

Drought Report for the Agricultural Region of Alberta:

May 14, 2004

Summary

Most precipitation for the first half of May occurred during a storm event between May 10th and 11th. The heaviest accumulations, 40-60 mm, fell as snow that was concentrated in the foothills west of Calgary and also in the Crowsnest Pass, bringing some relief to long term *Drought* conditions in the southwest. Up to 30 mm of precipitation fell on the plains as far east as Red Deer in the north and Pincher Creek in the south. In the north and parts of the Peace region, less than 10 mm fell. Other parts of the province received between 10 and 20 mm. Despite this storm, precipitation for the past 90 days remains *Below Normal* for most of the province except for pockets west of Calgary, Crowsnest Pass and the Swan Hills where *Near to Much Above Normal* precipitation has occurred. Spring soil moisture levels were *Below Normal* for most of the province, but this spring was not as dry as the springs of 2000 and 2001. The longer-term conditions (past 365 days) still show *Drought* conditions intensifying and spreading in the southwest, southeast, and central portions of the province including a pocket in Clearwater County. All but the northern parts of the province and the eastern Peace region remain in *Drought Alert* status.

Current Situation

Long term *Drought* (Figure 1):

- Areas in the *Drought* class increased significantly especially in central Alberta include Special Areas 3 and 4, and now include the M.D. of Acadia and all of the Counties of Starland, Kneehill and parts of the Counties of Stettler, Lacombe, Red Deer, Camrose, Wheatland and Clearwater. Of particular note is an area of *Exceptional Drought* developing in the heart of Starland County suggesting that surrounding areas are deep into the *Drought* classification. The southwestern portion of the province also showed increases in the *Drought* class and some growing pockets of *Exceptional Drought* can be found in the M.D.'s of Pincher Creek, Willow Creek and the Counties of Cardston, Starland and Cypress.
- In total the 16% of the reporting area was classified as *Drought*, and 1% is classified as *Exceptional Drought*, up from 11% and 0.3% since April 30th, respectively.
- The areas in *Drought Alert* include most of southern central Alberta, central and western Alberta and the western Peace region.
- Currently 49% of the reporting area is in the *Drought Alert* category up from 43% reported on April 30th. Approximately 34% of the reporting area is classified as *Normal* (down from 43% reported on April 30th) and includes northeastern Alberta, the east half of the Peace region and in the south, some isolated pockets in the Counties of Newell and Cypress as well as the M.D. of Rocky View.

Recent trends (Figure 2):

- Recent (90 day) trends toward *Normal* conditions (-0.5 to 0.5) were experienced in much of the Province.
- Areas trending toward *Drought Alert* status (-2 to -3) decreased markedly since April 30th, 2004 report. Currently the southwest and southeast parts of the province and portions of the northeast, including the Counties of Two Hills, Minburn, Beaver, Camrose, Flagstaff, Wainwright and Provost are included in this category. In the north similar areas are found in and around the County of Woodlands and in the Peace a small pocket can be found west of

Grande Prairie. Of these areas, those in *Drought* status are expected to stay in *Drought* status and those not in *Drought* are expected to move into *Drought* status if current conditions persist.

- Only a few isolated pockets in the south are trending toward *Drought* status (-1 to -2) and include the Counties of Cypress and Forty Mile. One small pocket can also be found in the County of Minburn in the northeast. Those areas already in *Drought* are showing no indication of changing.

Precipitation (Figures 3 – 4):

- Precipitation in the past 90 days (since February 16th) was *Much Below Normal* in the south for isolated areas in the Counties of Cypress and Forty Mile. In the east central parts of the province this category included the Counties of Two Hills, Minburn, Beaver, Camrose, Flagstaff, Wainwright and Provost and Special Area 4. In the north a similar area was reported in the County of Woodlands. *Below Normal* precipitation was recorded for most of the rest of the province save for the central Peace and the extreme northern parts of the province where *Near Normal* conditions are reported. Other isolated pockets of *Near Normal* or better include an area just east of Edmonton, south of Red Deer, the Crowsnest Pass area and *Much Above Normal* was recorded in the Swan Hills area (Figure 3)
- Historically May marks the beginning of the wet season in Alberta with much of the province receiving between 30-90 mm of precipitation. However, at this time of year the greatest amount of precipitation (50-70 mm) usually falls on the west half of the province with the rest of the province receiving between 30 and 50 mm of precipitation (Figure 4). Normal rainfall in June would bring even greater amounts of precipitation across the province with a range of 50 to 120 mm of precipitation
- Most of the precipitation recorded since the last report (April 30, 2004) fell mainly during a storm event that occurred between May 10th and 11th. The storm that hit southern Alberta on May 10th – 11th resulted in 40-60 mm of water equivalent concentrated in the foothills west of Calgary and also in the Crowsnest Pass. Also 20-50 mm was reported from the Foremost-Vauxhall-Calgary area west to the foothills, and 0-20 mm in most of southeastern Alberta. In the north and parts of the Peace region less than 10 mm fell. Other parts of the province received between 10 and 20 mm.

Spring Soil Moisture (Figures 5 – 6):

- Approximately 70 percent of the provincial agricultural area had insufficient moisture for optimum re-cropping showing soil moisture levels below 50 mm (Figure 5)
- This year is drier than average, and drier than 2003, but not as dry as the springs of 2000 and 2001
- Much of the southeastern part of the province had soil moisture levels below 50mm including Special Areas 3 and 4, The M.D. of Acadia, much of the counties of Paintearth, Settler, Starland, Newell, Vulcan and smaller areas in the Counties of Wheatland, Foothills, Forty Mile, Cypress and the M.D. of Taber.
- The largest moisture deviations (100 to 50mm) *Below Normal* were in west central and southwestern Alberta, including a small area of the Counties of Clearwater, Cardston and half of the M.D. of Pincher Creek. Similarly, and in the Peace, there was a small area north of Manning, where moisture levels are 50-100 mm *Below Average* (Figure 6). These areas usually have adequate spring soil moisture.

Explanation of Terms

Seasonal *Drought* (reported during the growing season months only)

Seasonal *Drought* is only reported for two periods, the growing season (May 1st – August 31st) and the fall (September 1st – October 31st). Seasonal *Drought* during the growing season impacts annual crops, hay and pastures but does not necessarily affect livestock water supply. Seasonal *Drought* during the fall can affect hay and pastures. It also affects livestock water supply in the following year by reducing the potential for spring runoff. The ratings are based on the current soil moisture conditions and precipitation departures. Seasonal *Drought* is rated as *Normal*, *Drought Alert* or *Drought*.

Long term (hydrologic) *Drought*

Long term, or hydrologic, *Drought* is a result of the cumulative effect of several dry months. It primarily impacts livestock feed and water supply and may affect annual crops. Hydrologic *Drought* is determined from precipitation totals over a 365-day period using the Standardized Precipitation Index (SPI). Long-term *Drought* is rated as either *Wet*, *Above Normal*, *Normal*, *Drought Alert*, *Drought* or *Exceptional Drought*. The SPI is recommended for *Drought* identification by the United States National *Drought* Mitigation Centre. The long-term *Drought* conditions are reported year-round.

The trend in long-term *Drought* is determined by comparing the 365-day SPI with the 90-day SPI. Where the 90-day SPI value is -1 to $+1$, then a trend toward moderating conditions is occurring, potentially resulting in *Normal* status. If the 365-day SPI values for that area are already *Normal*, then the trend is toward no change. If the 90-day SPI value is -1 to -2 , then the area is trending toward *Drought Alert* status. This could be a deteriorating condition if the current 365-day value is *Normal*, however it could represent a continuing condition if the area is already in *Drought Alert*, or an improving condition if the area is already in *Drought*. Values of the 90-day SPI that are between -2 to -3 and lower than -3 indicate a trend toward *Drought* and *Extreme Drought* respectively. Values of the 90-day SPI that are between $+1$ and $+2$, and greater than $+2$ represent a trend toward *Above Average* and *Wet* respectively.

Soil Moisture (reported during the growing season months only)

The crop gets the moisture it requires from the reserve of soil moisture, which in turn is replenished by rainfall. Soil moisture is a valuable indicator of *Drought* potential because it shows the reserve of water available to the crop at a given point in time. During peak growing periods, soil moisture reserves are consumed quickly and must be replenished frequently by rainfall. Low soil moisture reserves during these times indicate a high risk of immediate crop stress. Prolonged stress becomes *Drought*, and results in significant unrecoverable yield loss.

Because the climate varies across Alberta, comparing current moisture levels to *Normal* levels provides a valuable indicator of *Drought* risk that can be applied to all localities and to all times of the season. *Below Average* soil moisture levels, at any time, indicate a need for more rain or snow to restore reserves.

Soil moisture is measured as millimeters (mm) of plant available water. Plant available water is approximately half of the total water that can be measured in the soil. Soil moisture is monitored from May through October.

Precipitation Trends¹

Long-term cumulative precipitation departures are generated monthly to assess the long-term water status at representative stations in all five regions of the agricultural area of Alberta. Cumulative monthly total precipitation was compared to *Normal*, starting from an arbitrary reference point of January 2001. These departures provide information on how effective recent precipitation trends are in restoring conditions to *Normal*, given that we have had several months of *Below Normal* precipitation.

This helps understand what amount of rainfall is required to offset the *Drought* and dry weather since 2001. When the line slopes down, the precipitation is *Below Normal*. When the line slopes up, precipitation is *Above Normal* and when the line is flat, precipitation is *Near Normal*. From this information, short-term periods of *Normal* or *Above Normal* precipitation can be put into perspective with the cumulative effect of conditions since January 2001. For example, in southern Alberta, since the heavy rains in June 2002, precipitation dropped sharply from *Normal* at Cardston, but remained *Near Normal* at Medicine Hat until the summer of 2003. The effect of the dry summer of 2003 can be seen in the steeply sloping lines at most stations in all regions. In the southern Peace region, the flat lines indicate a return to *Near Normal* precipitation during August 2003, however the cumulative total since 2001 is still *Below Normal* for all stations except Ballater.

Report prepared by the Drought Reporting Team

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This report was created on May 14, 2004.

Drought analysis is scheduled at monthly intervals between November 1 and April 30. This report updates the previous report of April 18th, 2004.

¹ Precipitation analysis was based on Environment Canada data, with recent data unverified. Amounts may change as data becomes verified.

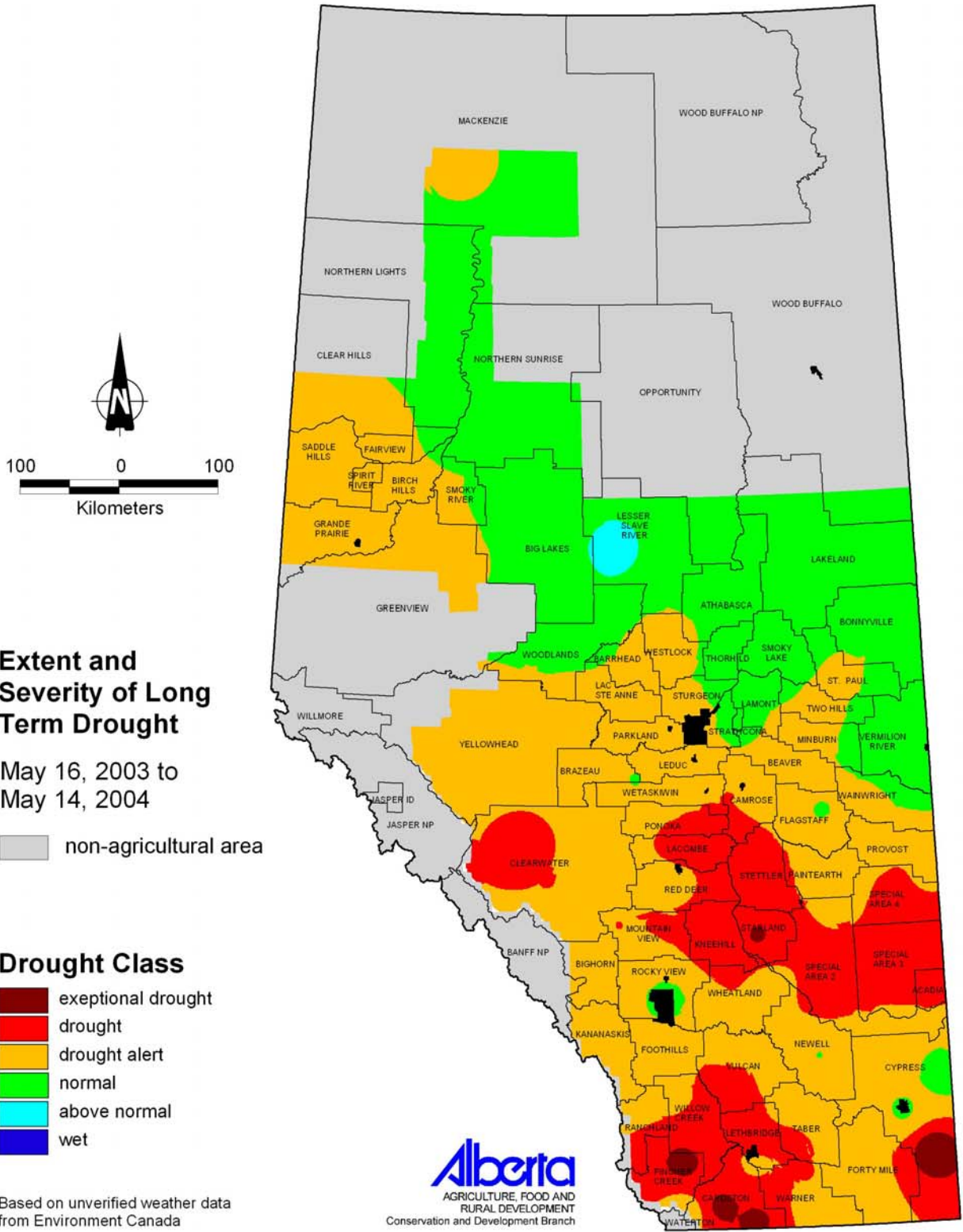


Figure 1. Extent and severity of long-term drought in the agricultural region of Alberta, May 14, 2004.

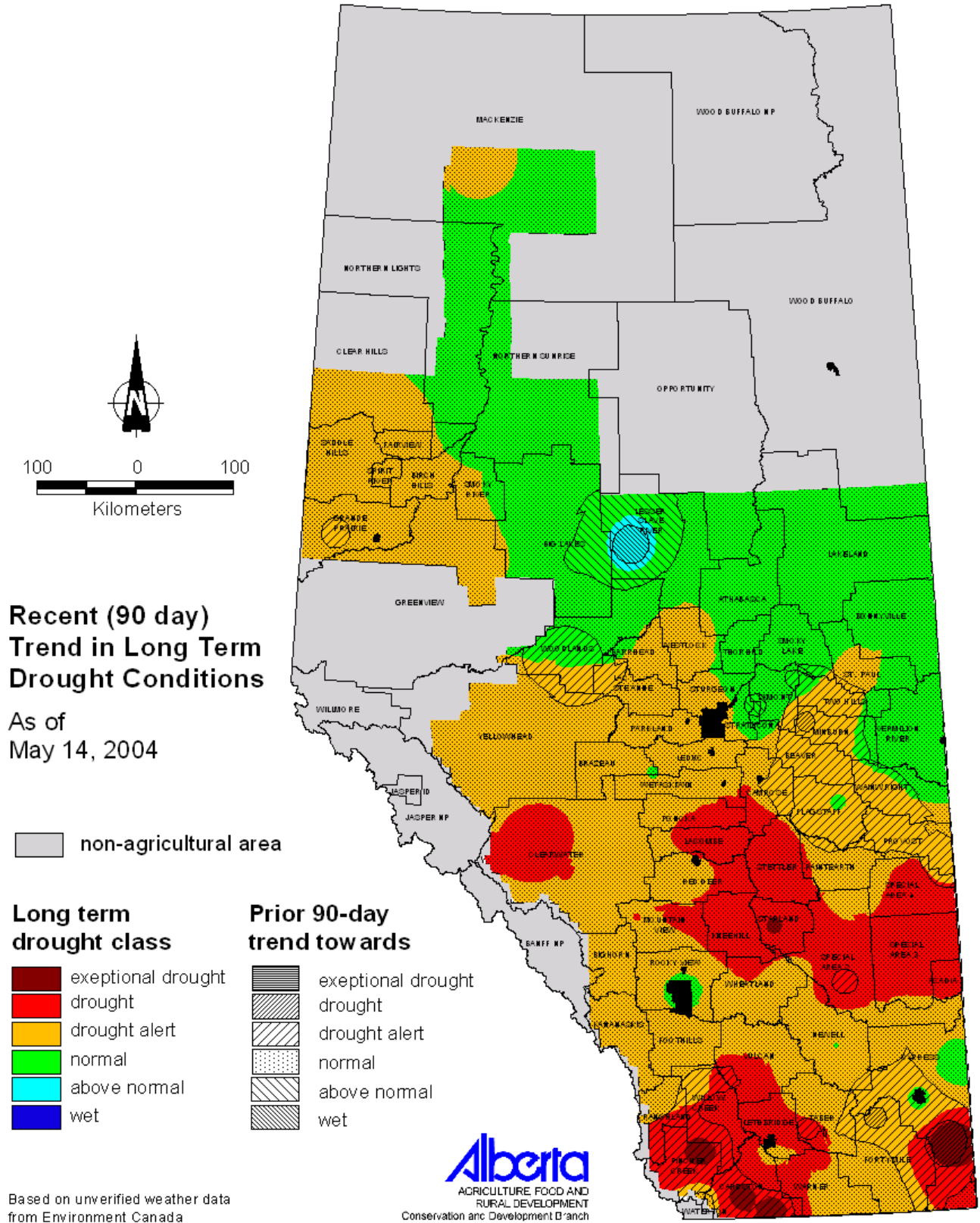


Figure 2. Recent (90 day) trends in drought status in the agricultural region of Alberta, May 14, 2004.

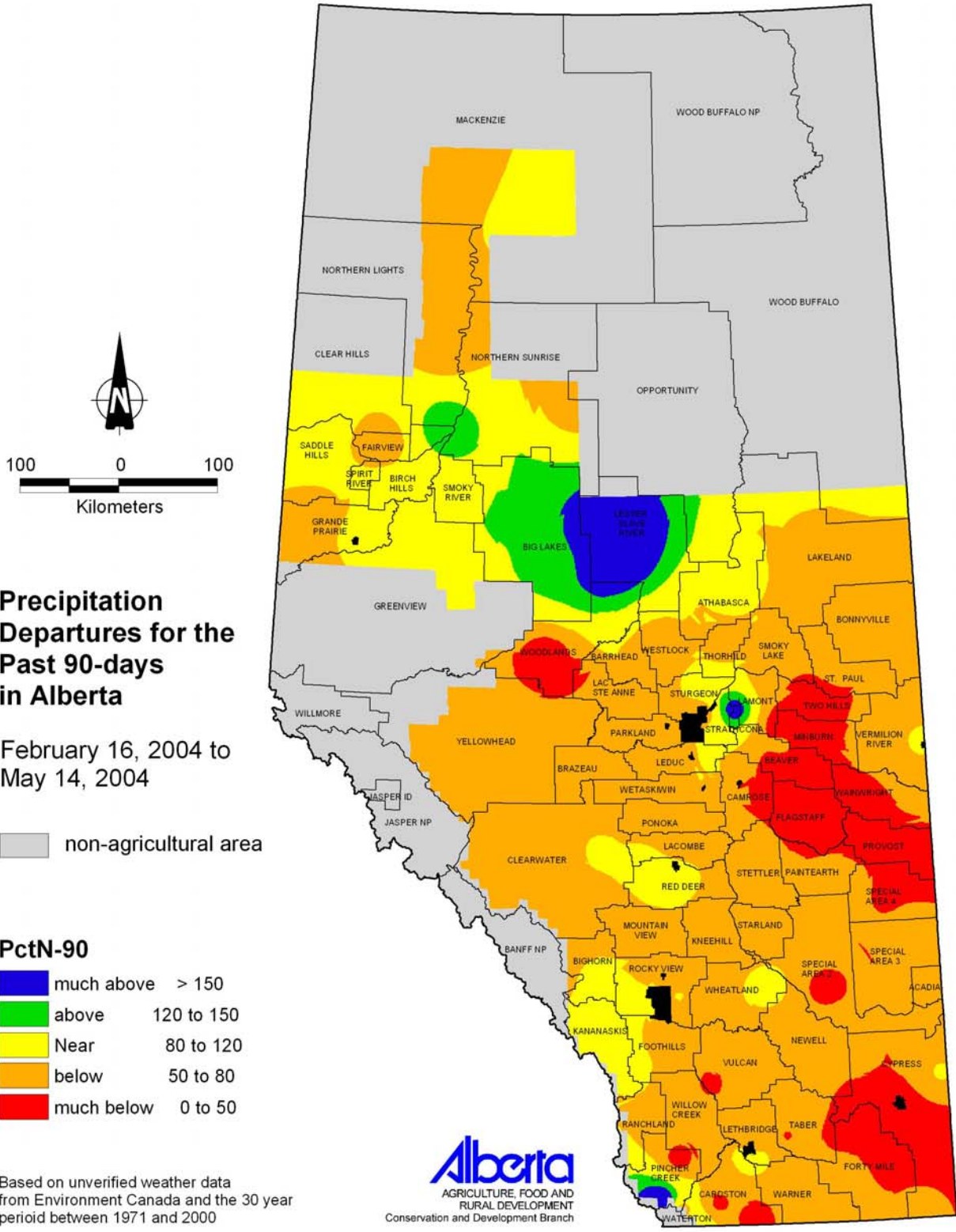


Figure 3. Precipitation departures for the 90 days up to and including May 14, 2004.

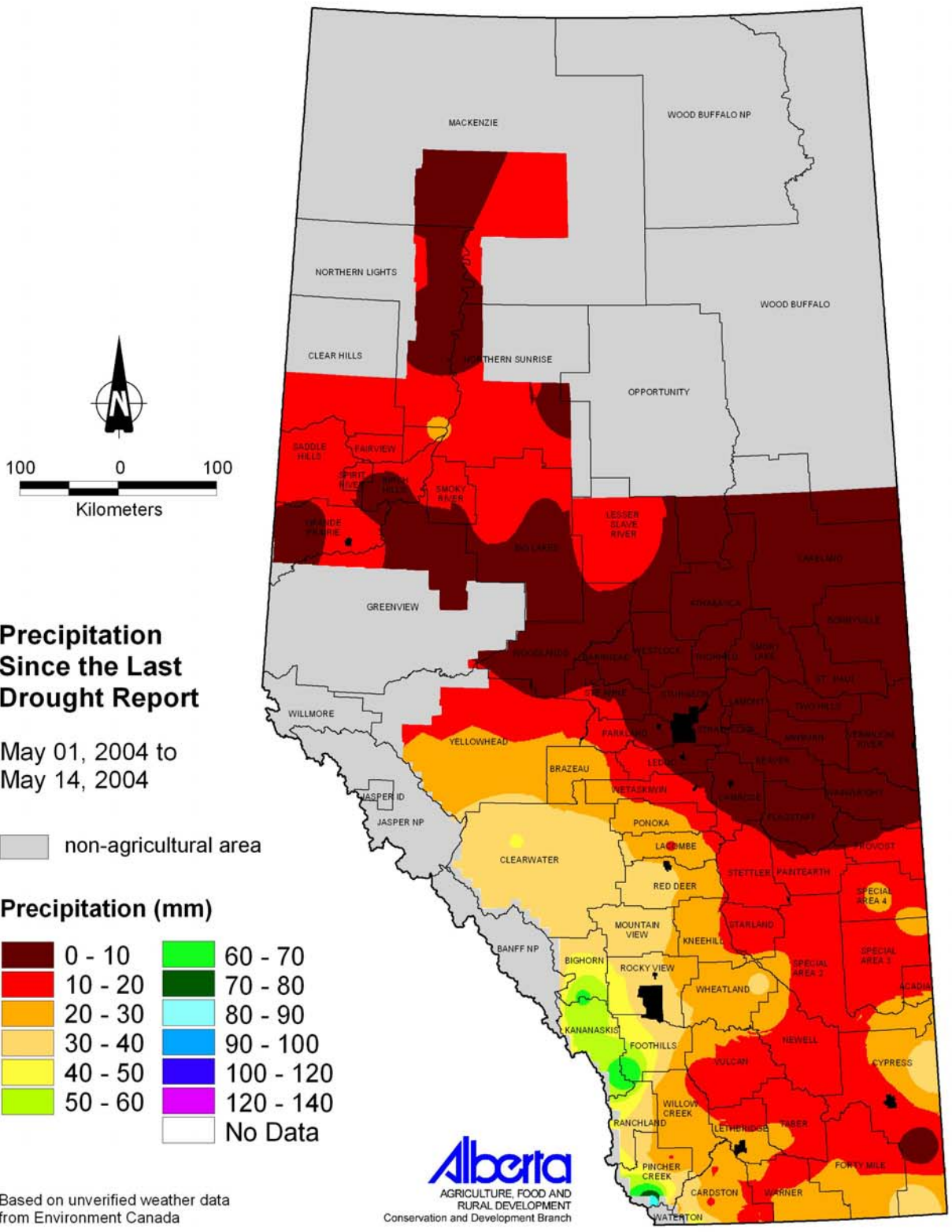


Figure 4. Precipitation (mm) for May 14, 2004 received since the last drought report (April 30, 2004).

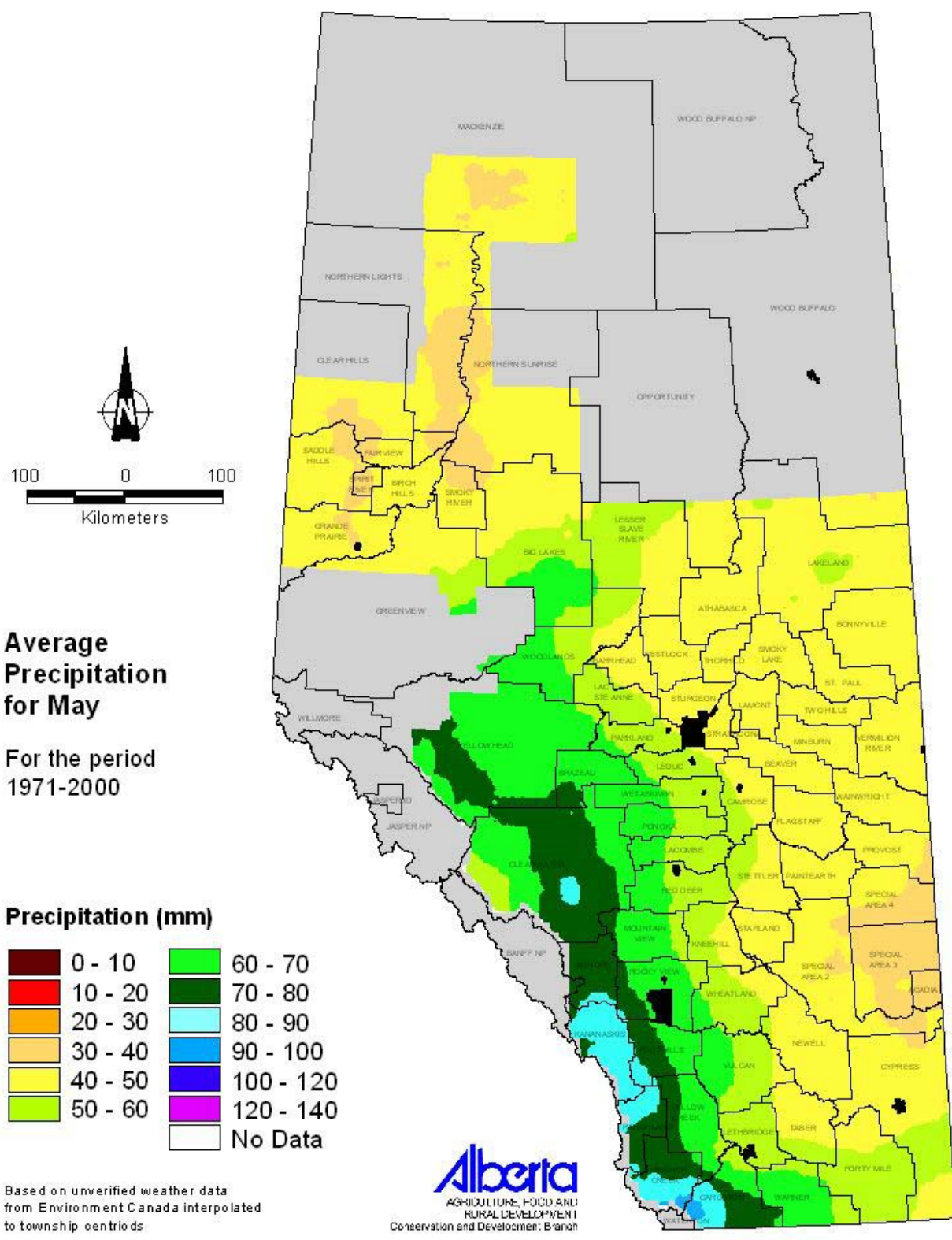


Figure 4. Normal precipitation for May

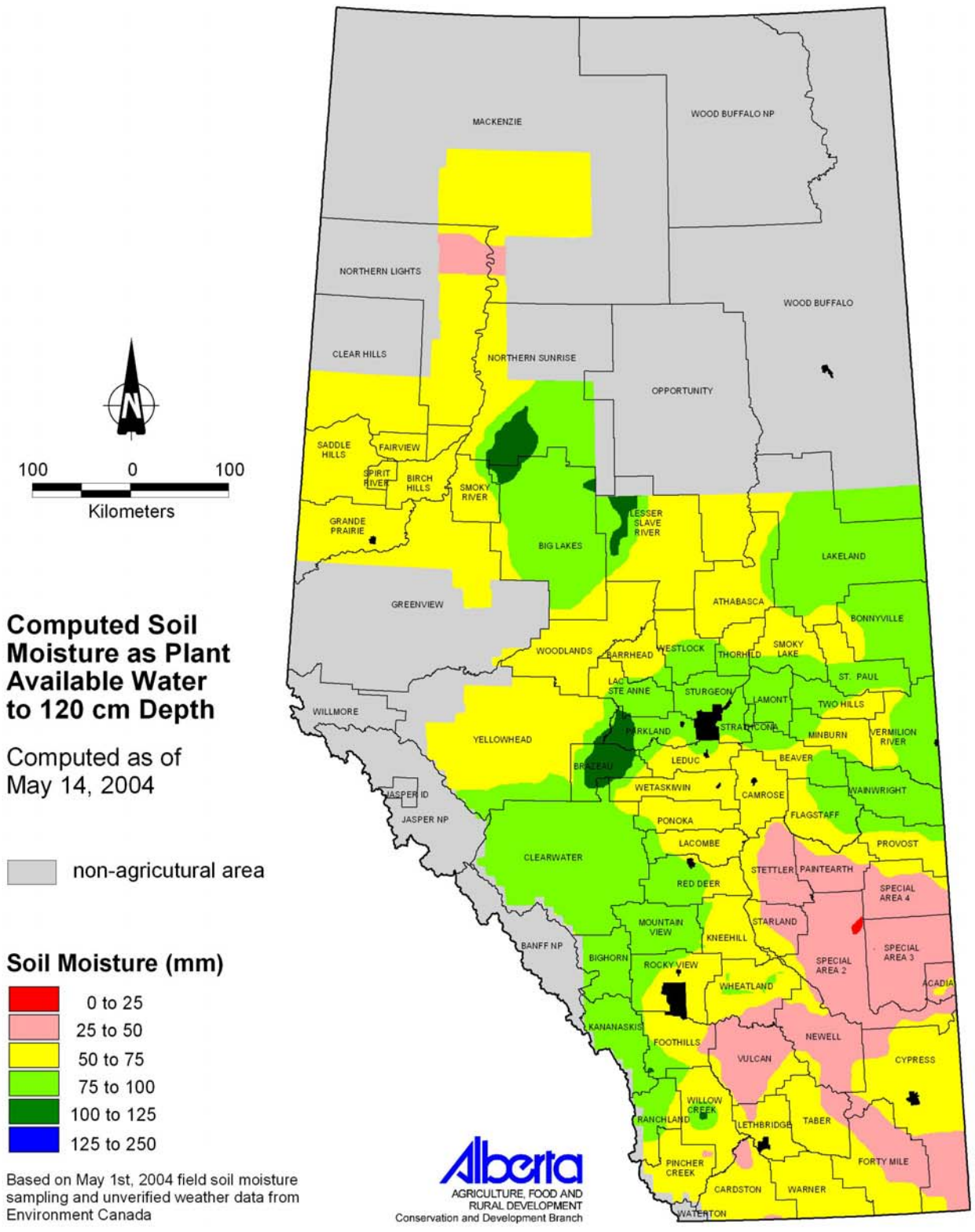


Figure 5. Spring soil moisture as of May 14, 2004.

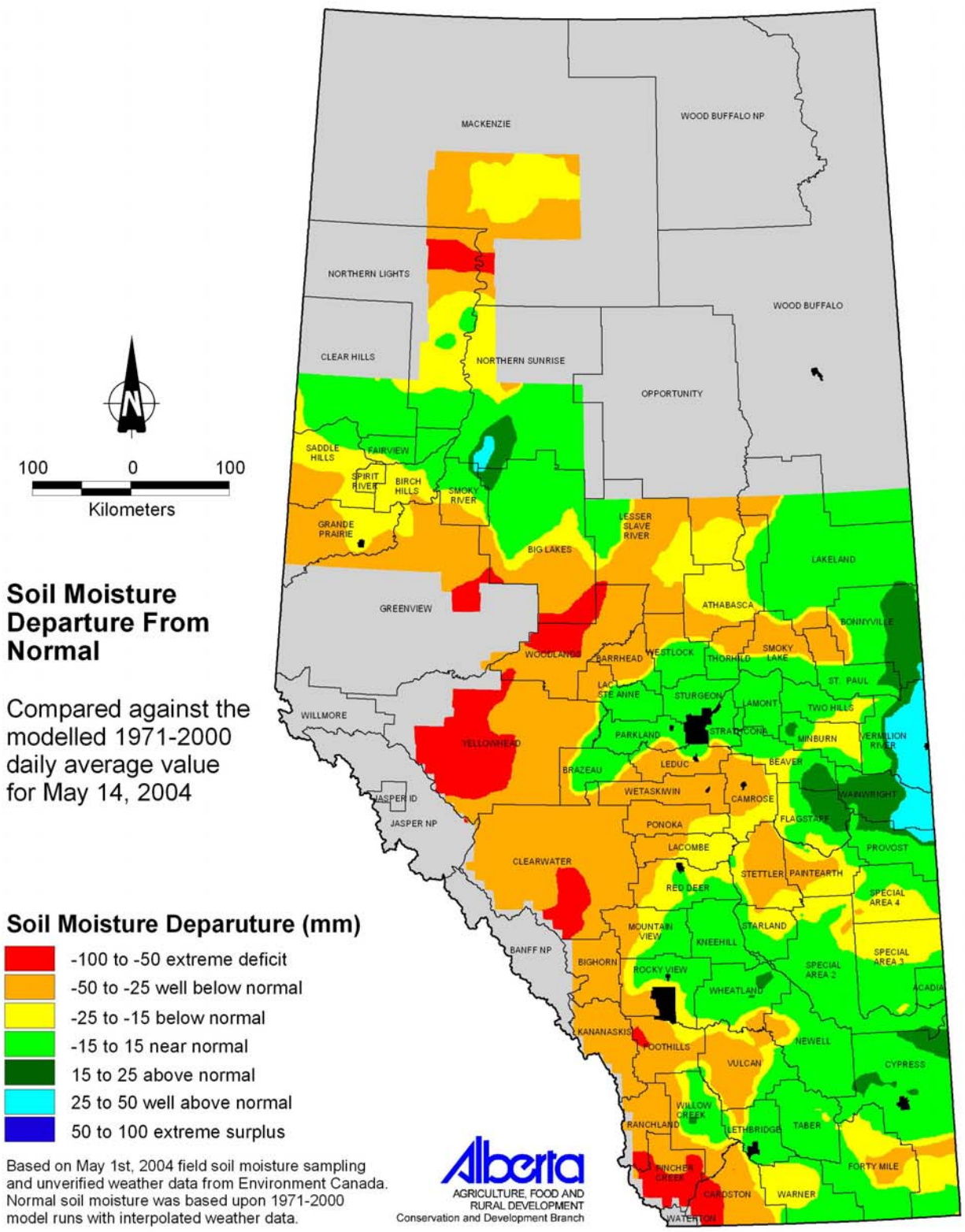


Figure 6. Spring soil moisture departure from normal spring soil moisture for May 14, 2004.