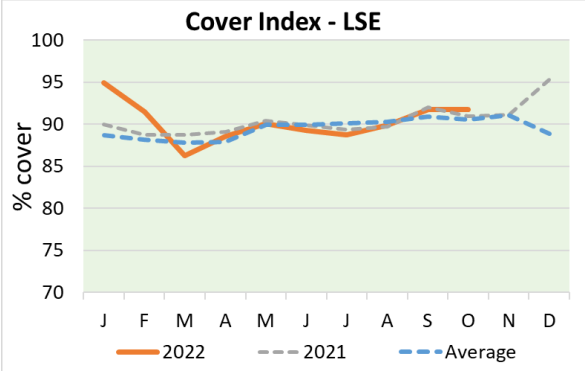
- Cooler weather and rain slowed ripening of crops but harvest has commenced in northern parts of the region.
- Hay and silage cutting continued and canola crops were windrowed ready for harvest.
- Growth of crops and pastures and regrowth of hay cut areas has produced a large volume of biomass.
- Crop yields are expected to be very good and stubbles will provide abundant surface cover.
- Livestock feed is plentiful.

Plant growth index and cover index charts for subregions of Limestone Coast: Upper South East (USE); Lower South East (LSE). Subregion boundaries shown in Figure 13.

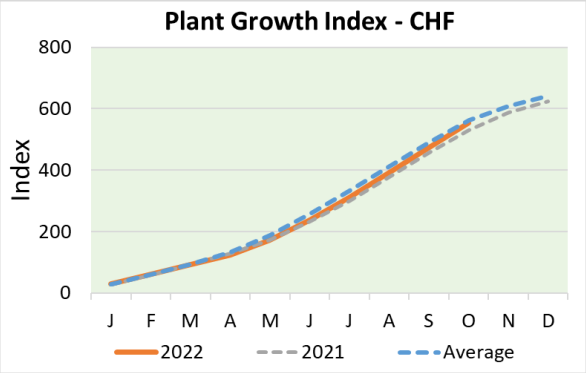


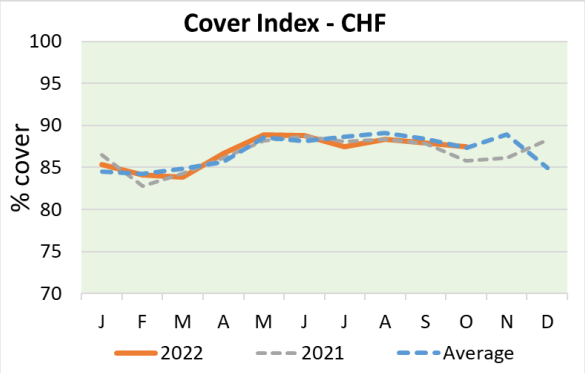


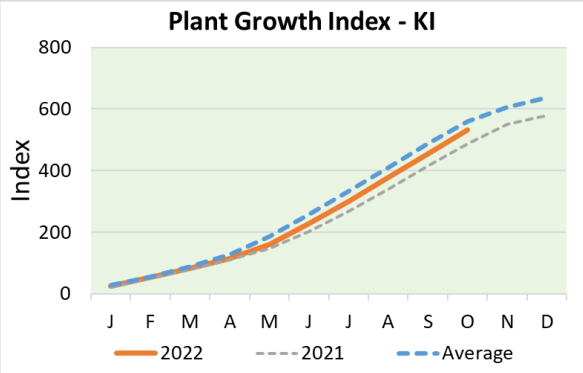




Plant growth index and cover index charts for Central Hills and Fleurieu (CHF) subregion and Kangaroo Island (KI). Subregion boundaries shown in Figure 13.







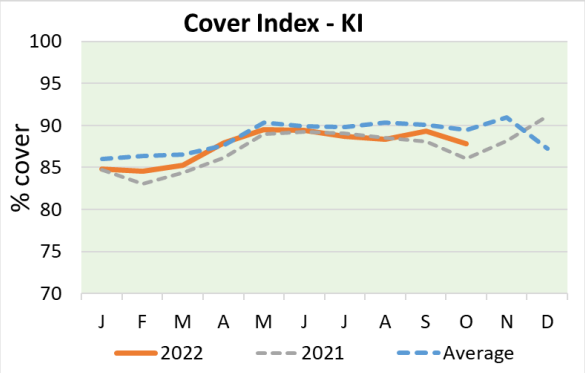


Figure 13: Agricultural subregions

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