PRAIRIE WIND TRAJECTORY AND CEREAL RUST RISK REPORT for July 1-7, 2025

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Agriculture and Agri-Food Canada (AAFC) and Environment and Climate Change Canada (ECCC) have been working together to study the potential of trajectories for monitoring insect movements since the late 1990s. Trajectory models are used to deliver an early-warning system for the origin and destination of migratory invasive species, such as diamondback moth. In addition, plant pathologists have shown that trajectories can assist with the prediction of plant disease infestations and are also beginning to utilize these same data. We receive two types of model output from ECCC: reverse trajectories and forward trajectories.

'Reverse trajectories' (RT) refer to air currents that are tracked back in time from specified Canadian locations over a five-day period prior to their arrival date. Of particular interest are those trajectories that, prior to their arrival in Canada, originated over northwestern and southern USA and Mexico, anywhere diamondback moth populations overwinter and adults are actively migrating. If diamondback adults are present in the air currents that originate from these southern locations, the moths may be deposited on the Prairies at sites along the trajectory, depending on the local weather conditions at the time that the trajectories pass over our area (e.g. rain showers, etc.). Reverse trajectories are the best available estimate of the ''true'' 3D wind fields at a specific point. They are based on observations, satellite and radiosonde data.

Disclaimer

Information related to trajectory events based on forecast and diagnostic wind fields and cereal rust risk is experimental, and is **OFFERED TO THE PUBLIC FOR INFORMATIONAL PURPOSES ONLY**. Agriculture and Agri-Food Canada, Environment Canada, and their employees assume no liability from the use of this information.

1. RUST DEVELOPMENT IN SOURCE LOCATIONS

a. Pacific Northwest (PNW)

i. The USDA-ARS Cereal Disease Laboratory posts maps showing observations of stripe and leaf rust in the USA and maps as of July 14, 2024 (note no changes from the June 24-30, 2025 PCDMN rust risk update) are shown in Figures 1-4, with information for the PNW region in Figures 1a and 1b. In addition, stripe rust observations in some US states are also posted on the Ag Pest Monitor website (Figure 5).

ii. In the most recent update on June 18, 2025, Dr. Chen, USDA-ARS/WSU, indicated that they have finished stripe rust assessments in their winter wheat trials at five locations in Washington State and at Hermiston, Oregon (Dr. Chen, USDA-ARS/WSU, Stripe Rust Update and Special Notes on Yr5 and Yr15, June 18, 2025, Stripe rust report 06/19/25 | WAWG). Very high levels of stripe rust (>=90%) occurred at these locations on susceptible test lines/varieties. In contrast, stripe rust severities in commercial fields in the PNW on both winter and spring wheat have been low and generally <1%. Reduced rainfall will likely limit further development of stripe rust on spring wheat, although fungicide is suggested on susceptible varieties where increased moisture has occurred or with irrigated crops. Dr. Chen also indicates that the 2025 season for stripe rust on winter wheat is mainly over now.

iii. Drs. L. Hebb and U. McKelvy, Montana State University (MSU), reported on the recent observations of stripe rust in research trial plots at multiple Montana locations (Stripe Rust Found on Winter Wheat in Montana – Northern Ag Network and https://www.ars.usda.gov/ARSUserFiles/50620500/CRBs/2025%20CRB%20June%2027.pdf).

1. Symptoms were found on susceptible varieties in test plots in southwestern Montana near Bozeman (Gallatin County), and at the Kalispel Northwestern Agricultural Research Centre (Flathead County). Levels at the Gallatin County trial were generally low to moderate depending on the variety/line, while trace levels were observed at the Kalispel trial site
2. There was an additional report of trace levels at another research farm (A.H. Post Farm) near Bozeman in southwestern Montana
3. No symptoms of stripe rust have been observed on winter wheat in trials at Moccasin (central MT), Sidney (eastern MT), Huntley (southern MT).

iv. **As of July 14, 2025, the current limited development of stripe rust, especially in commercial fields, indicates the PNW region represents a low risk of being a source of stripe rust inoculum for Prairie wheat growers in 2025. Further significant PNW stripe rust development is not expected, while the winter wheat crop is maturing with about 5% and 13% harvested as of July 13, 2025 in Washington State and Oregon, respectively (https://quickstats.nass.usda.gov/results/6973F6E0-3DE0-3153-BEBB-489BD4DB599D, https://quickstats.nass.usda.gov/results/6E5D1535-CD81-3CC1-8B45-F5D373826C23). Thus the PNW winter wheat crop no longer is an important source of stripe rust for the Prairie region.**

1. The observation of stripe rust in Montana trial sites brings the stripe rust problem much closer to southern Alberta and southwestern to southcentral Saskatchewan and could represent a regional source of this disease.

v. During the first week of July there were multiple reports of stripe rust in Alberta, including in the Calgary to Drumheller region, as well as in the Airdrie region (https://prairiecropdisease.com/2025/07/04/first-observations-of-stripe-rust-in-commercial-fields-in-alberta/, Dani Kerr, Micayla Code, Emma Nesbitt, and Grace Gregory, Nutrien agronomists, and Rebecca Wiebe, Agronomy Manager with Core-Ag, Carstairs, AB and Core-Ag colleagues Candice Kerr and Jill McCambly). Levels have been mainly low, although patches of increased levels were observed in some fields.

1. In their most recent update as of July 14 and 15, 2025, Dani Kerr, Nutrien indicated that stripe rust symptoms have been observed in the Penhold and Bentley areas of central Alberta, while also receiving a report from a grower in the Rimbey region.
2. Last week, there were further reports of stripe rust at low levels in multiple fields in the Madden to Airdrie area of Alberta (Rebecca Wiebe, Agronomy Manager with Core-Ag, Carstairs, AB and Core-Ag colleagues Candice Kerr and Jill McCambly; and Craig Shand, Chinook Agronomics Inc., Co-owner/operator Shand Farms Ltd.). In addition, Dr. Mike Harding and colleagues, AAI Brooks, observed stripe rust in a field around Nanton, AB.
3. There have been additional reports of stripe rust in fields in the Bruderheim and Taber (observation made last week) areas of Alberta
    a. Christine MacTaggart, Richardson Pioneer, Lamont, AB
    b. Dana Maxwell, President & CEO, Director of Plant Genetics Services, Ag-Quest.
4. The PCDMN wishes to graciously acknowledge the efforts and willingness of industry and provincial staff to share their rust observations. Further updates on the detection of rust are expected over the next 1-2 weeks.

b. **Texas/Oklahoma**

i. **As of July 14, 2025, the Texas/Oklahoma region is no longer a significant source of stripe, leaf, stem and crown rust inoculum for dispersal into the Prairie region of Canada.** As of July 13, 2025, 90% and 94% of the Texas and Oklahoma winter wheat crops have been harvested, respectively (https://quickstats.nass.usda.gov/results/6973F6E0-3DE0-3153-BEBB-489BD4DB599D). Given the growth stage of Texas and Oklahoma winter wheat crops, they no longer represent an important source of uredospores which only develop on green living non-senesced plant tissues.

c. **Kansas/Nebraska**

i. Currently the Kansas winter wheat crop as of July 13, 2025 is 93% harvested (https://quickstats.nass.usda.gov/results/6973F6E0-3DE0-3153-BEBB-489BD4DB599D) and thus is no longer a significant source of stripe rust.

ii. The most recent update from Nebraska on June 20, 2025 indicates continued observations of stripe rust, especially in eastern Nebraska, although its late arrival will likely have minor impacts on winter wheat yields (https://cropwatch.unl.edu/late-season-rust-observed-eastern-nebraska-wheat-limited-yield-impact-expected/). Significant levels of leaf rust were observed at a research site in Lancaster county, while stripe rust infections are starting to mature with the production of the teliospore stage. Surveys indicated that leaf rust was found in two more counties, with a total of three counties being affected, while stripe rust is in 14 counties (Figure 6).

1. Dry conditions in Nebraska likely have slowed down development of stripe and leaf rust, while the USDA Farm Service Agency has indicated as of June 26, 2025, that drought conditions in numerous Nebraska counties have resulted in these regions being a "primary natural disaster areas due to drought conditions" (https://cropwatch.unl.edu/news/usda-designates-numerous-nebraska-counties-natural-disaster-areas-due-drought/).

iii. In late May the first observation of stripe rust was reported in Wisconsin in a research trial at the Arlington Agricultural Research Centre (Stripe Rust Detected in Wisconsin Wheat | Wisconsin Ag Connection, Figure 5). Symptoms were observed on a susceptible trial line.

iv. In a July 10, 2025, North Dakota State University (NDSU) Crop & Pest Report, Dr. A. Friskop reported that none of the cereal rusts have been reported in North Dakota as of yet in 2025 (https://www.ndsu.edu/agriculture/sites/default/files/2025-07/12%20July%2010%202025%20Final%20edits_1.pdf).

v. **As of July 14, 2025, there is a low risk associated with the Kansas/Nebraska region being a significant source of stripe and leaf rust inoculum for dispersal into the Prairie region of Canada.** Drought conditions that have occurred in Nebraska will likely limit further rust development. The observation of stripe rust in Wisconsin in late May also brings the stripe rust issue potentially closer to the central to eastern Prairie region. Finally, winter wheat development in Kansas is progressing with 93% of the winter wheat crop harvested as of July 13, 2025 (https://quickstats.nass.usda.gov/results/6973F6E0-3DE0-3153-BEBB-489BD4DB599D). In Nebraska as of July 13, 2025 approximately 35% of the winter wheat crop has been harvested (https://quickstats.nass.usda.gov/results/6973F6E0-3DE0-3153-BEBB-489BD4DB599D). Given the status of Kansas and Nebraska winter wheat crops, they no longer represent an important source of uredospores which only develop on green living non-senesced plant tissues.

2. Reverse trajectories (RT)

a. Since April 1, 2025 the majority of reverse trajectories that have crossed the prairies have originated from the Pacific Northwest (Idaho, Oregon and Washington) (Figures 7-10).

b. **Pacific Northwest (Washington, Oregon, Idaho)** – Since April 1, 2025, the greatest number of reverse trajectories, crossing the Prairies, have originated from the Pacific Northwest (n=1103, Figure 7). Most of these trajectories passed over Alberta and western regions of Saskatchewan (Figure 8). For the week of July 1-7, 2025 there have been a total of 73 trajectories for 31 locations down from the 143 reverse trajectories that passed through the Prairie region over 35 locations from June 24-30, 2025 (Table 1). LETHBRIDGE and MEDICINE HAT, AB had a total of seven and six wind trajectories from the PNW, respectively from July 1-7, 2025. CALGARY and VULCAN, AB, and SWIFT CURRENT, SK each had four trajectories, while BEISEKER, AB, GRENFELL, MOOSE JAW, NORTH BATTLEFORD, REGINA, and WEYBURN, SK each had three trajectories from the Pacific Northwest from July 1-7, 2025. The remaining 20 locations had 1-2 trajectories from the Pacific Northwest during this period (Table 1).

i. **As of July 7, 2025, there is low-moderate risk associated with the PNW region being a significant source of wind trajectories for dispersal of the stripe rust pathogen into most of the Prairie region. Locations with three or more trajectories during this period would be at higher risk.**

c. **Oklahoma and Texas** – Given that Texas and Oklahoma crops are mature and being harvested, this region is no longer a significant of wind trajectories for dispersal of rust pathogens into the Prairie region of Canada (https://quickstats.nass.usda.gov/results/6973F6E0-3DE0-3153-BEBB-489BD4DB599D).

d. **Nebraska and Kansas** – A total of 312 reverse trajectories, originating from Kansas and Nebraska have crossed the prairies, primarily Manitoba and Saskatchewan (April 1 – July 7, 2025) (Figure 9). Most of these trajectories passed over Manitoba and central to eastern Saskatchewan (Figure 10). From July 1-7, 2025, there were a total of 14 trajectories over 12 Prairie locations, compared with 17 trajectories for 13 locations from June 24-30, 2025 (Table 2). All locations with trajectories from the KS/NE region had 1-2 events from July 1-7, 2025 (Table 2).

   i. **As of July 7, 2025, there is a low risk associated with the KS/NE region being a significant source of wind trajectories for dispersal of rust uredospores into most of the Prairie region.**

e. **Montana** – Given the recent observations of stripe rust at several Montana locations over the last few weeks, this region could represent a source of stripe rust spores for the Prairie region. A total of 1147 reverse trajectories, originating from Montana, have crossed the prairies (April 1 – July 7, 2025) (data not shown). From July 1-7, 2025, there were a total of 88 trajectories over 31 Prairie locations (Table 3). MEDICINE HAT, AB, and GAINSBOROUGH and WEYBURN, SK each had six trajectories from Montana from July 1-7, 2025, with LETHBRIDGE, AB, GRENFELL, MOOSE JAW, and REGINA, SK having five trajectories (Table 3). Over the same period, VULCAN, AB, and SWIFT CURRENT, SK had four events, while KINDERSLEY, SASKATOON, and WATROUS, SK and BRANDON, PORTAGE, and RUSSELL, MB, each had three trajectories.

   i. **As of July, 2025, there is a low to moderate risk associated with the Montana region being a significant source of wind trajectories for dispersal of rust uredospores into most of the Prairie region.**

3. Prairie Crop Development, Weather Conditions, and Overwintering of Rust

a. Winter wheat – Winter wheat is generally moving into the grain filling stages (https://tinyurl.com/2y5hyen5, https://tinyurl.com/53ae9hc6, https://tinyurl.com/bp6yv9ac).

b. Spring wheat – As of early to mid July spring wheat is generally moving out of the flag and head emergence stages, and are flowering, although some fields depending on location, seeding date and weather are either not as advanced or are starting grain filling (https://tinyurl.com/2y5hyen5; https://tinyurl.com/53ae9hc6; https://tinyurl.com/bp6yv9ac) .

c. This past week (June 30-July 6, 2025) the average temperature across the Prairies ranged from around 11 to 21.8°C, with the coolest areas being in Alberta and northern cropping areas of Saskatchewan (Figure 11).

d. Growing season temperatures (April 1-July 6, 2025) have been ~1-2.8 °C above average for large areas of the Prairies, although the BC Peace was up to 2.8°C above normal for this period, while areas around Grande Prairie, AB, southcentral and southeastern Saskatchewan and southwestern Manitoba have been close to normal or slightly cooler than normal (Figure 12).

e. Accumulated rainfall over the past week (June 30-July 6, 2025) ranged from around 0 to 46 mm for the Prairie region. Levels were lowest in northern cropping areas of Manitoba, and in east central to northeastern, and west central to northwestern Saskatchewan, as well as eastern Alberta, the Calgary region and in the BC Peace (Figure 13). Wetter areas included the Edmonton region, areas in the Peace region, and southwestern Alberta, south eastern Saskatchewan, and southern cropping regions of Manitoba.

f. Growing season rainfall from April 1 to July 6, 2025 has been below normal in much of the Peace region of Alberta, northeastern and southeastern Alberta, northwestern Saskatchewan and a path from southwestern to northeastern Saskatchewan, and most of Manitoba (Figure 14). Large areas of Alberta from the Edmonton region to the US border, west-central Saskatchewan, the Saskatoon region, and southeastern Saskatchewan, and southwestern Manitoba have had close to average to above average rainfall (Figure 14).

4. Overall Rust Risk Assessment and Need For In-Crop Scouting

a. **Crop development and weather**

   i. Prairie winter wheat crops are generally moving into the grain filling growth stages, while much of the spring wheat crop is moving out of flag leaf emergence into head emergence and flowering.

ii. Temperatures have been somewhat higher than normal for most of the Prairie region since April 1, 2025, and from June 30-July 6, 2025 temperatures ranged from around 11 to 21.8°C. These temperatures are generally not conducive to leaf and stem rust development, although cooler temperatures are more conducive for stripe rust.

iii. Growing season rainfall for the Prairie region has been variable with some areas below or above normal. Recent rainfall in some areas the Prairies could potentially have washed rust spores from the air and into wheat crops, while also resulting in canopy moisture conditions that may favour infection and further rust development.

b. **Pacific Northwest** – There were low-moderate reverse wind trajectories that passed over the PNW region and into the prairies from July 1-7, 2025. Stripe rust development, especially in commercial winter wheat fields is generally lower versus 2024. **Overall, as of July 7, 2025 the risk of stripe rust appearance from the PNW is generally low and scouting for this disease in the Prairie region is generally not urgent (Figure 15).** Nonetheless, Prairie locations with three or more trajectories may be at higher risk (Table 1). The late development and low levels of stripe rust in commercial PNW fields has had an overall dampening effect on the rust risk from the PNW.

c. **Montana** - The recent detection of stripe rust in research plots at multiple locations in Montana brings the stripe rust issue adjacent to the Prairie region. These observations bring the stripe rust problem much closer to southern Alberta and southern Saskatchewan and could represent a regional source of this disease. There were a moderate number of trajectories that passed over Montana and into the Prairie region from July 1-7, 2025. **Overall, as of July 7, 2025 the risk of Montana acting as a source of stripe rust for Prairie region is generally low given observations of stripe rust have been in research trial plots.** However, further stripe rust development in commercial Montana wheat fields could increase the risk for Prairie producers.

d. Prairie wheat growers in areas with >=three trajectories from the PNW or Montana are encouraged to be on the look out for symptoms of stripe rust, **especially in fields planted to susceptible to moderately susceptible varieties.** For information on cereal variety reactions for stripe rust, please consult your Provincial variety guides:
    1. Alberta
    2. Saskatchewan
    3. Manitoba.

e. **Kansas-Nebraska corridor** – There was a low number of wind trajectory events from the KS/NE region for July 1-7, 2025. **Overall, as of July 7, 2025 the risk of stem, leaf, stripe, and crown rust appearance from the Kansas-Nebraska corridor is limited and scouting for these diseases in the Prairies is not urgent** (**Figure 16).** Dry conditions and the progress of winter wheat crop towards maturity and harvest will reduce the risk from the KS/NE region. However, the detection of stripe rust in research plots earlier this summer in Wisconsin brings the stripe rust issue closer to the Prairie region.

Contacts for rust research and extension expertise

f. **Research**
   i. Reem Aboukhaddour, AAFC Lethbridge, AB, reem.aboukhaddour@agr.gc.ca. Stripe rust;
   ii. H.R. Kutcher, University of Saskatchewan, Saskatoon, SK, randy.kutcher@usask.ca. Stripe rust;
   iii. B. McCallum, AAFC Morden, MB, brent.mccallum@agr.gc.ca. Leaf, stem, and stripe rust;
   iv. Xiben Wang, AAFC Brandon/Morden, MB, xiben.wang@agr.gc.ca. Stem and crown rust of oat.
   v. S. Rehman, Western Crop Innovations (formerly Olds College/Alberta Agriculture), Field Crop Development Centre, Lacombe, AB, srehman@westerncropinnovations.com. Stripe and leaf rust;
   vi. G. Brar, University of Alberta, gurcharn.brar@ualberta.ca. Stripe rust.

g. **Extension**
   i. Alberta Ministry of Agriculture and Irrigation, Mike Harding, michael.harding@gov.ab.ca;
   ii. Saskatchewan Ministry of Agriculture, Alireza Akhavan, alireza.akhavan@gov.sk.ca;
   iii. Manitoba Ministry of Agriculture, TBA.

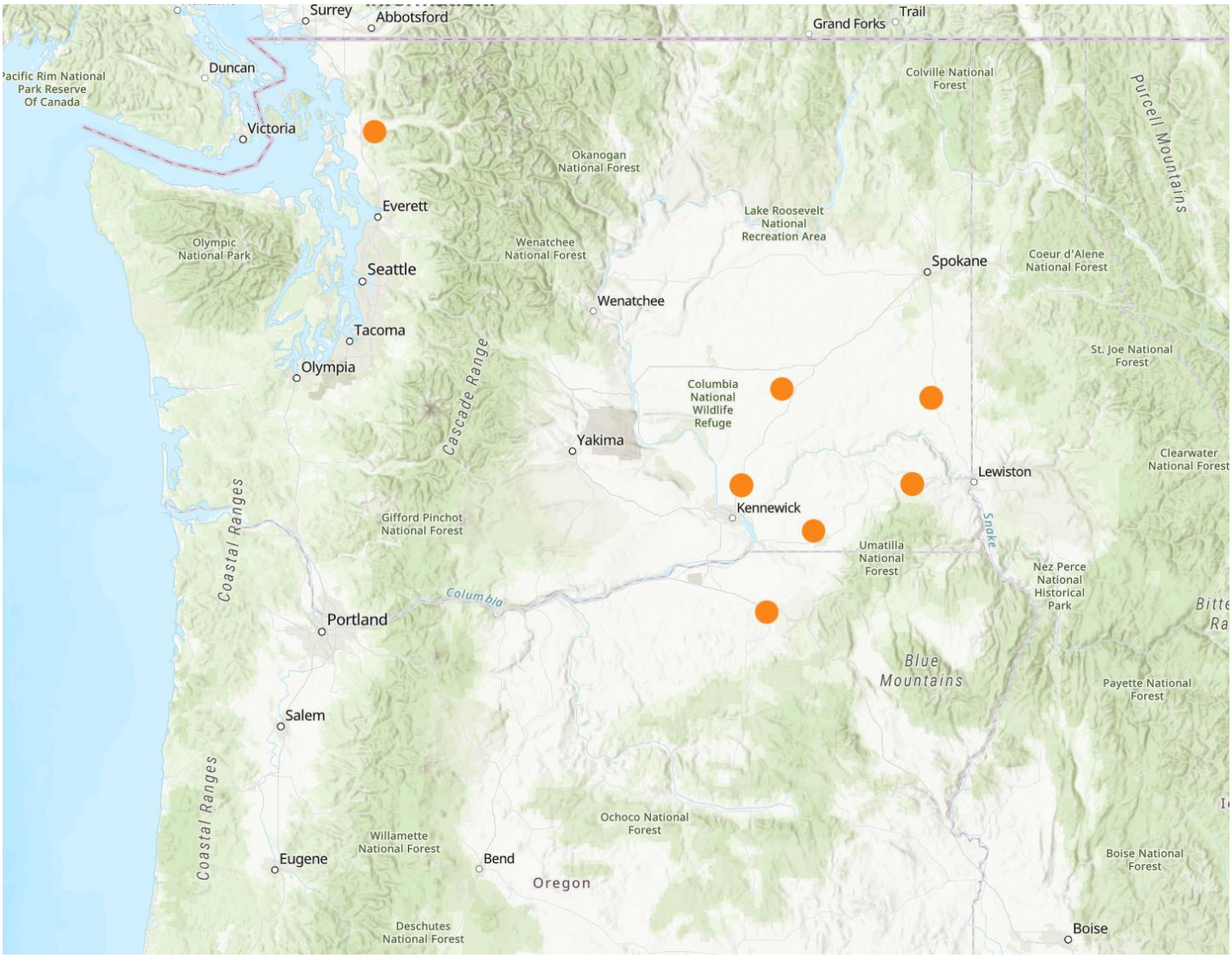


Figure 1a. Pacific Northwest stripe rust observations in wheat, USDA-ARS, Cereal Disease Laboratory, Cereal Rust Observation Maps as of July 14, 2025 (note no changes from the June 24-30, 2025 PCDMN rust risk update). https://usdaars.maps.arcgis.com/apps/mapviewer/index.html?webmap=7eabb3bc66c045568a406569b731ac6d (note the map is updated as new reports are received).

Figure 1b. Pacific Northwest leaf rust observations in wheat, USDA-ARS, Cereal Disease Laboratory, Cereal Rust Observation Maps as of July 14, 2025 (note no changes from the June 24-30, 2025 PCDMN rust risk update), https://usdaars.maps.arcgis.com/apps/mapviewer/index.html?webmap=5dedcdc1a86443a09189c2b6e5598c54 note the map is updated as new reports are received).

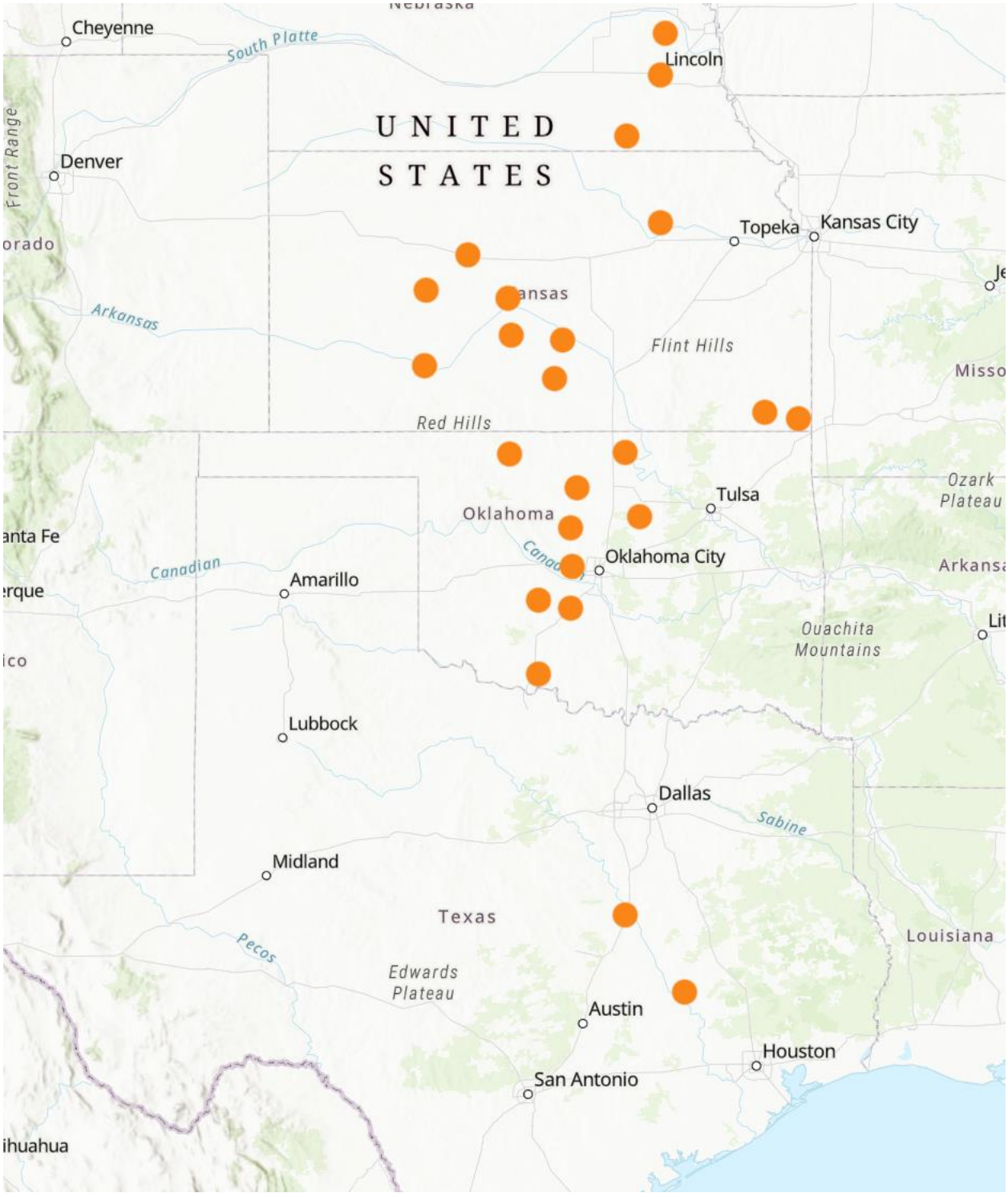


Figure 2. Texas, Oklahoma, and Kansas stripe rust observations in wheat, USDA-ARS, Cereal Disease Laboratory, Cereal Rust Observation Maps as July 14, 2025 (note no changes from the June 24-30, 2025 PCDMN rust risk update), https://usdaars.maps.arcgis.com/apps/mapviewer/index.html?webmap=7eabb3bc66c045568a406569b731ac6d (note the map is updated as new reports are received).

Figure 3. Texas and Oklahoma leaf rust observations/collections in wheat, USDA-ARS, Cereal Disease Laboratory, Cereal Rust Observation Maps as of July 14, 2025 (note no changes from the June 24-30, 2025 PCDMN rust risk update), https://usdaars.maps.arcgis.com/apps/mapviewer/index.html?webmap=5dedcdc1a86443a09189c2b6e5598c54 (note the map is updated as new reports are received).

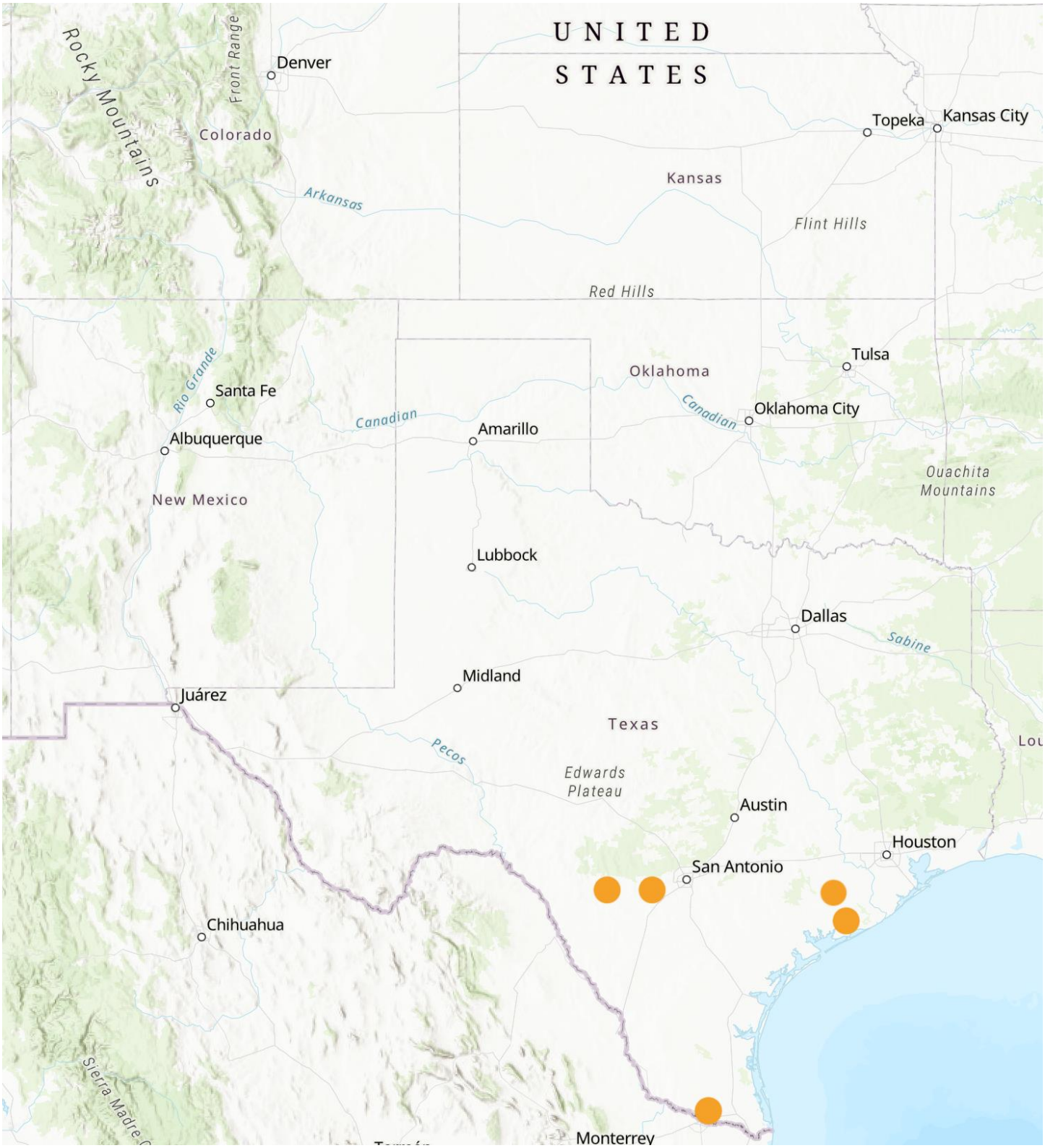


Figure 4. Texas oat crown rust observations/collections in wheat, USDA-ARS, Cereal Disease Laboratory, Cereal Rust Observation Maps as of July 14, 2025 (note no changes from the June 24-30, 2025 PCDMN rust risk update), https://usdaars.maps.arcgis.com/apps/mapviewer/index.html?webmap=a5bae196706b48fa83a8d5e1b344f802 (note the map is updated as new reports are received).

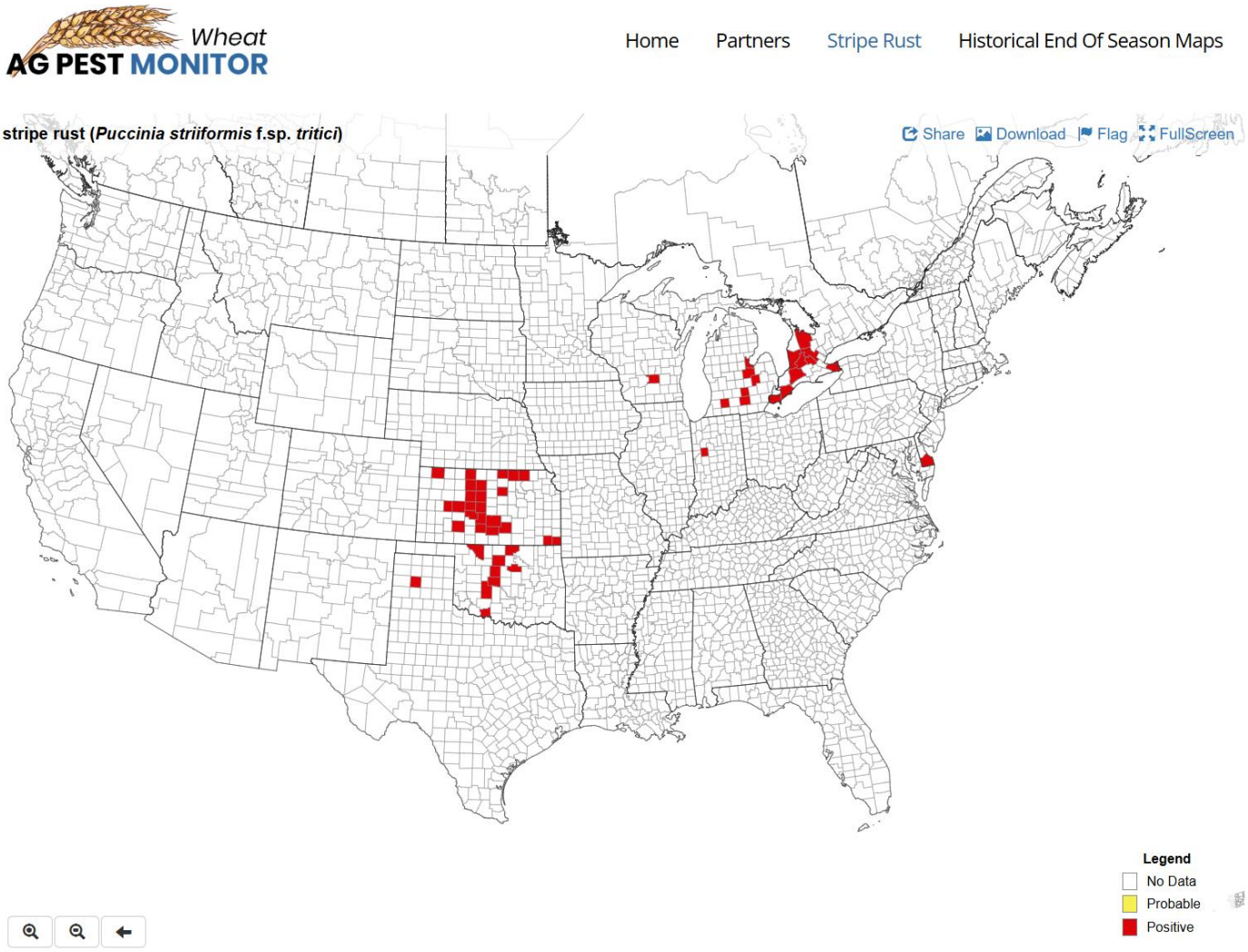
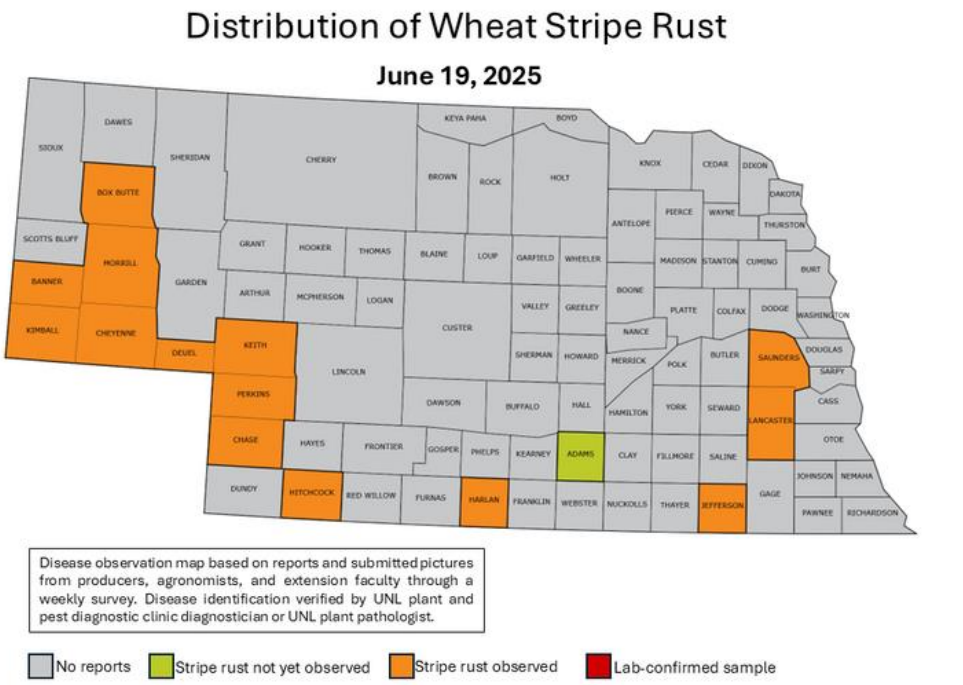


Figure 5. USA stripe rust observations, as of July 14, 2025, courtesy of AG PEST MONITOR: Wheat, https://wheat.agpestmonitor.org/stripe-rust/.



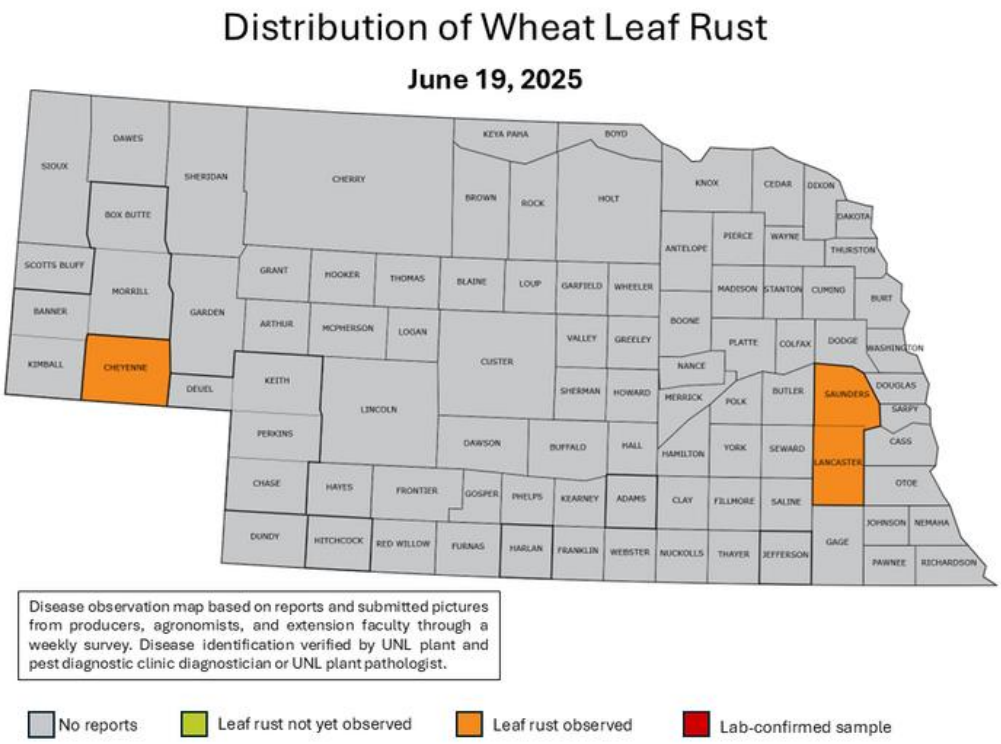


Figure 6. Distribution of stripe (top) and leaf (bottom) rust in Nebraska, USA, as of June 19, 2025 (https://cropwatch.unl.edu/late-season-rust-observed-eastern-nebraska-wheat-limited-yield-impact-expected/).

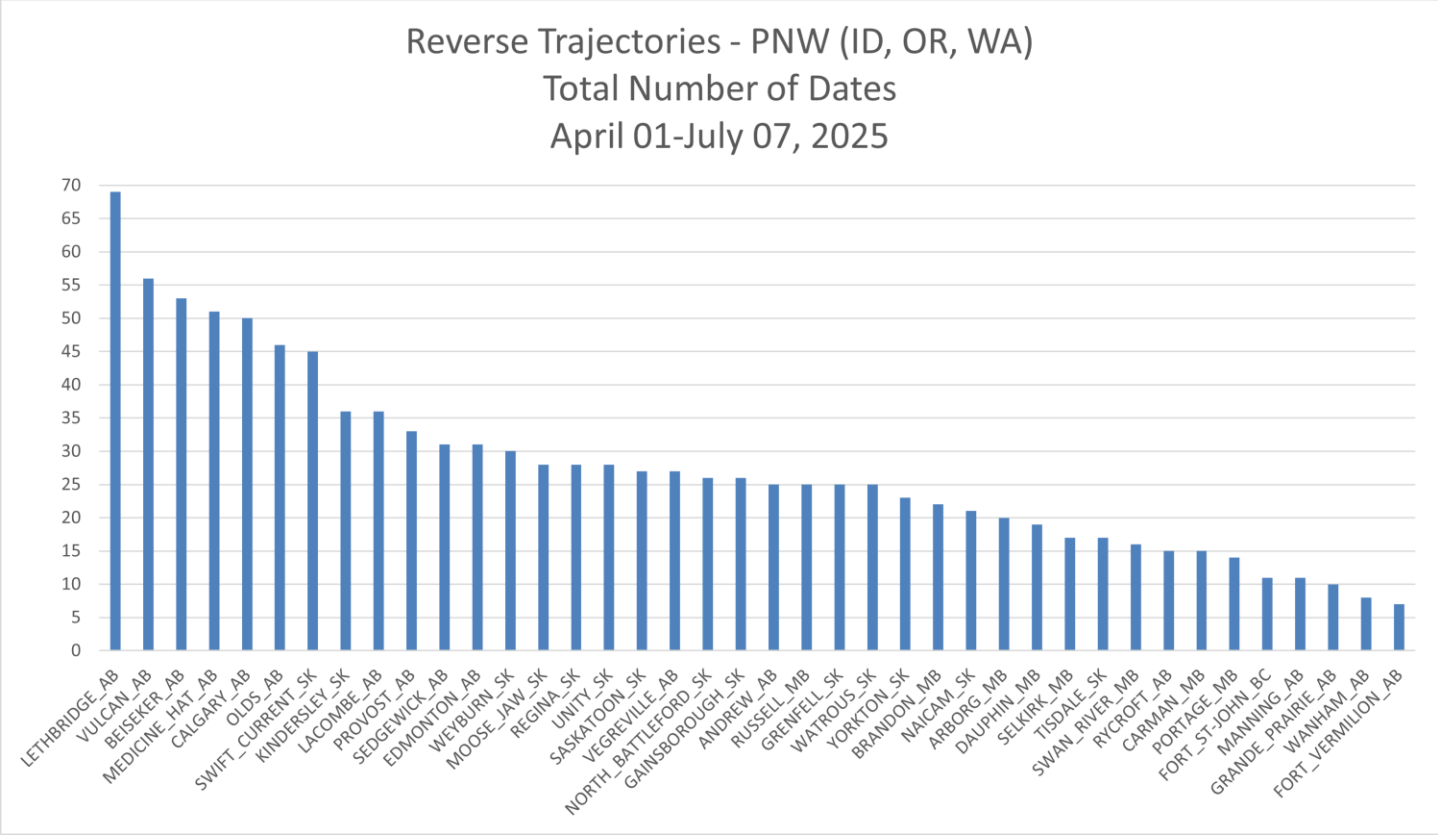


Figure 7. Reverse trajectory locations and number of events, for reverse trajectory events originating from the Pacific Northwest region of the USA, April 1 – July 7, 2025.

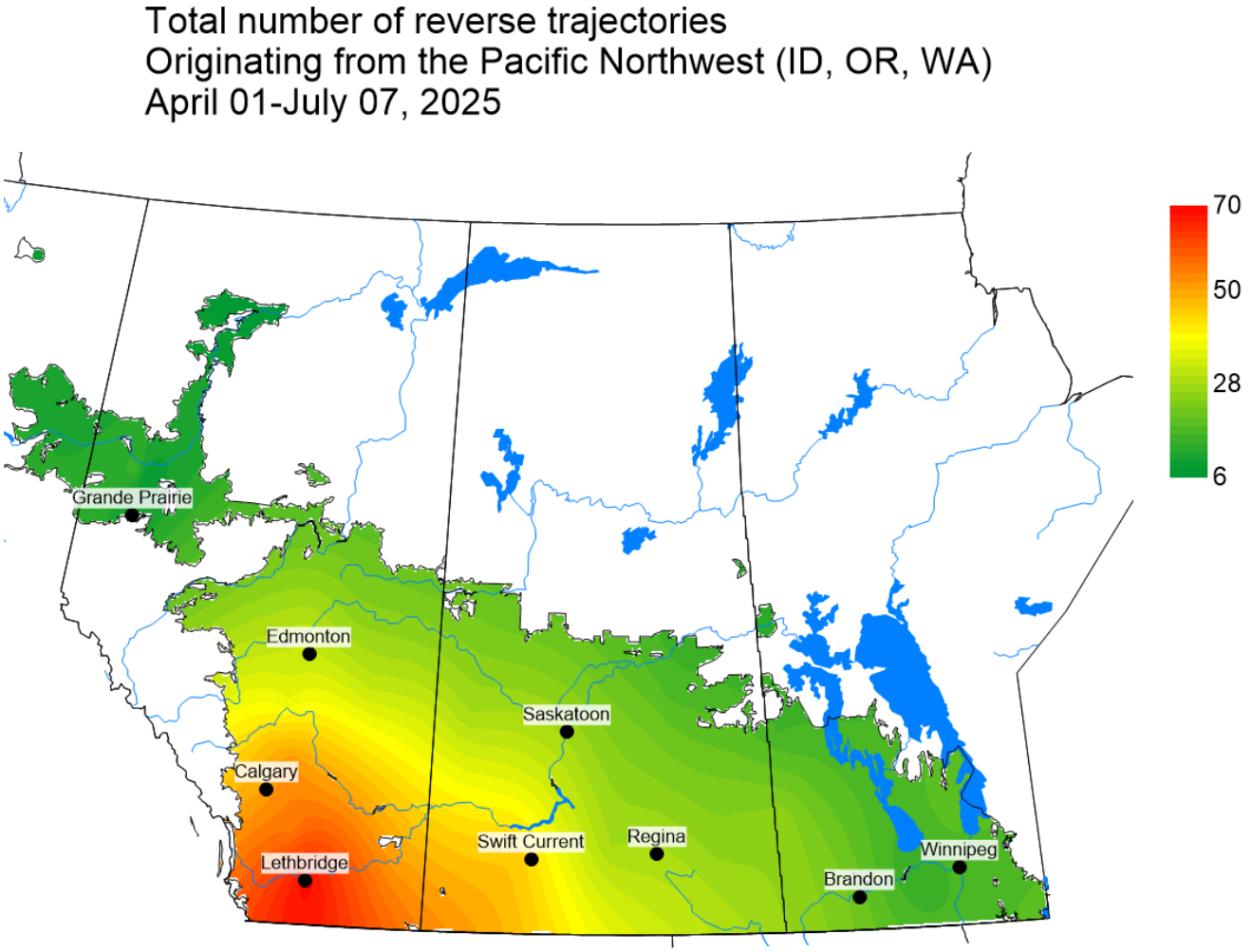


Figure 8. Total number of dates with reverse trajectories originating from the Pacific Northwest region of the USA that have crossed the Prairies between April 1 – July 7, 2025.

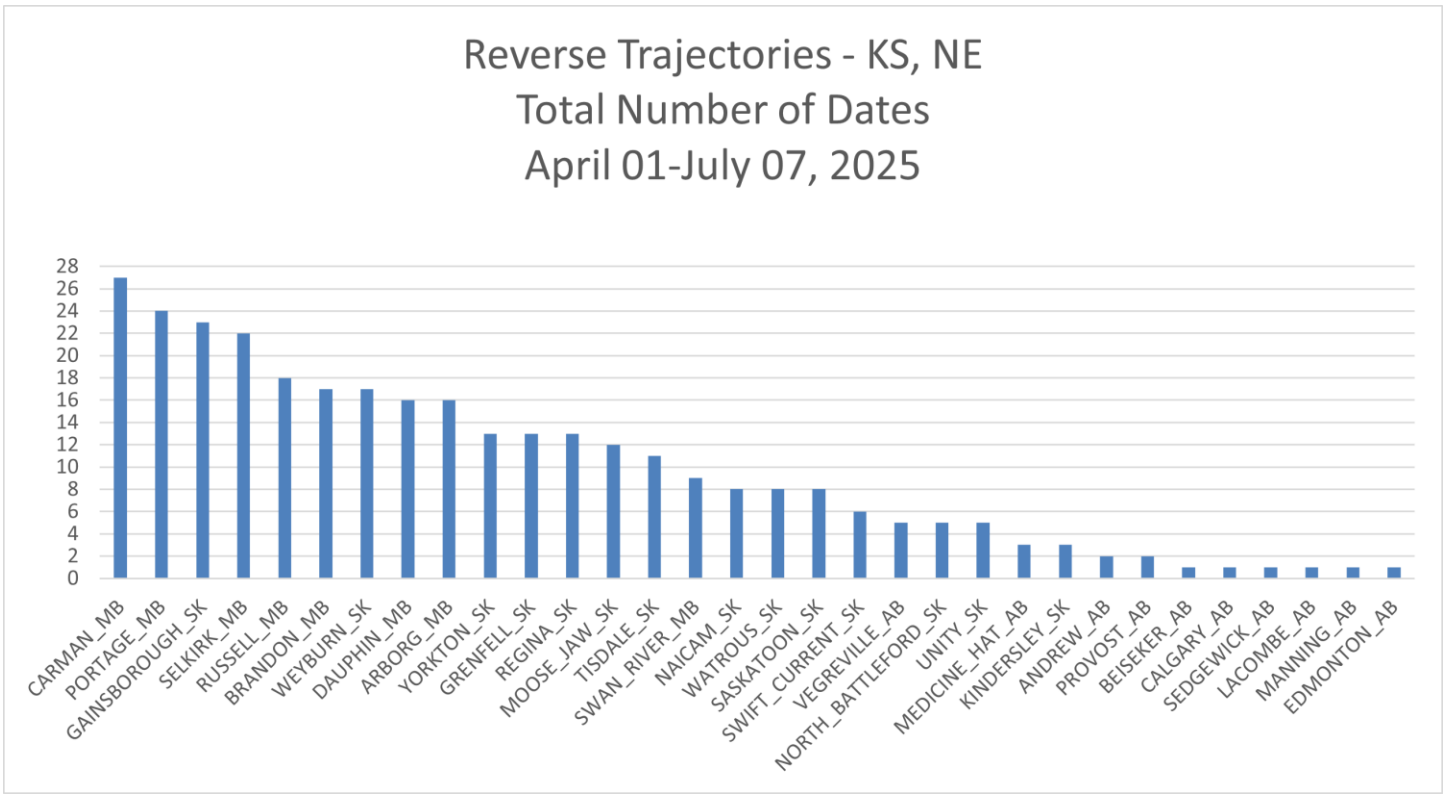


Figure 9. Reverse trajectory locations and number of events, for reverse trajectory events originating from Kansas and Nebraska, USA, April 1 – July 7, 2025.

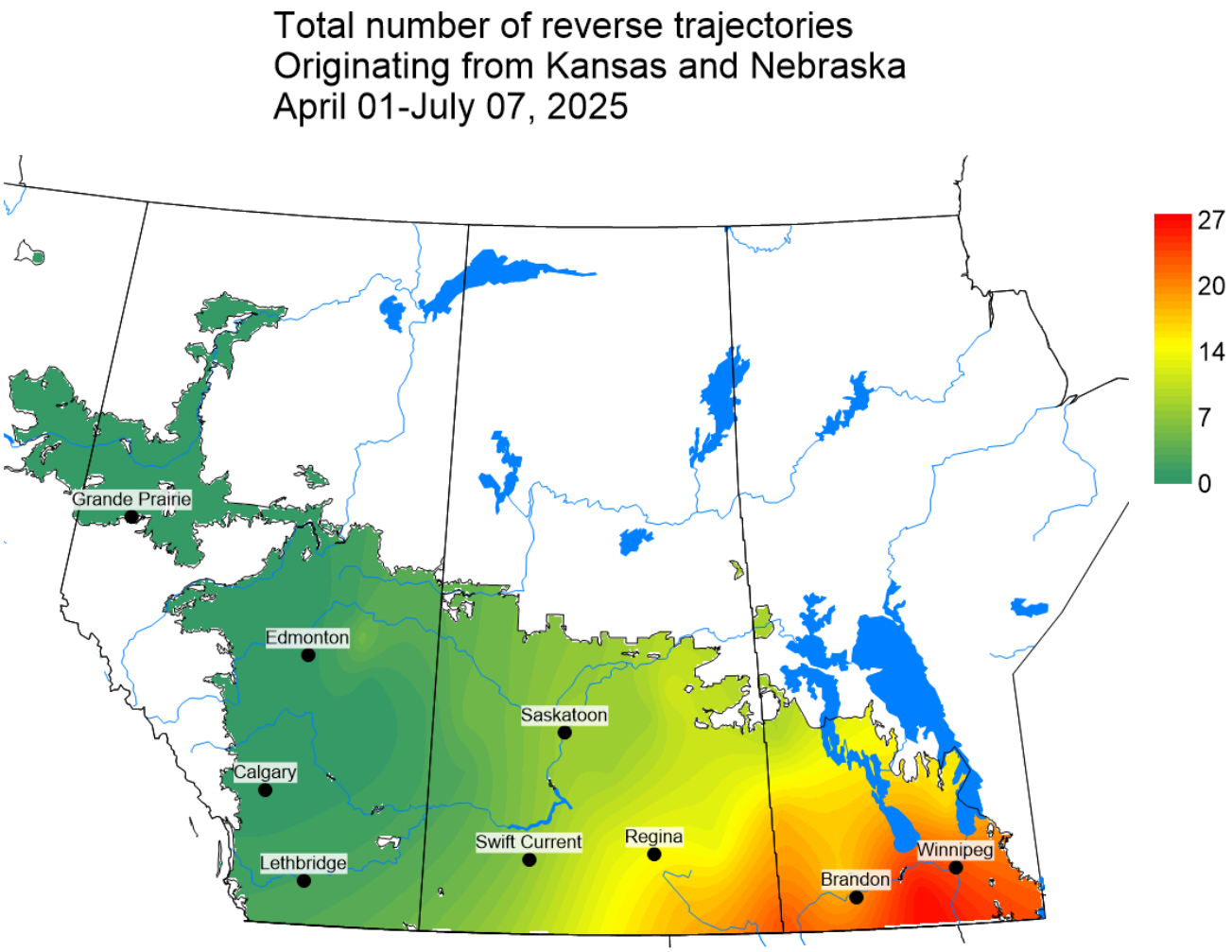


Figure 10. Total number of dates with reverse trajectories originating from Kansas and Nebraska, USA that have crossed the Prairies between April 1 – July 7, 2025.

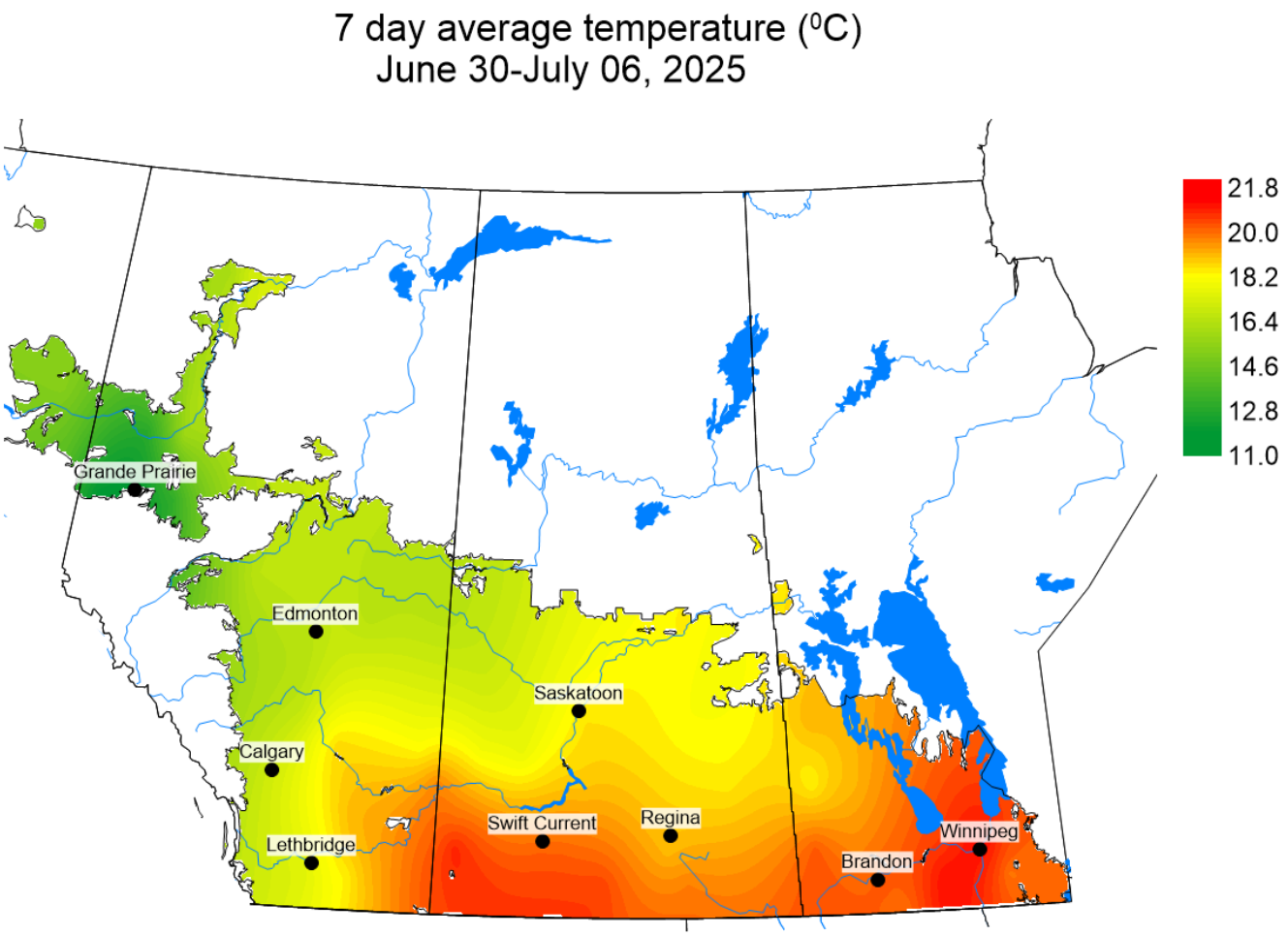


Figure 11. Seven day average temperature (°C), Prairie region, June 30-July 6, 2025.

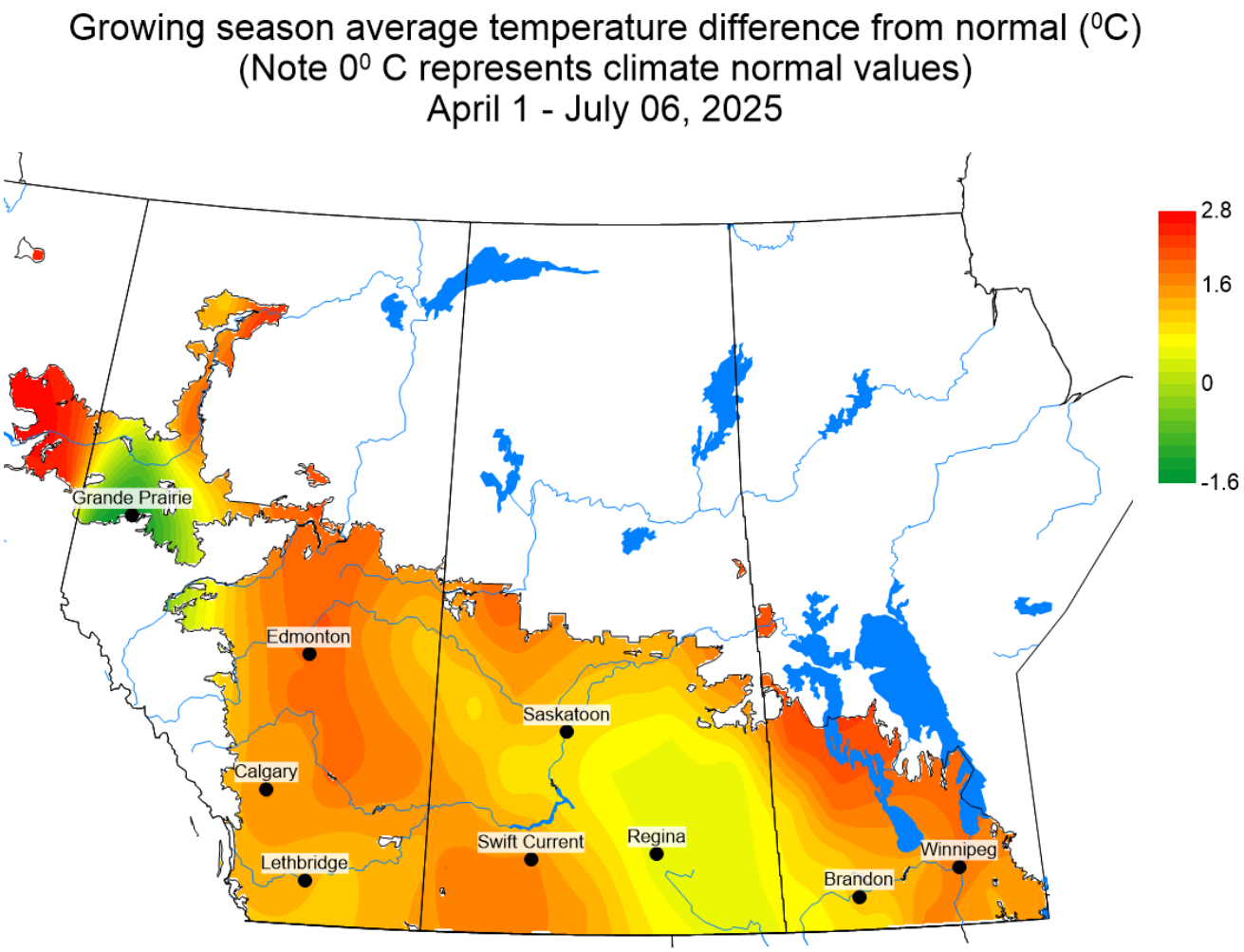


Figure 12. Growing season average temperature (°C) difference from normal, Prairie region, April 1 – July 6, 2025.

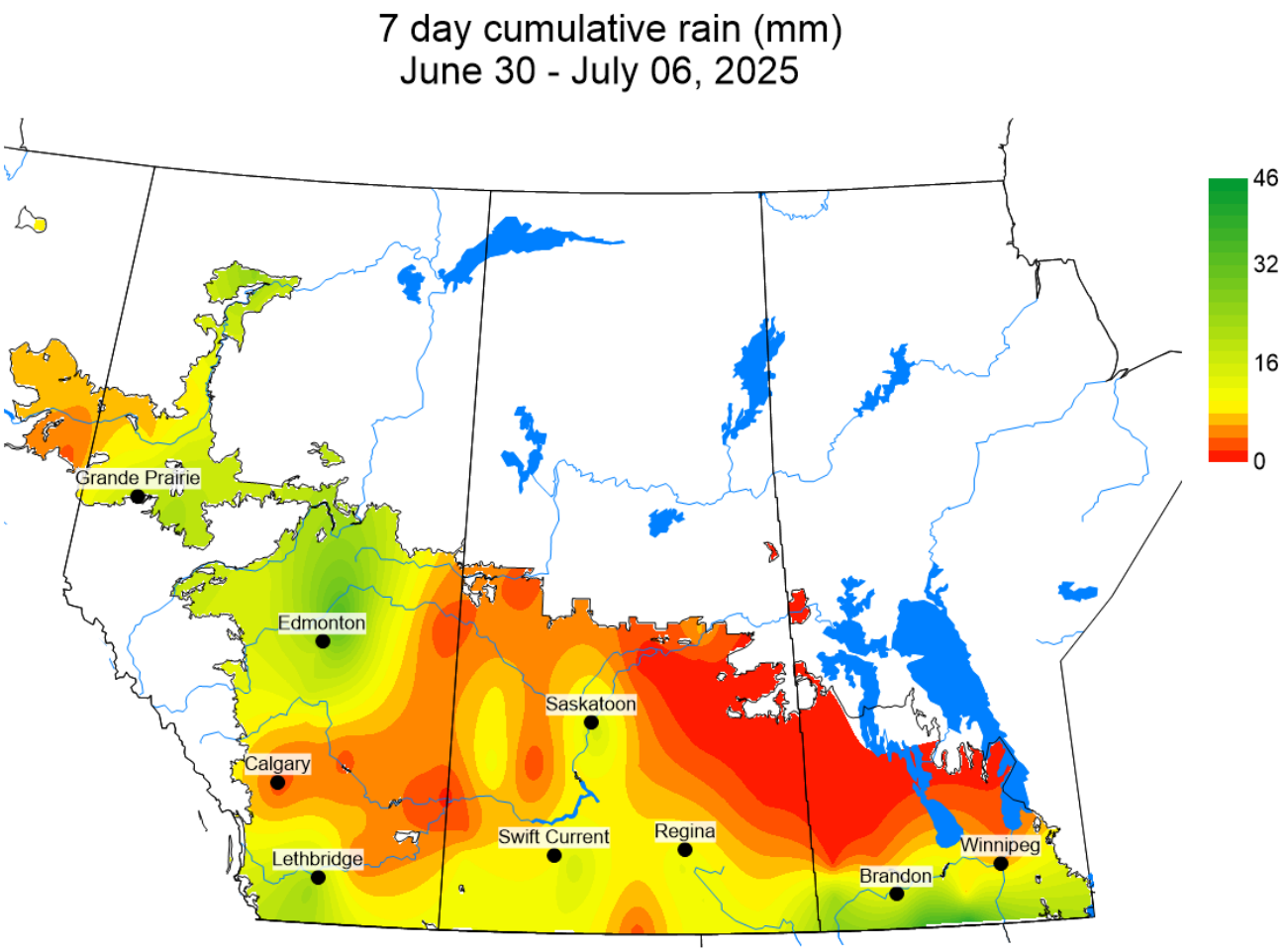


Figure 13. Seven day accumulated rainfall (mm), Prairie region June 30-July 6, 2025.

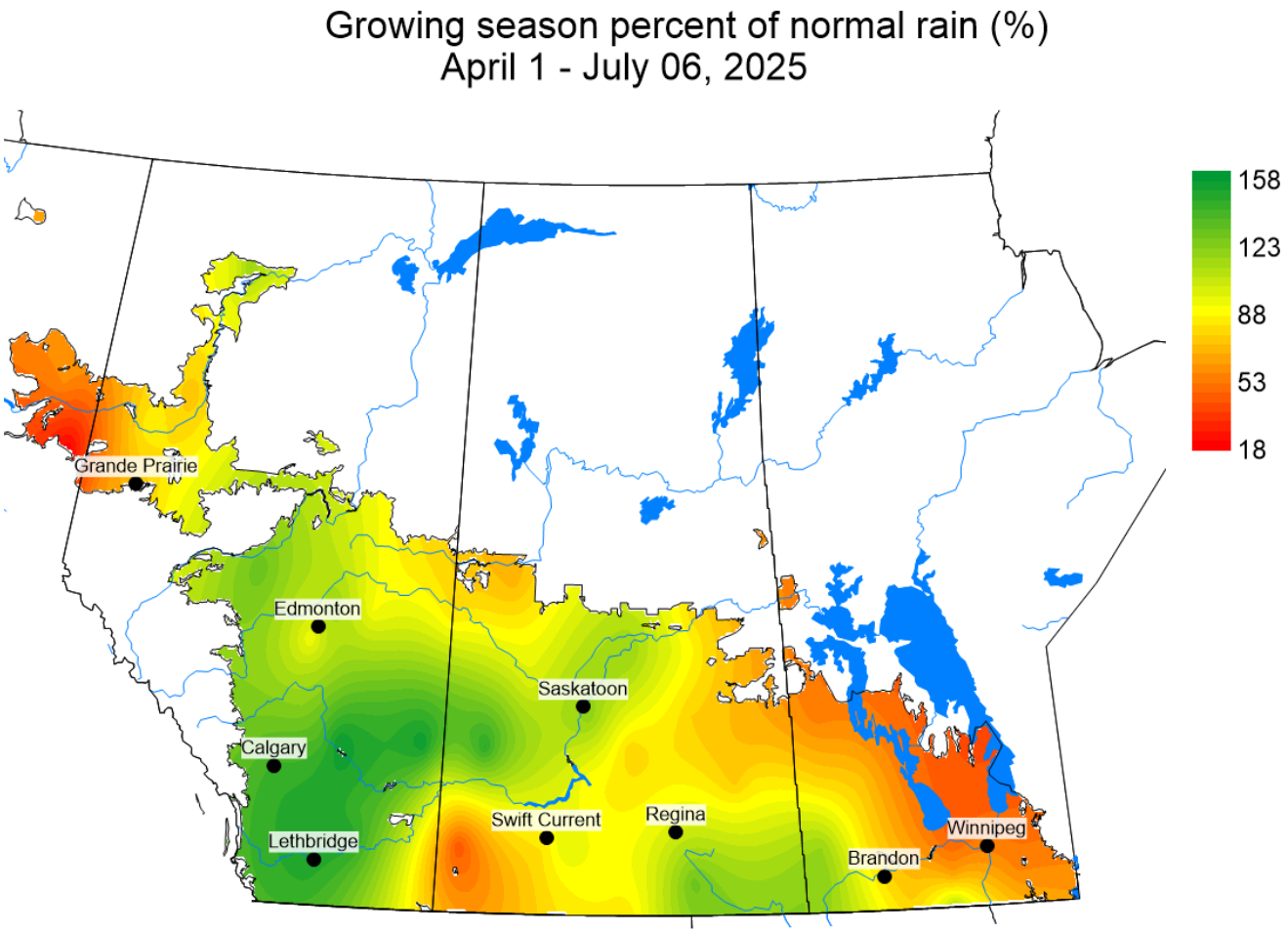


Figure 14. Growing season accumulated rainfall (mm) percent of normal, Prairie region April 1 – July 6, 2025.

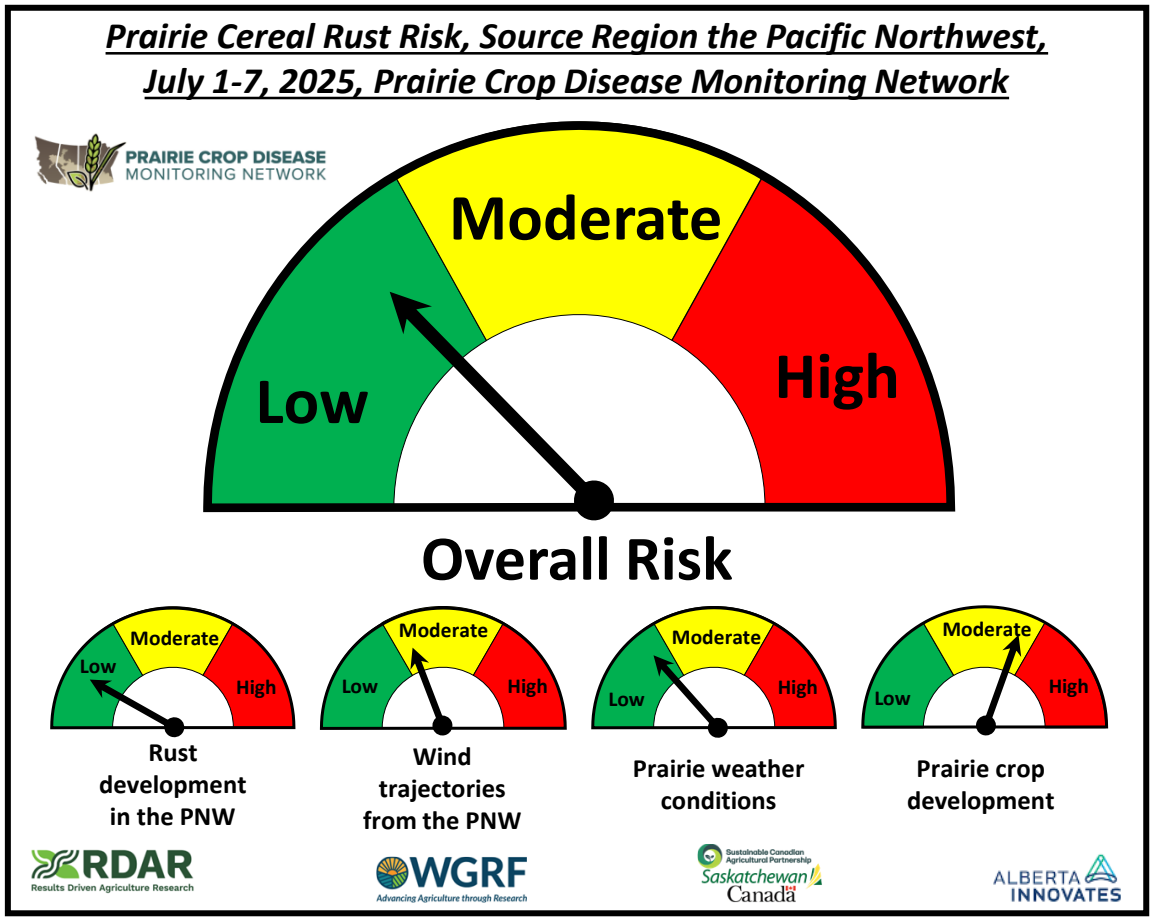


Figure 15. Prairie cereal risk speedometers for stripe rust from the Pacific Northwest, July 1-7, 2025.

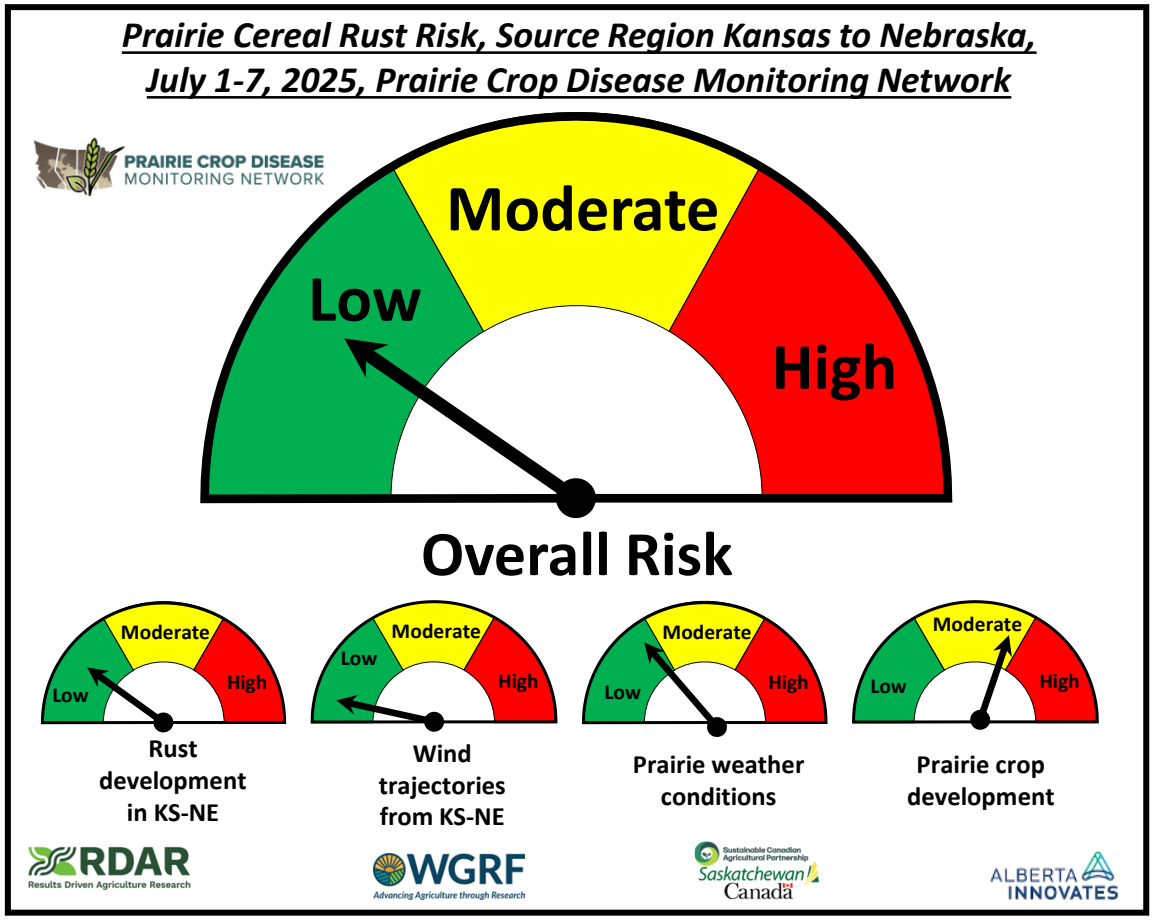


Figure. 16. Prairie cereal risk speedometers for stripe/leaf rust from the Kansas/Nebraska region, July 1-7, 2025.

Table 1. Reverse trajectory locations, arrival dates, and number of events, for reverse trajectory events originating from the Pacific Northwest region of the USA, July 01-07, 2025.

Location	Province	1-Jul-25	2-Jul-25	3-Jul-25	4-Jul-25	5-Jul-25	6-Jul-25	7-Jul-25	Total trajectories/ location
LETHBRIDGE	AB	1	1	1	1	1	1	1	**7**
MEDICINE HAT	AB	1	1	1	1	1	1	0	**6**
CALGARY	AB	0	1	1	0	1	1	0	**4**
SWIFT CURRENT	SK	0	0	1	1	0	1	1	**4**
VULCAN	AB	0	1	1	1	1	0	0	**4**
BEISEKER	AB	1	1	1	0	0	0	0	**3**
GRENFELL	SK	0	0	0	0	1	1	1	**3**
MOOSE JAW	SK	0	0	1	1	0	0	1	**3**
NORTH BATTLEFORD	SK	0	0	1	1	0	0	1	**3**
REGINA	SK	0	0	1	1	1	0	0	**3**
WEYBURN	SK	0	1	0	0	1	0	1	**3**
ANDREW	AB	0	1	1	0	0	0	0	**2**
CARMAN	MB	0	0	0	1	1	0	0	**2**
GAINSBOROUGH	SK	0	0	0	0	1	0	1	**2**
LACOMBE	AB	0	0	1	0	0	1	0	**2**
OLDS	AB	0	1	1	0	0	0	0	**2**
PORTAGE	MB	0	0	0	1	1	0	0	**2**
PROVOST	AB	0	0	1	1	0	0	0	**2**
RUSSELL	MB	0	0	0	0	1	0	1	**2**
UNITY	SK	0	0	1	1	0	0	0	**2**
WATROUS	SK	0	0	1	1	0	0	0	**2**
ARBORG	MB	0	0	0	0	1	0	0	**1**
BRANDON	MB	0	0	0	0	1	0	0	**1**
DAUPHIN	MB	0	0	0	0	1	0	0	**1**
EDMONTON	AB	0	0	1	0	0	0	0	**1**
KINDERSLEY	SK	0	0	0	1	0	0	0	**1**
NAICAM	SK	0	0	0	1	0	0	0	**1**
SASKATOON	SK	0	0	0	1	0	0	0	**1**
SEDGEWICK	AB	0	0	1	0	0	0	0	**1**
SELKIRK	MB	0	0	0	0	1	0	0	**1**
TISDALE	SK	0	0	0	1	0	0	0	**1**
Total trajectories per date		**3**	**8**	**17**	**16**	**15**	**6**	**8**	**73**

Table 2. Reverse trajectory locations, arrival dates, and number of events, for reverse trajectory events originating from Kansas and Nebraska, USA, July 01-07, 2025.

Location	Province	1-Jul-25	2-Jul-25	3-Jul-25	4-Jul-25	5-Jul-25	6-Jul-25	7-Jul-25	Total trajectories/ location
CARMAN	MB	0	0	0	1	1	0	0	**2**
PORTAGE	MB	0	0	0	1	1	0	0	**2**
ARBORG	MB	0	0	0	1	0	0	0	**1**
BRANDON	MB	0	0	0	1	0	0	0	**1**
DAUPHIN	MB	0	0	0	1	0	0	0	**1**
GAINSBOROUGH	SK	0	0	0	1	0	0	0	**1**
GRENFELL	SK	0	0	0	1	0	0	0	**1**
REGINA	SK	0	0	0	1	0	0	0	**1**
RUSSELL	MB	0	0	0	1	0	0	0	**1**
SELKIRK	MB	0	0	0	1	0	0	0	**1**
WEYBURN	SK	0	0	0	1	0	0	0	**1**
YORKTON	SK	0	0	0	1	0	0	0	**1**
Total trajectories per date		**0**	**0**	**0**	**12**	**2**	**0**	**0**	**14**

Table 3. Reverse trajectory locations, arrival dates, and number of events, for reverse trajectory events originating from Montana, USA, July 01-07, 2025.

Location	Province	1-Jul-25	2-Jul-25	3-Jul-25	4-Jul-25	5-Jul-25	6-Jul-25	7-Jul-25	Total trajectories/ location
GAINSBOROUGH	SK	0	1	1	1	1	1	1	**6**
MEDICINE HAT	AB	1	1	1	1	1	1	0	**6**
WEYBURN	SK	0	1	1	1	1	1	1	**6**
GRENFELL	SK	0	1	1	1	1	0	1	**5**
LETHBRIDGE	AB	1	1	1	1	0	1	0	**5**
MOOSE JAW	SK	0	1	1	1	0	1	1	**5**
REGINA	SK	0	1	1	1	0	1	1	**5**
SWIFT CURRENT	SK	0	1	1	1	0	1	0	**4**
VULCAN	AB	0	1	1	1	0	1	0	**4**
BRANDON	MB	0	1	0	1	0	0	1	**3**
KINDERSLEY	SK	0	1	1	0	0	0	1	**3**
PORTAGE	MB	0	0	0	1	1	0	1	**3**
RUSSELL	MB	0	0	0	1	1	0	1	**3**
SASKATOON	SK	0	0	1	1	0	0	1	**3**
WATROUS	SK	0	0	1	1	0	0	1	**3**
BEISEKER	AB	0	1	1	0	0	0	0	**2**
CARMAN	MB	0	0	0	1	1	0	0	**2**
DAUPHIN	MB	0	0	0	1	1	0	0	**2**
NAICAM	SK	0	0	0	1	0	0	1	**2**
NORTH BATTLEFORD	SK	0	0	1	0	0	0	1	**2**
SELKIRK	MB	0	0	0	1	1	0	0	**2**
UNITY	SK	0	0	1	1	0	0	0	**2**
YORKTON	SK	0	0	0	1	0	0	1	**2**
ANDREW	AB	0	0	1	0	0	0	0	**1**
ARBORG	MB	0	0	0	0	1	0	0	**1**
EDMONTON	AB	0	0	1	0	0	0	0	**1**
PROVOST	AB	0	0	1	0	0	0	0	**1**
SEDGEWICK	AB	0	0	1	0	0	0	0	**1**
SWAN RIVER	MB	0	0	0	1	0	0	0	**1**
TISDALE	SK	0	0	0	1	0	0	0	**1**
VEGREVILLE	AB	0	0	1	0	0	0	0	**1**
Total trajectories per date		**2**	**12**	**20**	**22**	**10**	**8**	**14**	**88**