

West Nile Virus and Degree Days Maps in Alberta in 2014

Special Thanks

Thank you to Agriculture and Agri-Food Canada for providing the Degree Day maps each week, and giving Alberta Health the permission to use them on our website.

What are cumulative degree days?

- **Degree Day** – a measurement of heat accumulation. 14.3 C is the threshold temperature below which West Nile virus development does not occur (when in mosquitoes).
- **Degree day calculation**
 - Degree Day = Mean temperature – Degree Day threshold
 - e.g., Degree Day = 19.3 – 14.3 = 5.0 Degree Days

Understanding Degree Day Maps

- During the season a running total of accumulated Degree Days is recorded. It is generally assumed that a total of 109 Degree Days above 14.3 C are required for 50% of mosquitoes to be able to transmit the **VIRUS**.(Reisen, 2006)
- The risk of transmission increases with increasing Degree Day accumulation.
 - Consistently warmer temperatures will significantly shorten virus development time thereby increasing the potential risk of WNV transmission – should the virus itself be present and other conditions prove to be favorable.
 - For example, at 18 C it takes around 30 days for *Culex tarsalis* to be able transmit the virus, whereas at 30 C it takes less than 1 week.

Understanding Degree Day Maps

- Degree Day calculations are collected from over 300 weather stations across the 3 prairie provinces and starting in late May to early June (depending on conditions) are used to produce a gradient map of the prairies for cumulative Degree Days.
- Seasonally the greatest accumulation of Degree Days typically occurs in southeast of Alberta.

West Nile Virus

Mosquitos vs Human Cases

- In past seasons, *C. tarsalis* activity in Alberta generally starts to be observed once the 150–200 Degree Day threshold has been met in the southeast (SE) of the province.
- As this threshold moves west and north increased *Culex* mosquito activity can be expected. Depending on the number of infected females that managed to over-winter, an increase in the proportion of *C. tarsalis* infected with WNV can occur as well. Activity will increase as more of the province reaches the 300+ Degree Day level, possibly resulting in human cases.

Alberta Results in 2014

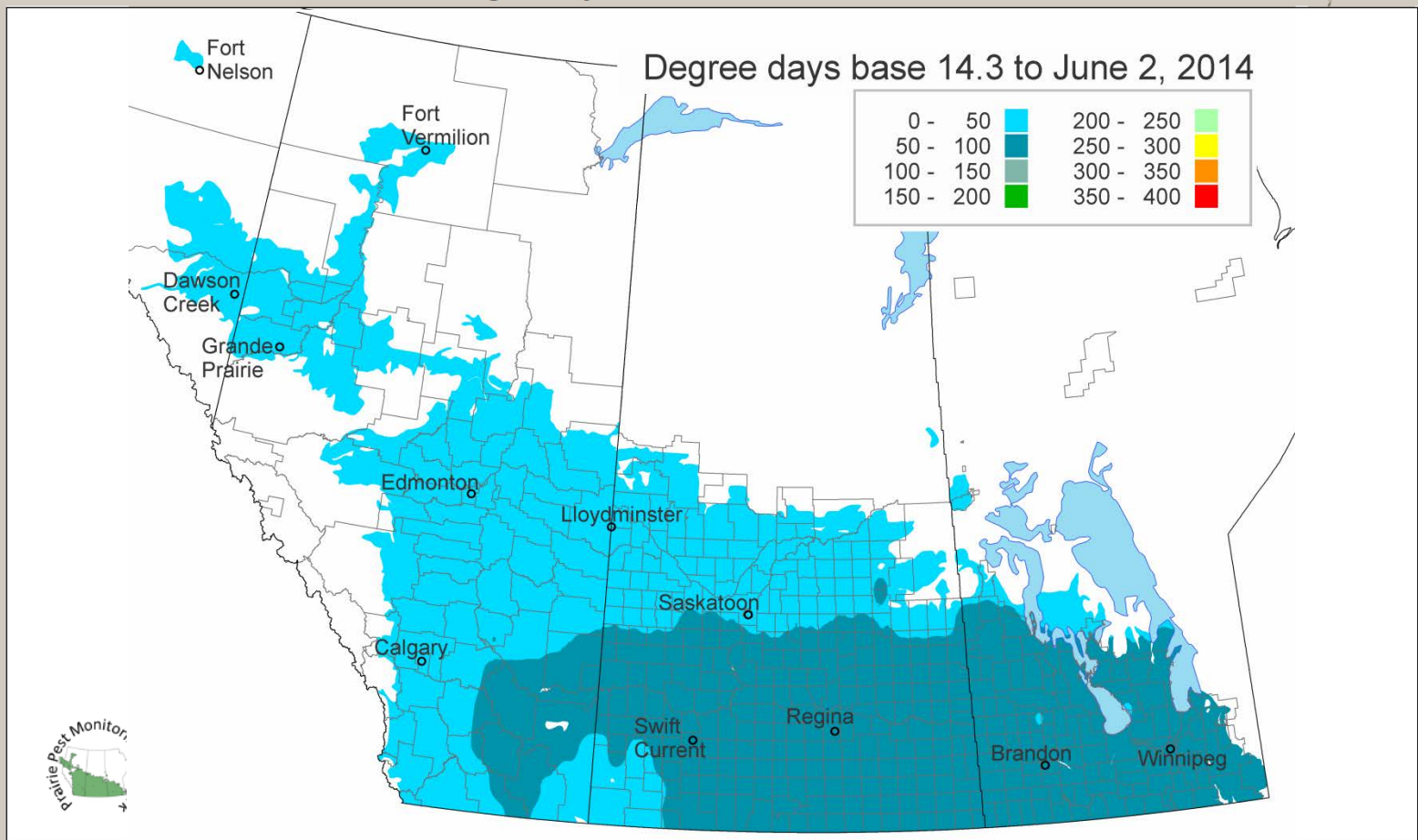
- **No human cases of West Nile Virus reported.**
- **6 confirmed positive cases in horses.⁽¹⁾**

(1) [www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/cpv12144](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/cpv12144)

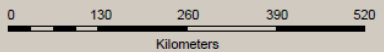
Culex tarsalis



Degree Day Accumulation for the Prairies



Supporting Partner



Disclaimer:
User assumes all responsibility for use, interpretation, and application of information contained on this map.

© 2014 Her Majesty the Queen in Right of Canada.
Agriculture and Agri-Food Canada

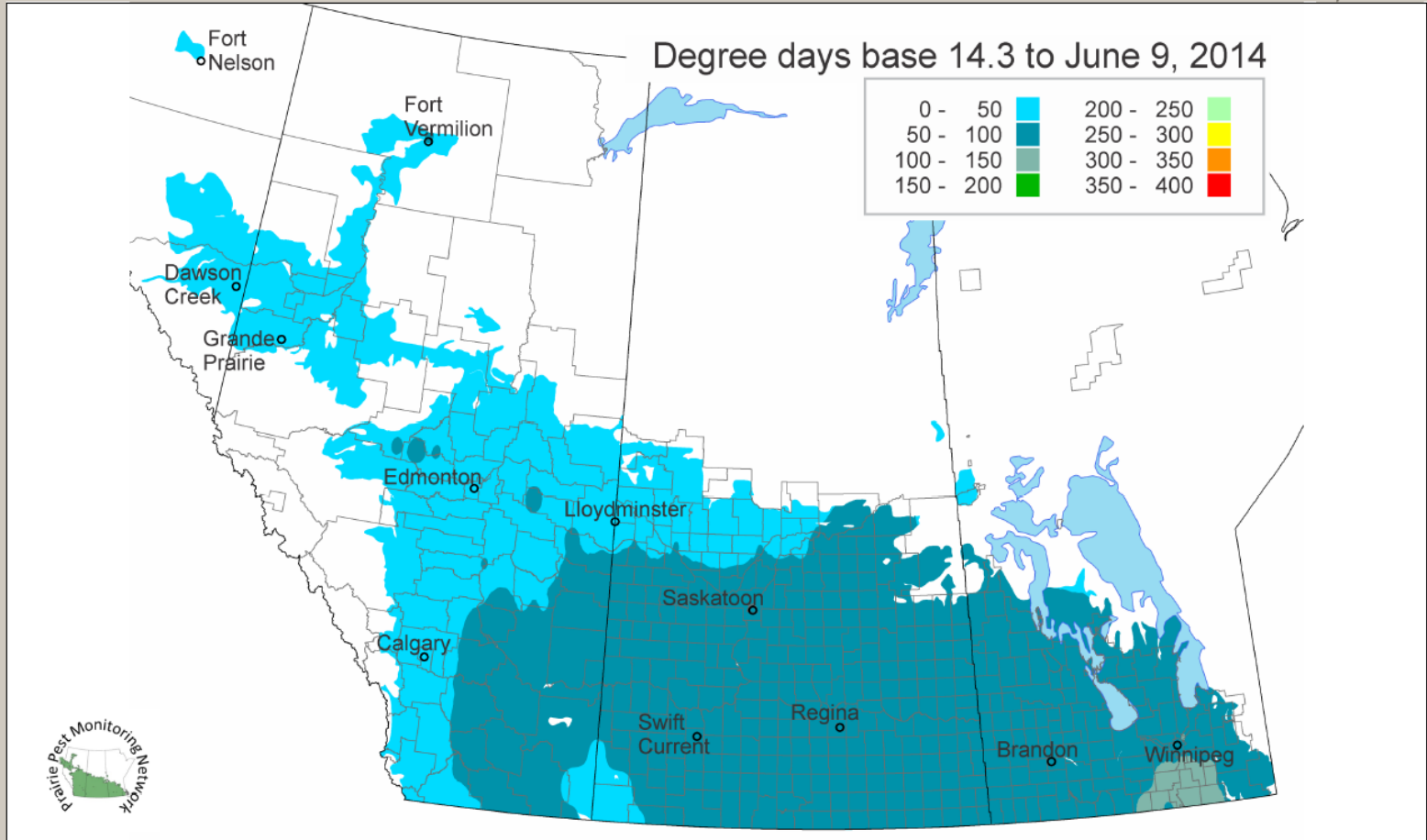
Produced by Agriculture and Agri-Food Canada
Science & Technology Branch



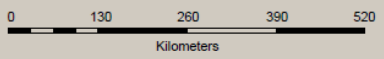
Culex tarsalis



Degree Day Accumulation for the Prairies



Supporting Partner



Disclaimer:
User assumes all responsibility for use, interpretation, and application of information contained on this map.

© 2014 Her Majesty the Queen in Right of Canada.
Agriculture and Agri-Food Canada

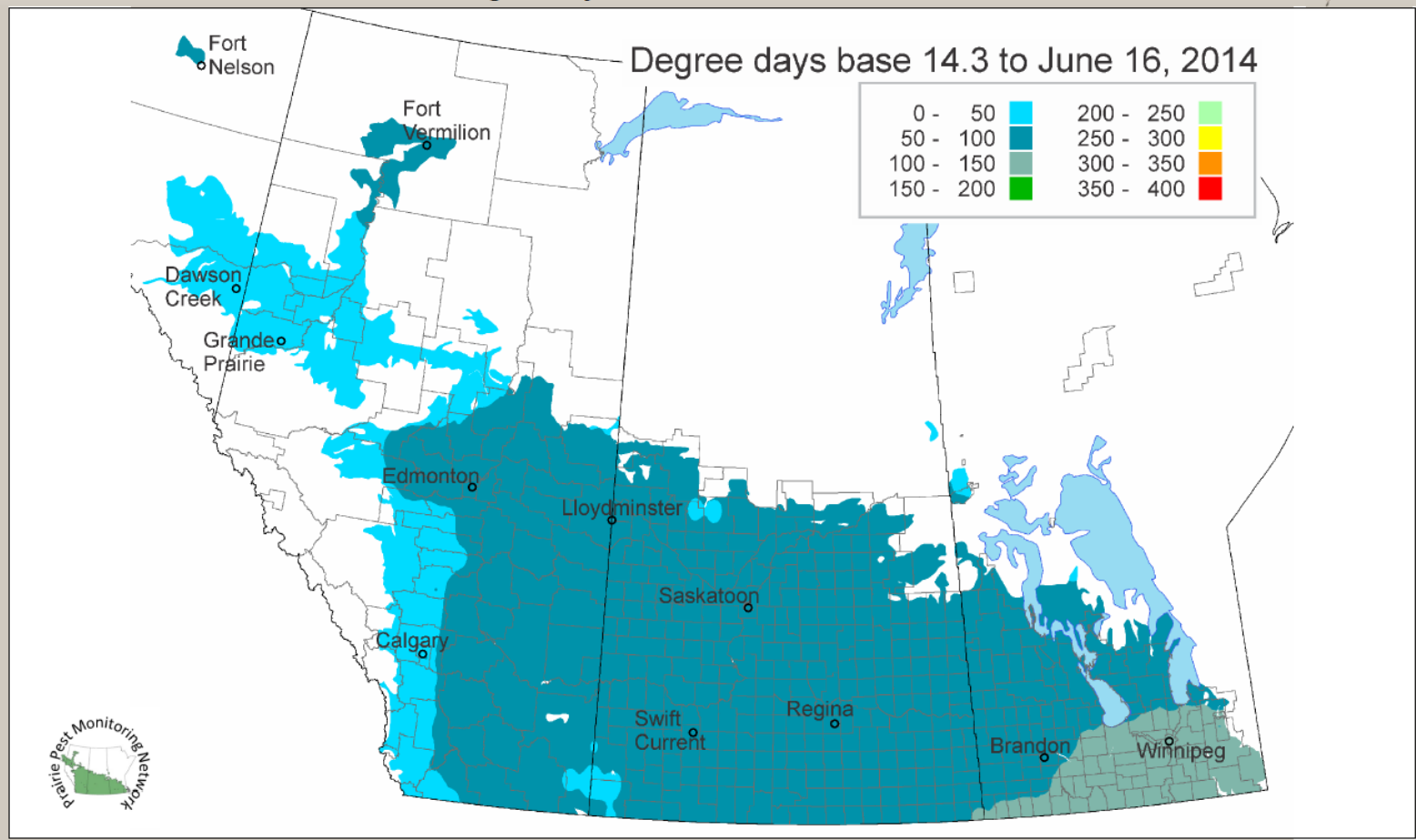
Produced by Agriculture and Agri-Food Canada
Science & Technology Branch



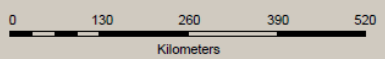
Culex tarsalis



Degree Day Accumulation for the Prairies



Supporting Partner



Disclaimer:
User assumes all responsibility for use, interpretation, and application of information contained on this map.

© 2014 Her Majesty the Queen in Right of Canada.
Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada
Science & Technology Branch **Canada**

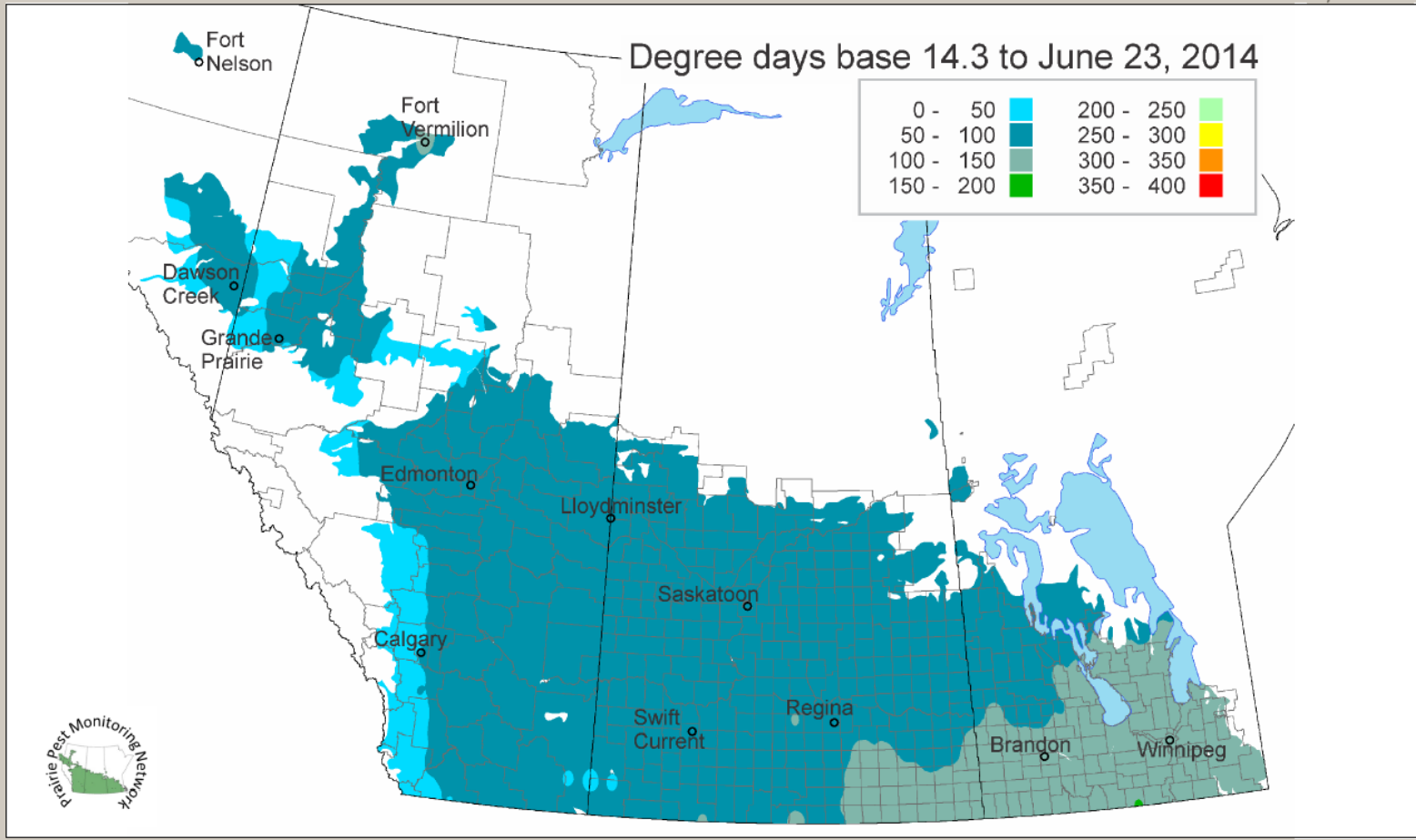


Culex tarsalis

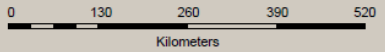
Degree Day Accumulation for the Prairies

Degree days base 14.3 to June 23, 2014

0 - 50	200 - 250
50 - 100	250 - 300
100 - 150	300 - 350
150 - 200	350 - 400

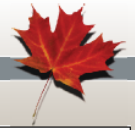


Supporting Partner



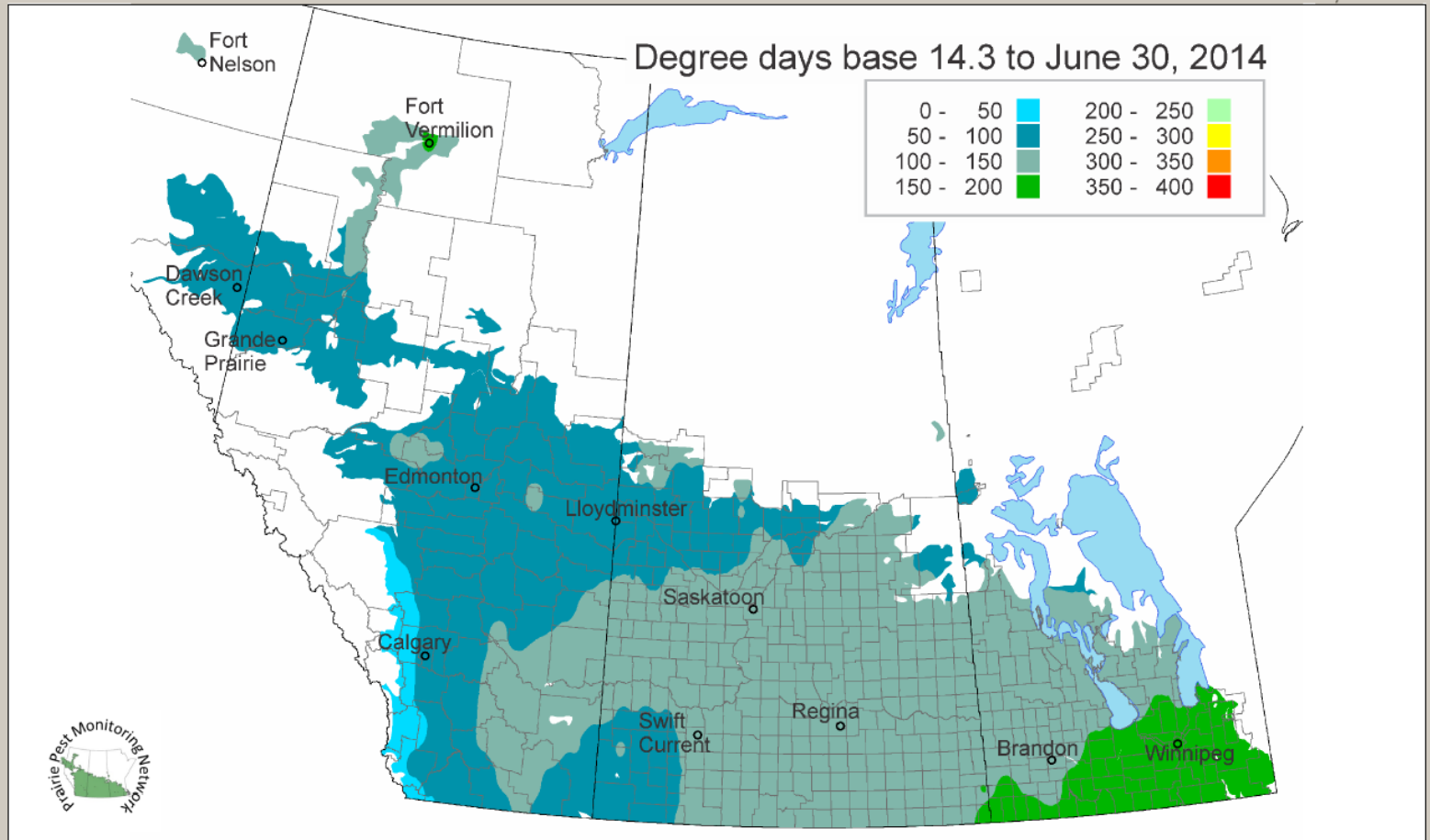
Disclaimer:
User assumes all responsibility for use, interpretation, and application of information contained on this map.

© 2014 Her Majesty the Queen in Right of Canada.
Agriculture and Agri-Food Canada



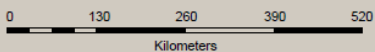
Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner

Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada



Disclaimer:
User assumes all responsibility for use, interpretation, and application of information contained on this map.

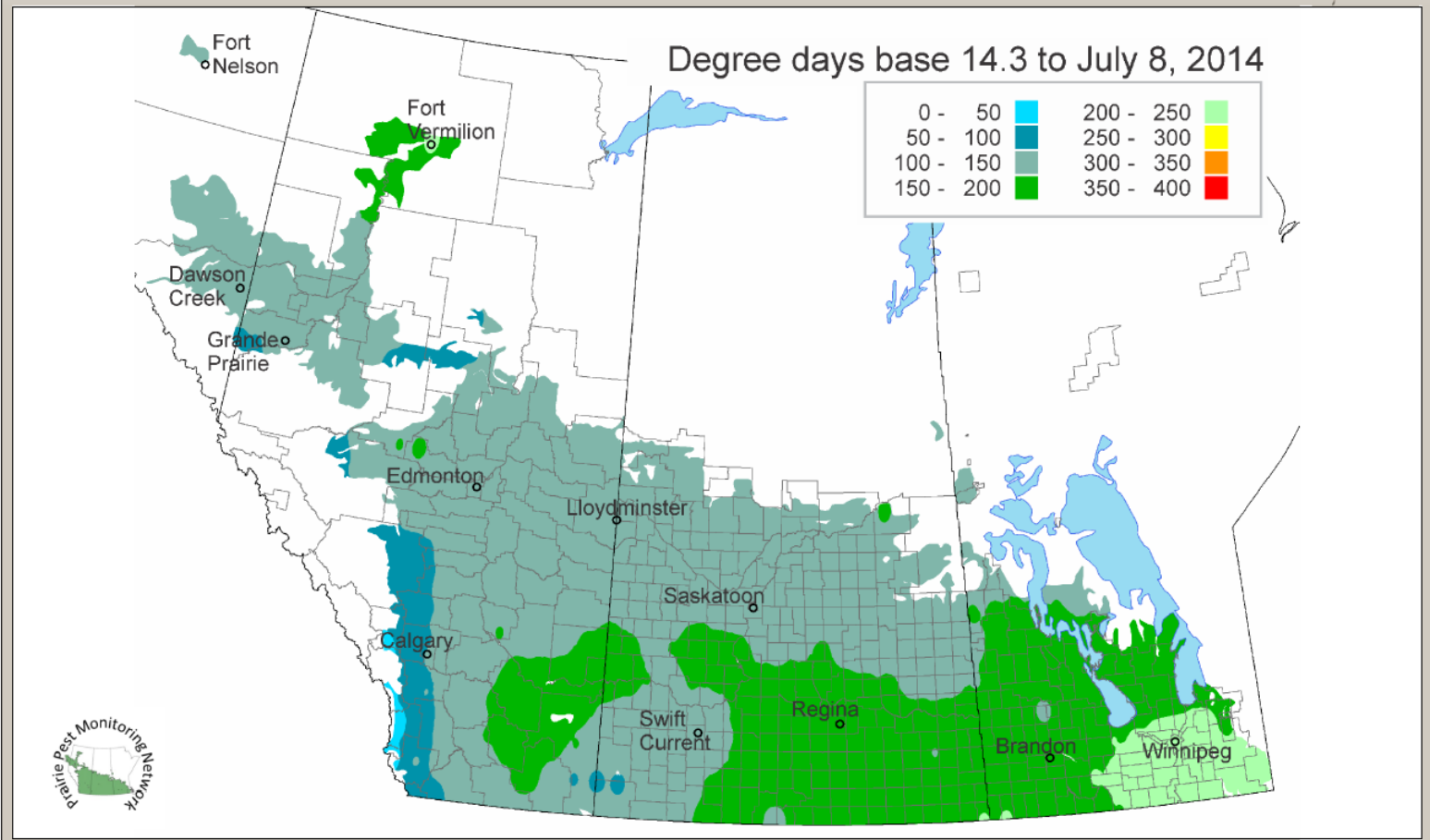
© 2014 Her Majesty the Queen in Right of Canada.
Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada
Science & Technology Branch

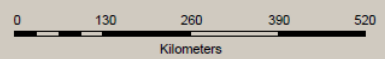


Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner
 Agriculture and Agri-Food Canada
 Agriculture et Agroalimentaire Canada



Disclaimer:
 User assumes all responsibility for use, interpretation, and application of information contained on this map.

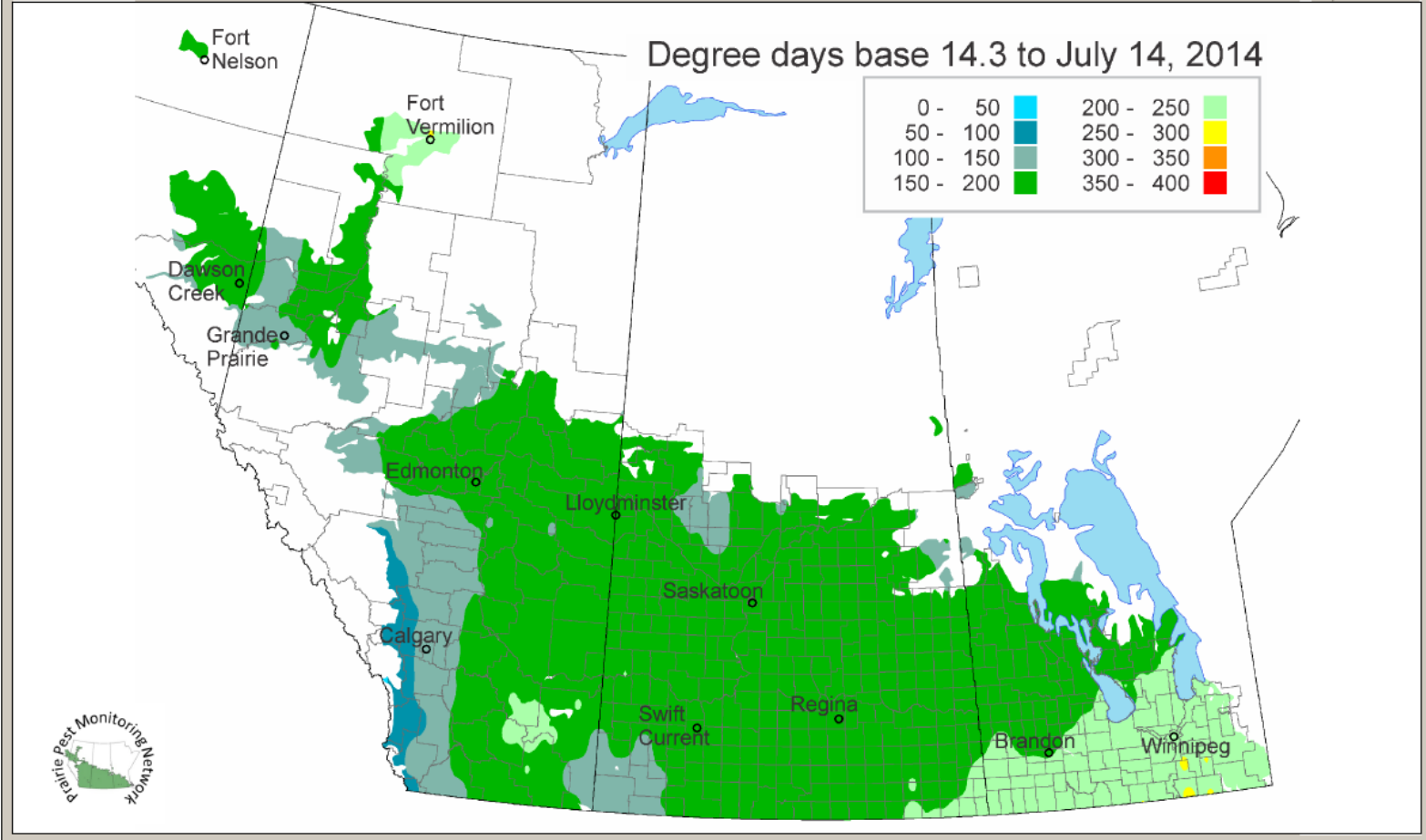
© 2014 Her Majesty the Queen in Right of Canada, Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada Science & Technology Branch

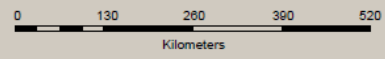


Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner



Disclaimer:
User assumes all responsibility for use, interpretation, and application of information contained on this map.

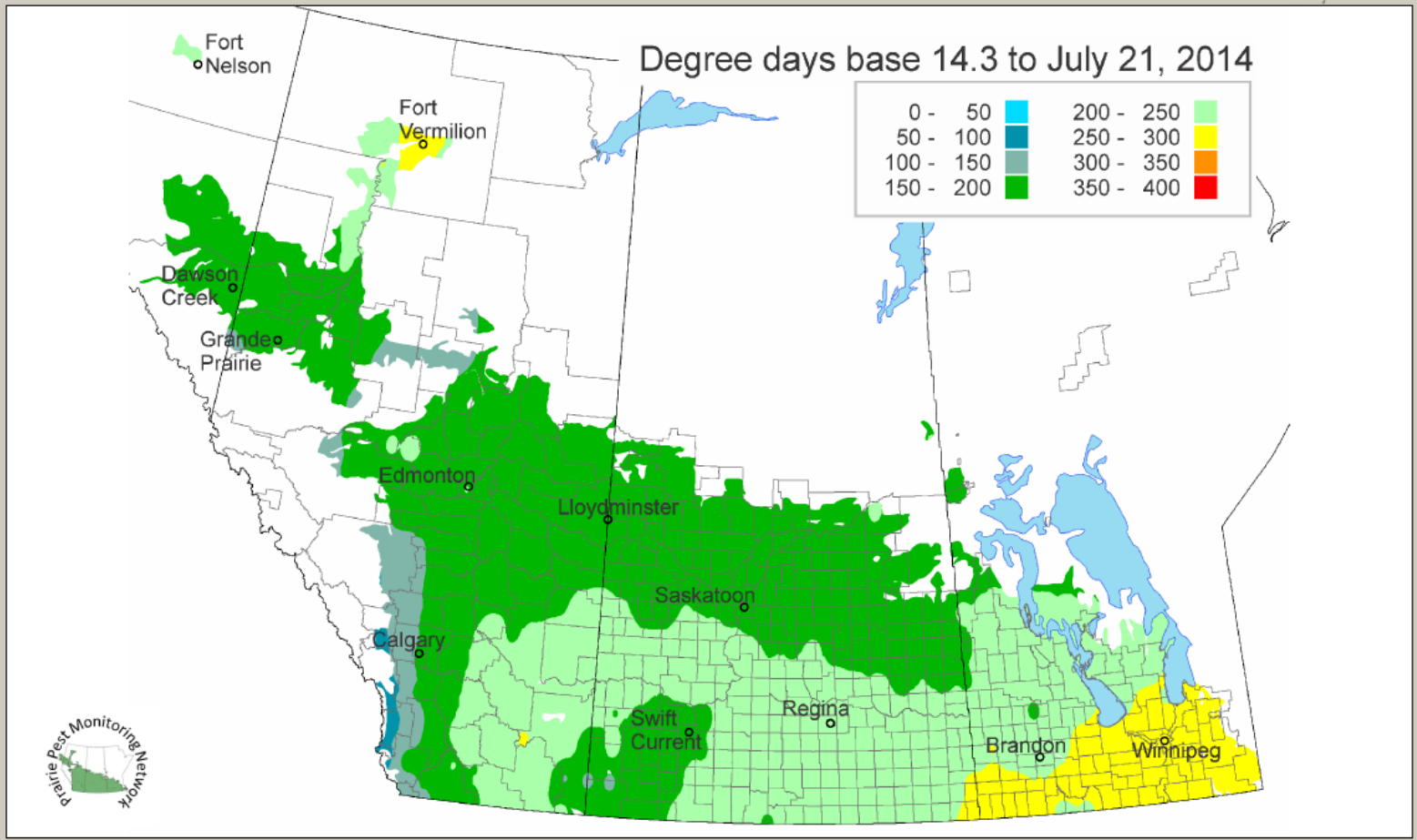
© 2014 Her Majesty the Queen in Right of Canada
Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada
Science & Technology Branch

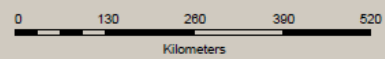
Culex tarsalis



Degree Day Accumulation for the Prairies



Supporting Partner
 Agriculture and Agri-Food Canada
 Agriculture et Agroalimentaire Canada



Disclaimer:
 User assumes all responsibility for use, interpretation, and application of information contained on this map.

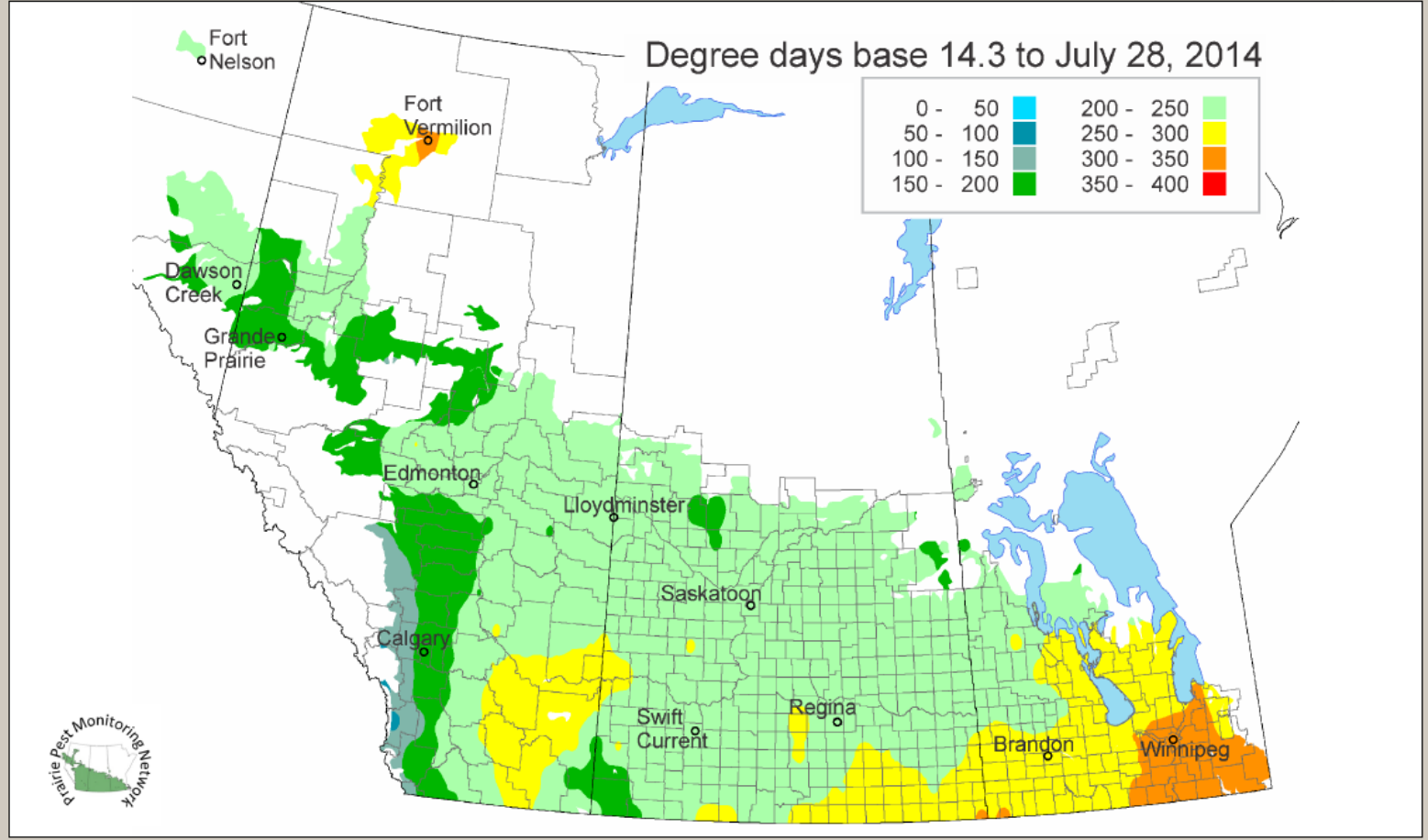
© 2014 Her Majesty the Queen in Right of Canada
 Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada
 Science & Technology Branch

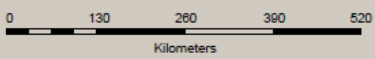
Culex tarsalis



Degree Day Accumulation for the Prairies



Supporting Partner
 Agriculture and Agri-Food Canada
 Agriculture et Agroalimentaire Canada



Disclaimer:
 User assumes all responsibility for use, interpretation, and application of information contained on this map.

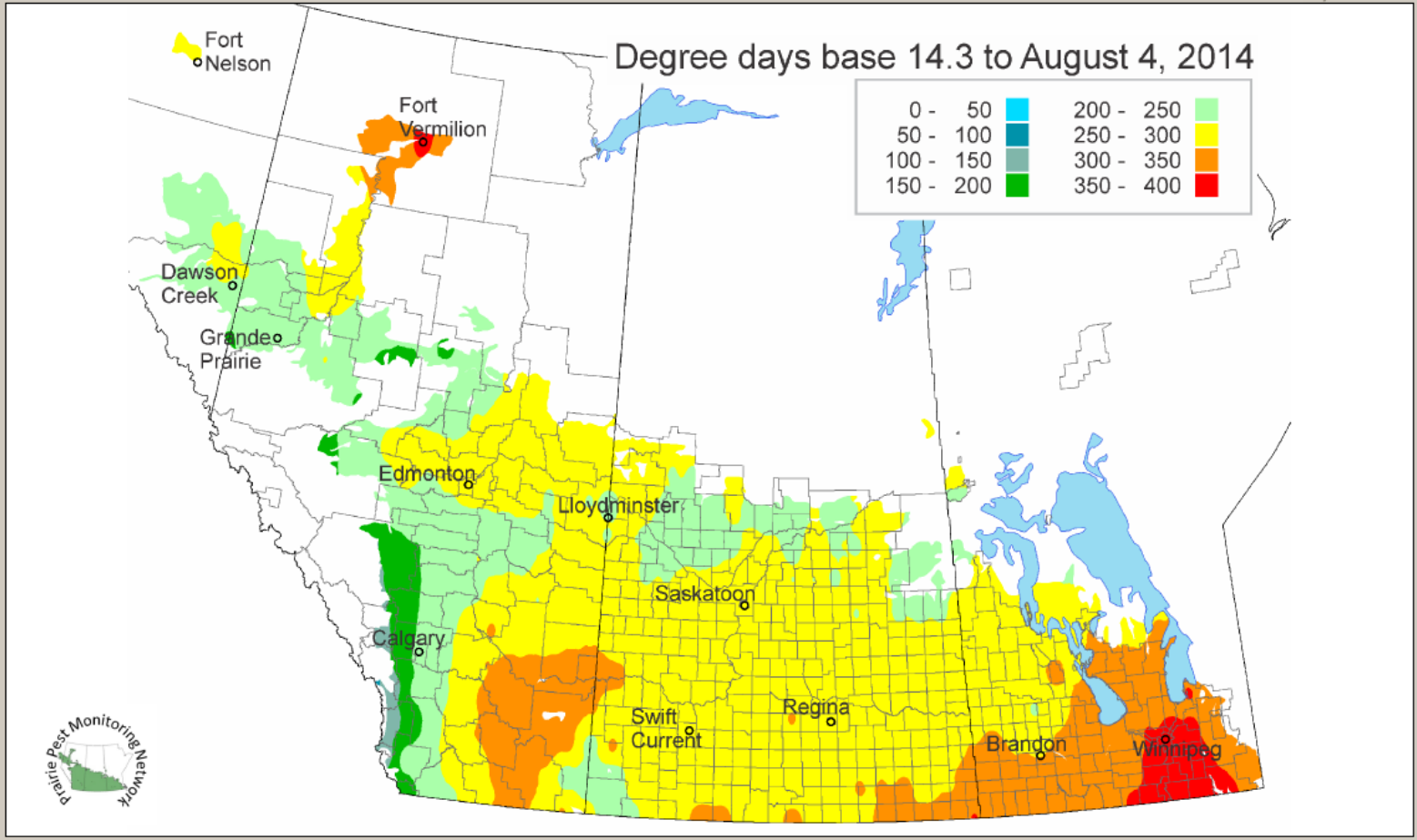
© 2014 Her Majesty the Queen in Right of Canada
 Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada
 Science & Technology Branch

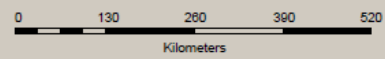


Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner
 Agriculture and Agri-Food Canada
 Agriculture et Agroalimentaire Canada



Disclaimer:
 User assumes all responsibility for use, interpretation, and application of information contained on this map.

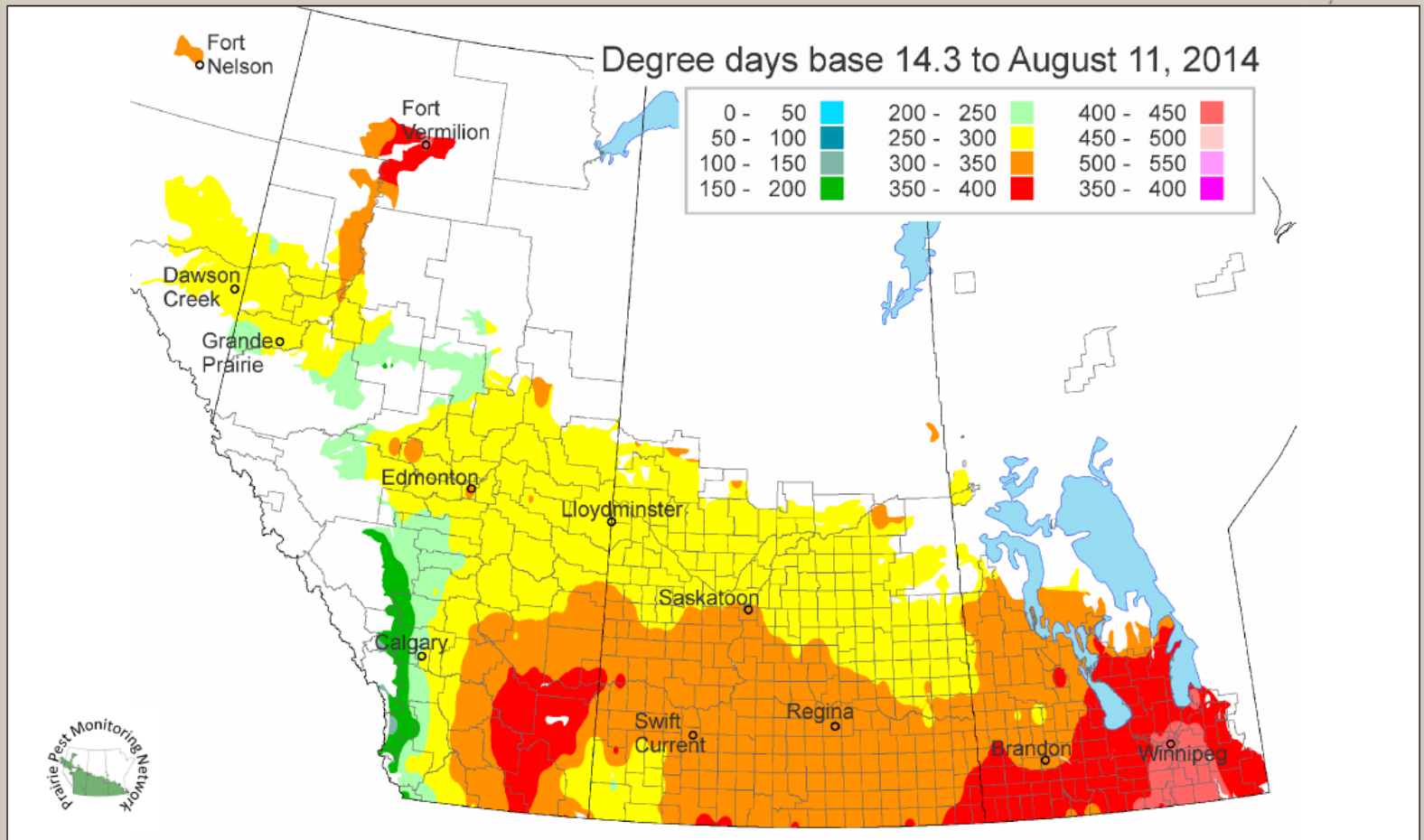
© 2014 Her Majesty the Queen in Right of Canada
 Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada
 Science & Technology Branch



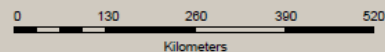
Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner

Agriculture and Agri-Food Canada Agriculture et Agroalimentaire Canada



Disclaimer:
User assumes all responsibility for use, interpretation, and application of information contained on this map.

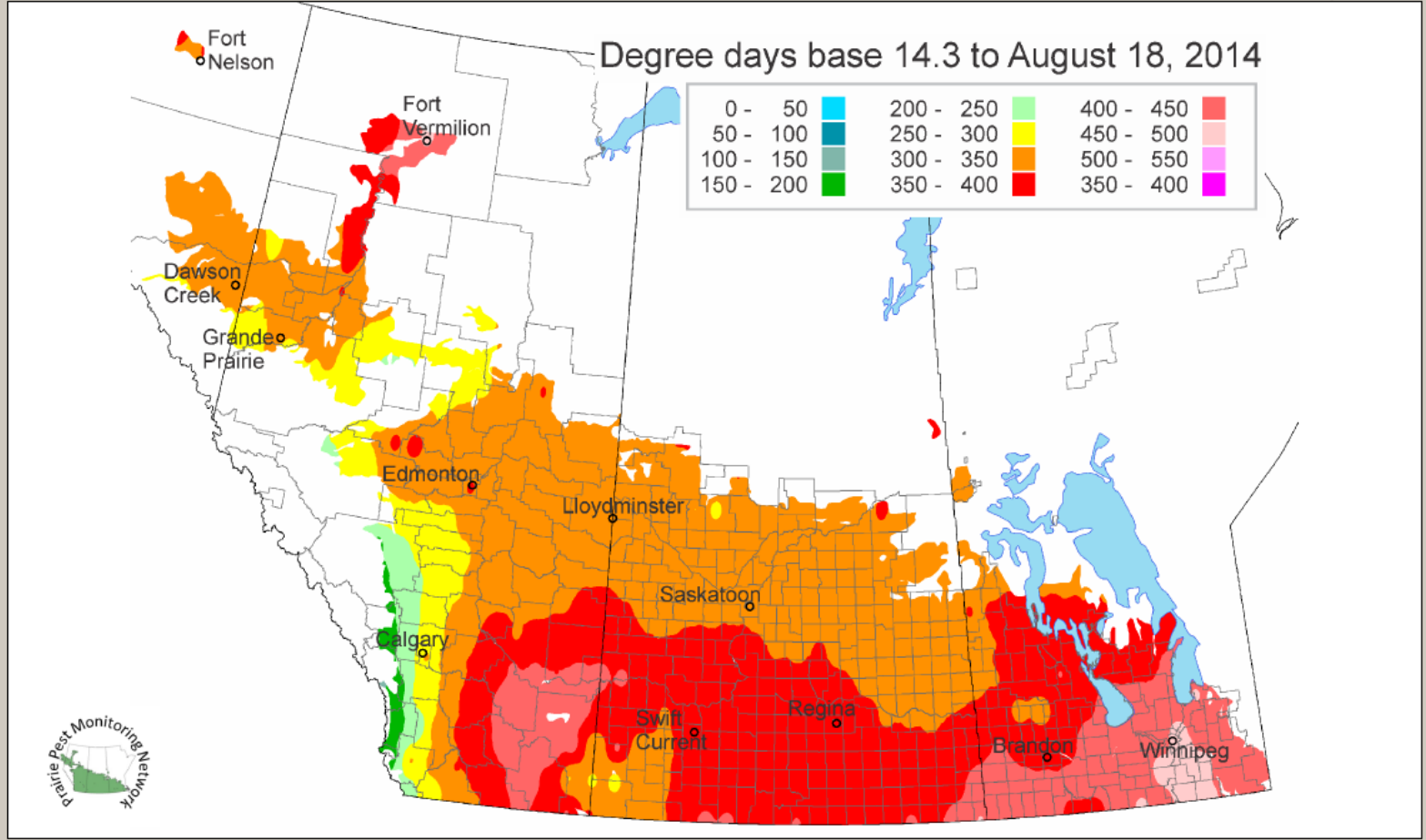
© 2014 Her Majesty the Queen in Right of Canada
Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada
Science & Technology Branch

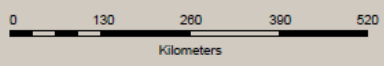


Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner
 Agriculture and Agri-Food Canada
 Agriculture et Agroalimentaire Canada



Disclaimer:
 User assumes all responsibility for use, interpretation, and application of information contained on this map.

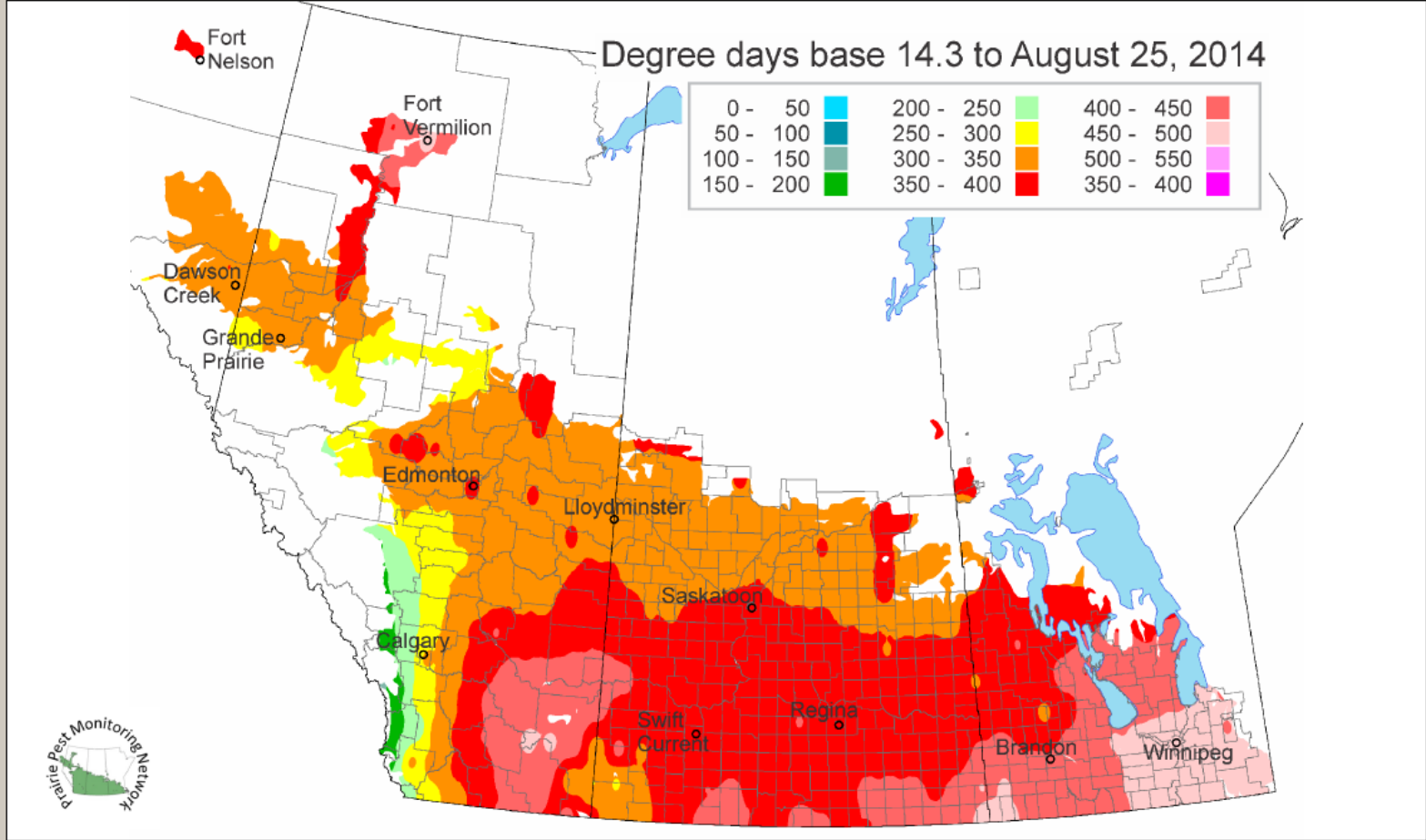
© 2014 Her Majesty the Queen in Right of Canada, Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada Science & Technology Branch

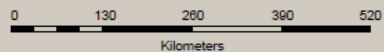


Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner



Disclaimer:
User assumes all responsibility for use, interpretation, and application of information contained on this map.

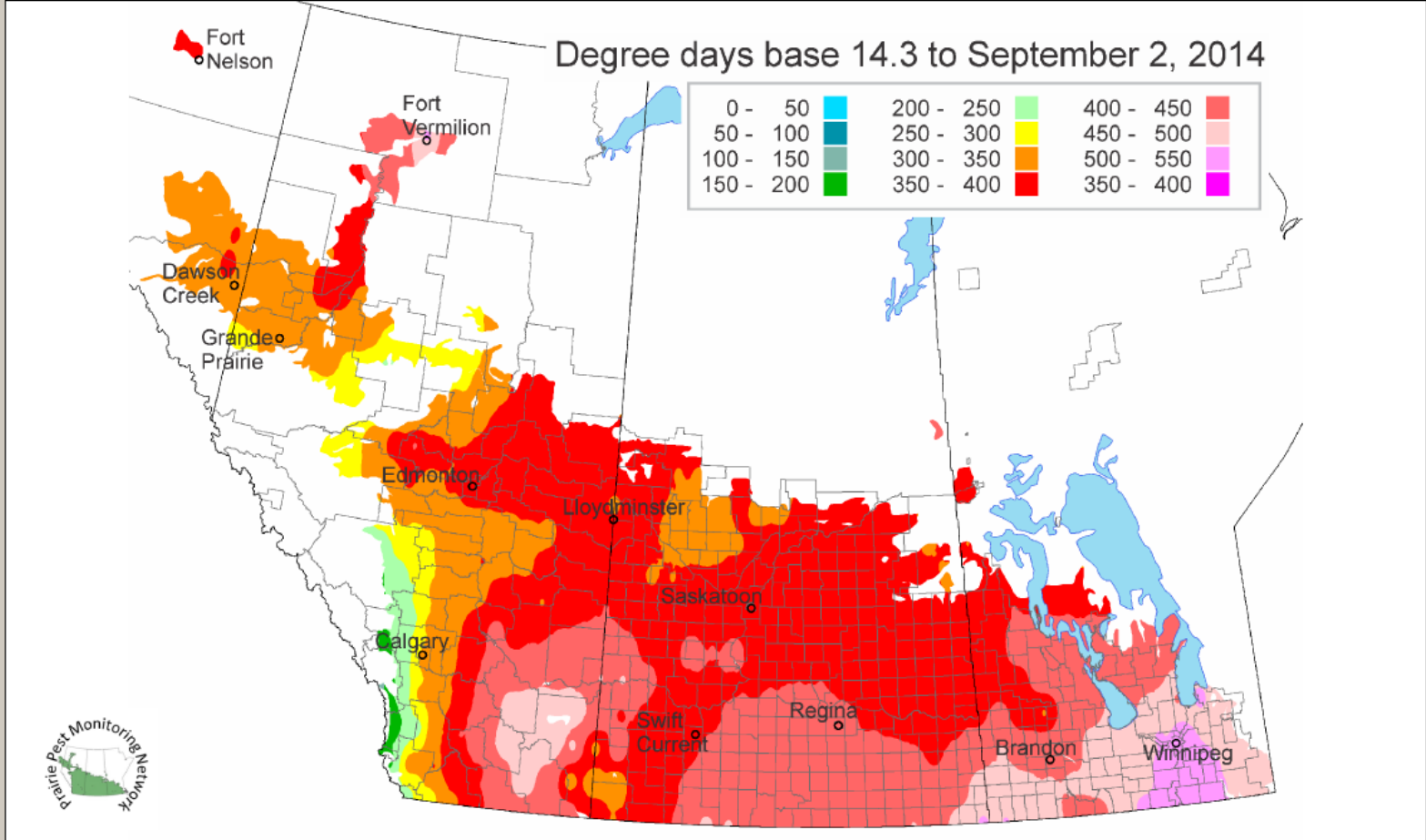
© 2014 Her Majesty the Queen in Right of Canada, Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada Science & Technology Branch

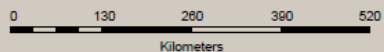


Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner



Disclaimer:
User assumes all responsibility for use, interpretation, and application of information contained on this map.

© 2014 Her Majesty the Queen in Right of Canada
Agriculture and Agri-Food Canada

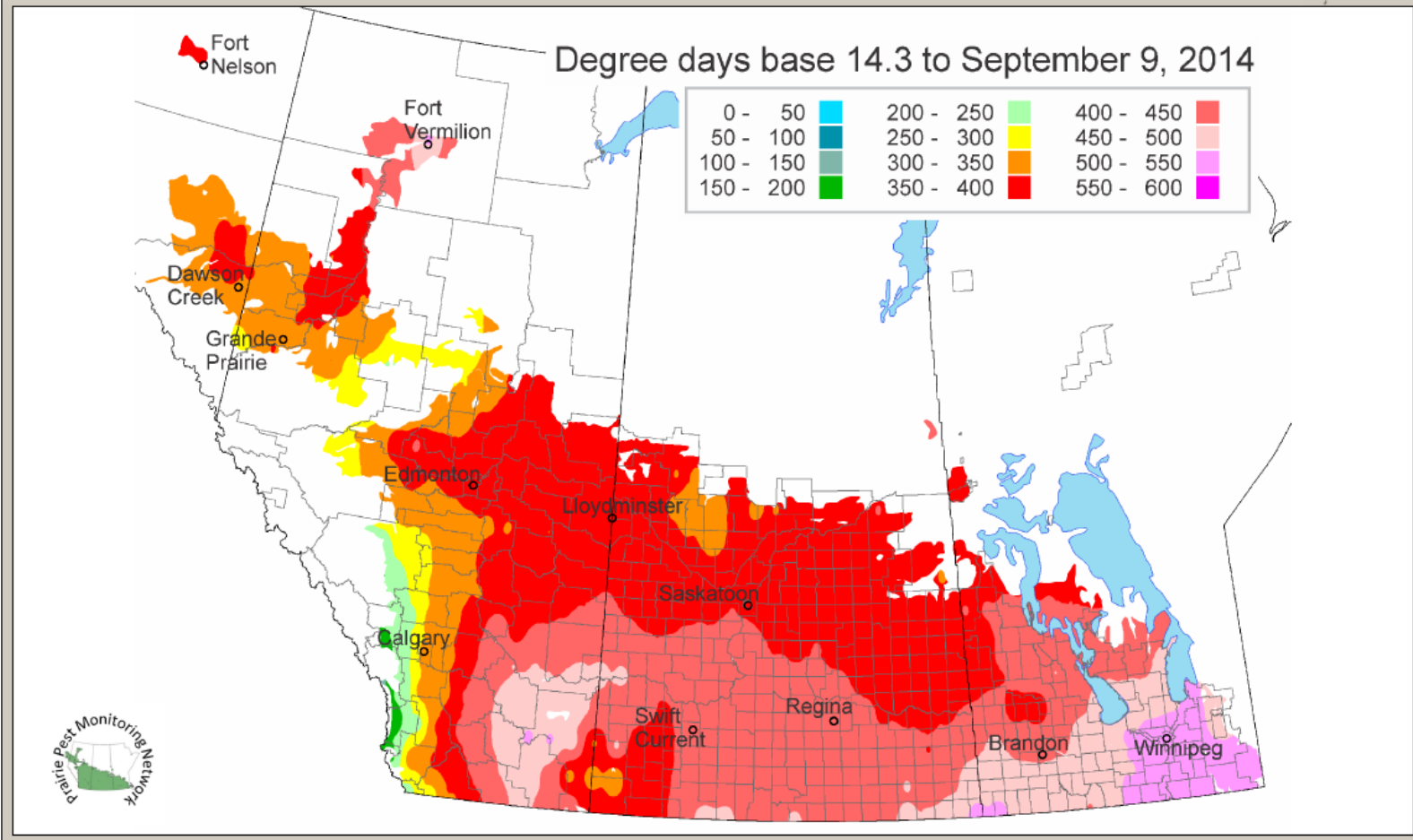
Produced by Agriculture and Agri-Food Canada
Science & Technology Branch



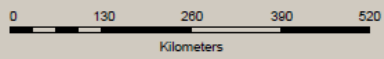


Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner



Disclaimer: User assumes all responsibility for use, interpretation, and application of information contained on this map.

© 2014 Her Majesty the Queen in Right of Canada
Agriculture and Agri-Food Canada

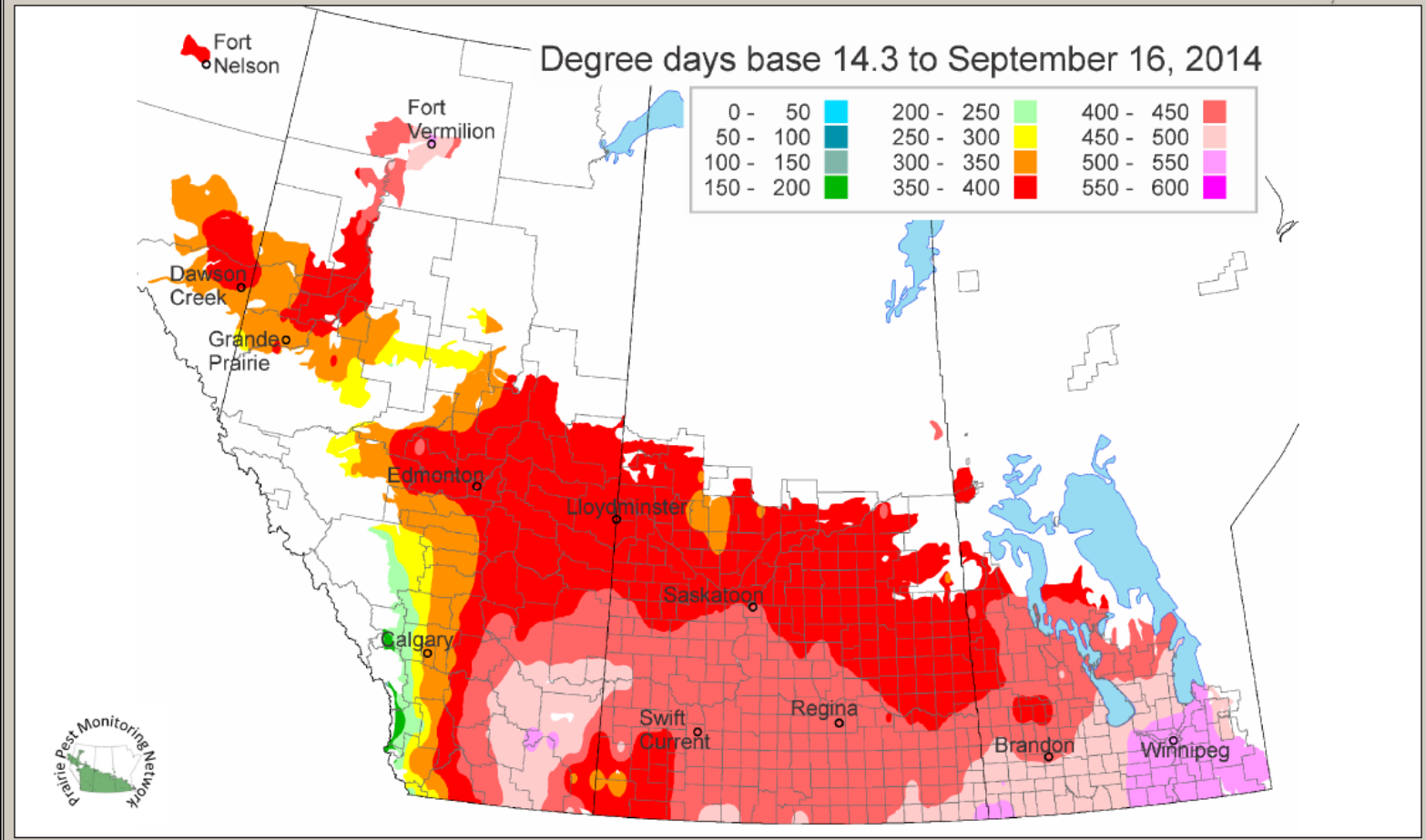
Produced by Agriculture and Agri-Food Canada
Science & Technology Branch



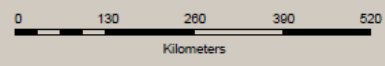


Culex tarsalis

Degree Day Accumulation for the Prairies



Supporting Partner
 Agriculture and Agri-Food Canada
 Agriculture et Agroalimentaire Canada



Disclaimer:
 User assumes all responsibility for use, interpretation, and application of information contained on this map.

© 2014 Her Majesty the Queen in Right of Canada
 Agriculture and Agri-Food Canada

Produced by Agriculture and Agri-Food Canada
 Science & Technology Branch

Selected References

- **Reisen WK. Fang Y. Martinez VM. Effects of temperature on the transmission of West Nile virus by *Culex tarsalis* (Diptera: Culicidae) J Med Entomol. 2006;43:309–317.**