

West Nile Virus and Degree Days Maps in Alberta in 2016

Current to September 11, 2016

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 its 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 to 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 plus 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

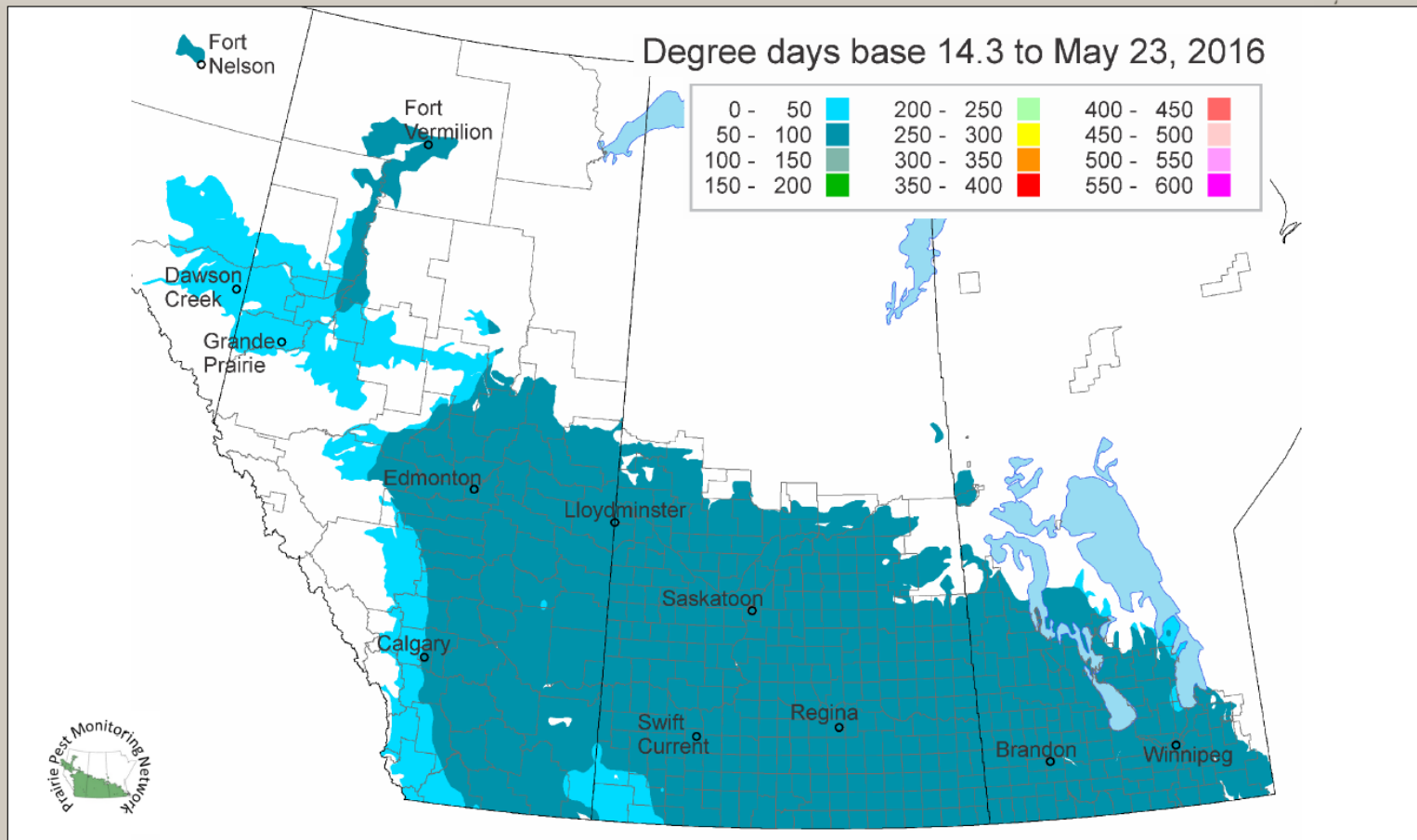
Mosquitos vs Human Cases

- 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.

Culex tarsalis



Degree Day Accumulation for the Prairies



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0 130 260 390 520
Kilometers

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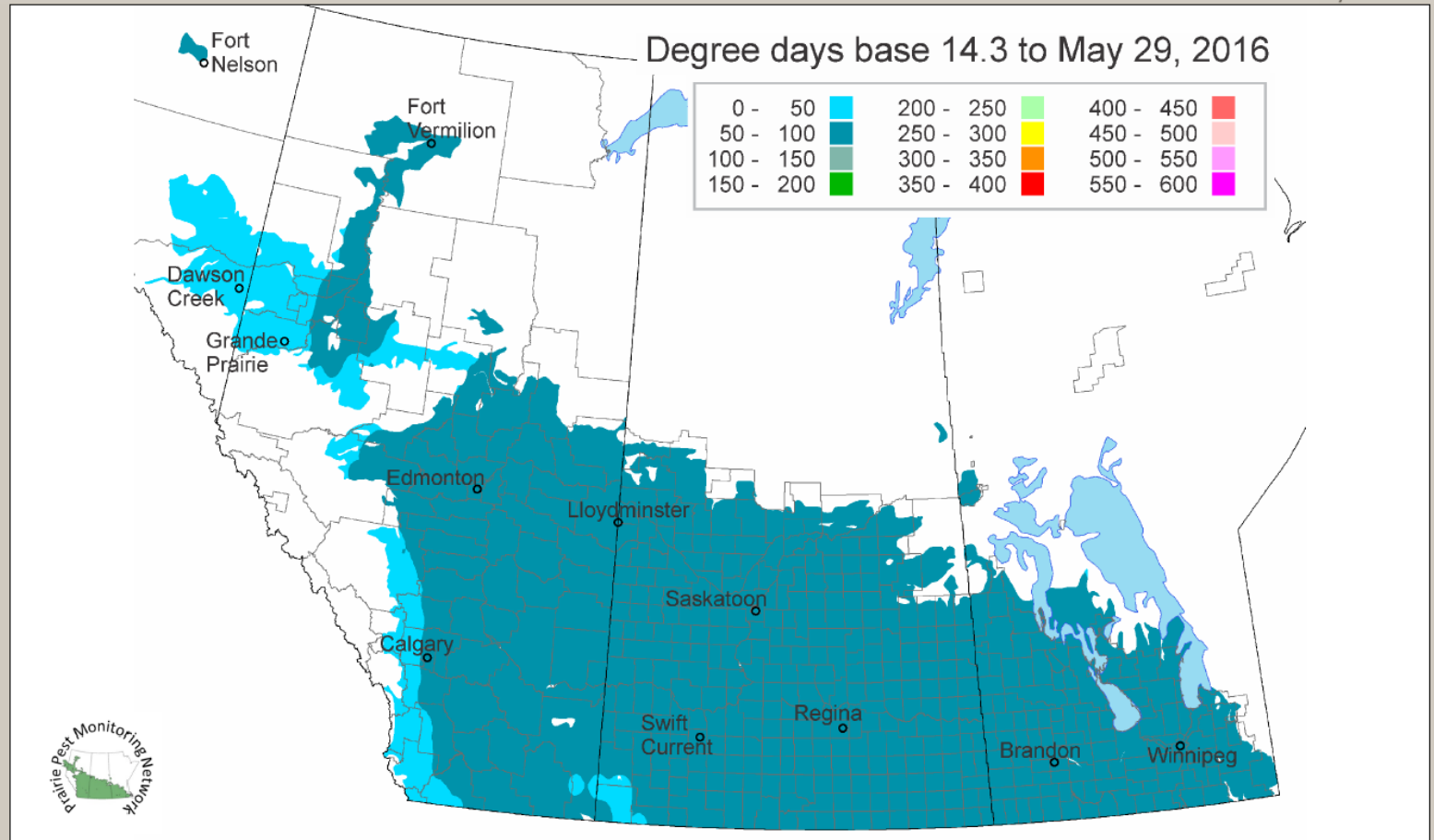
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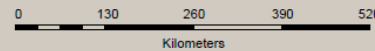
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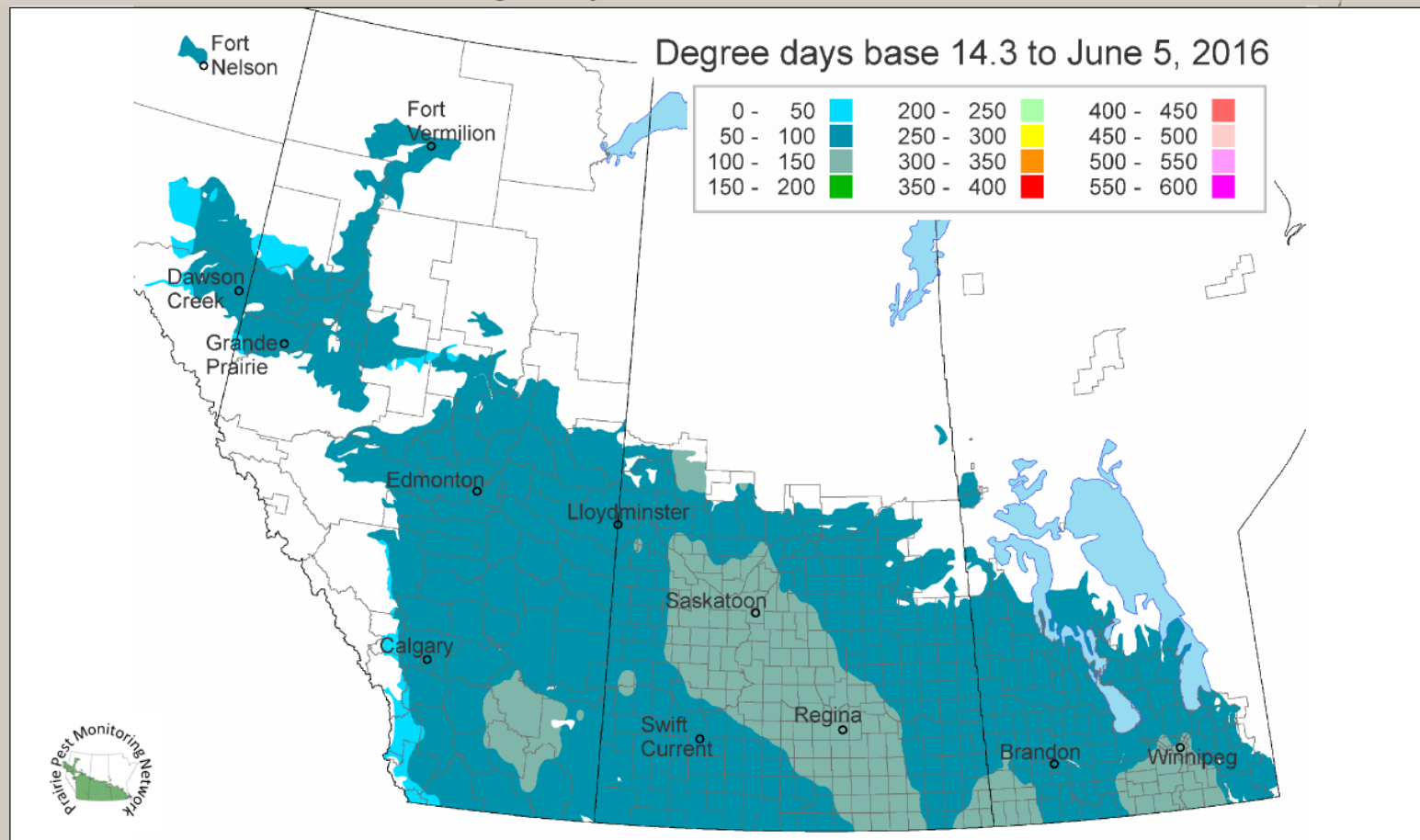
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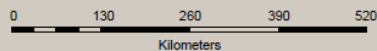
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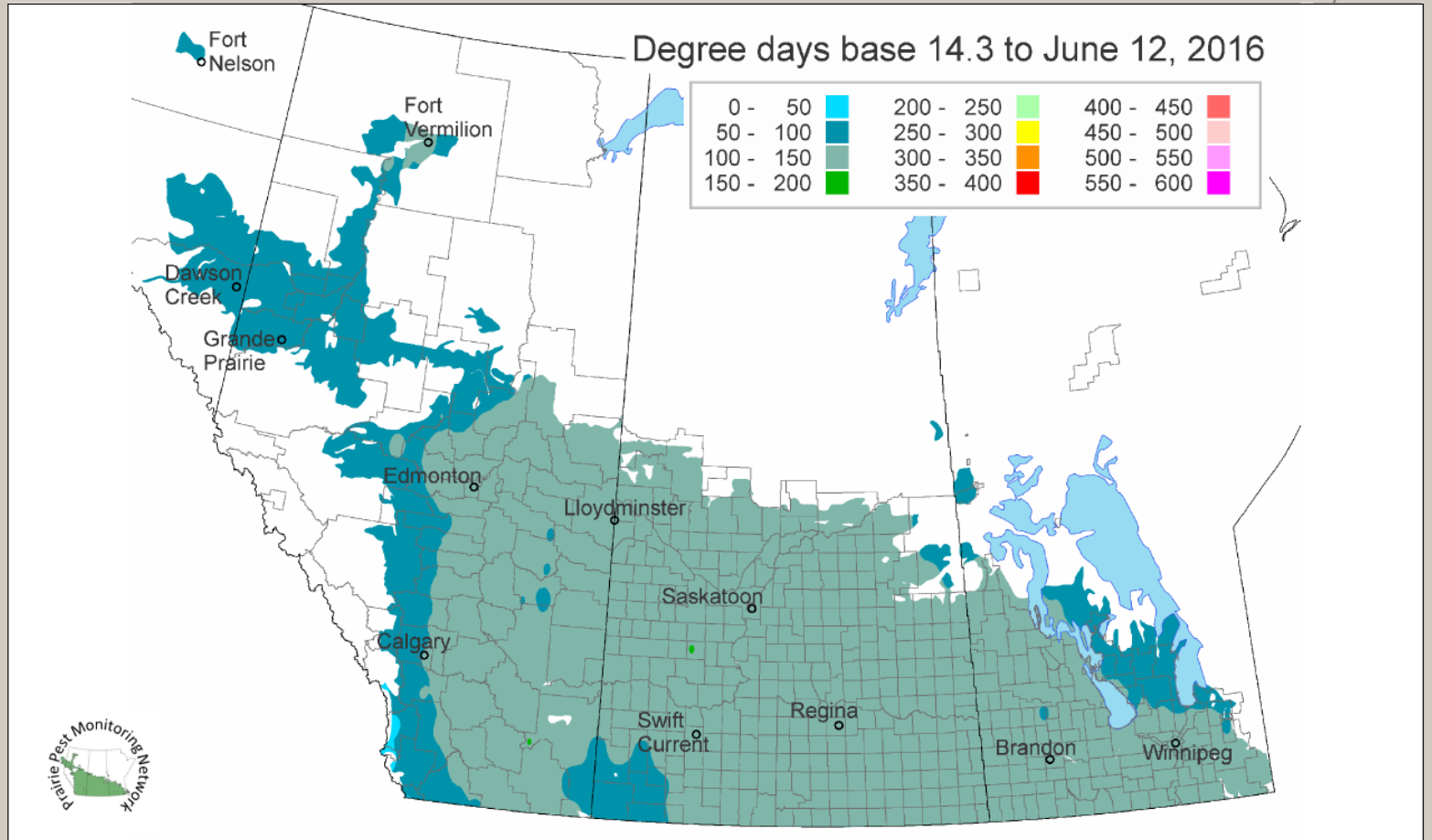
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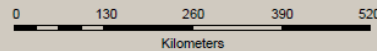


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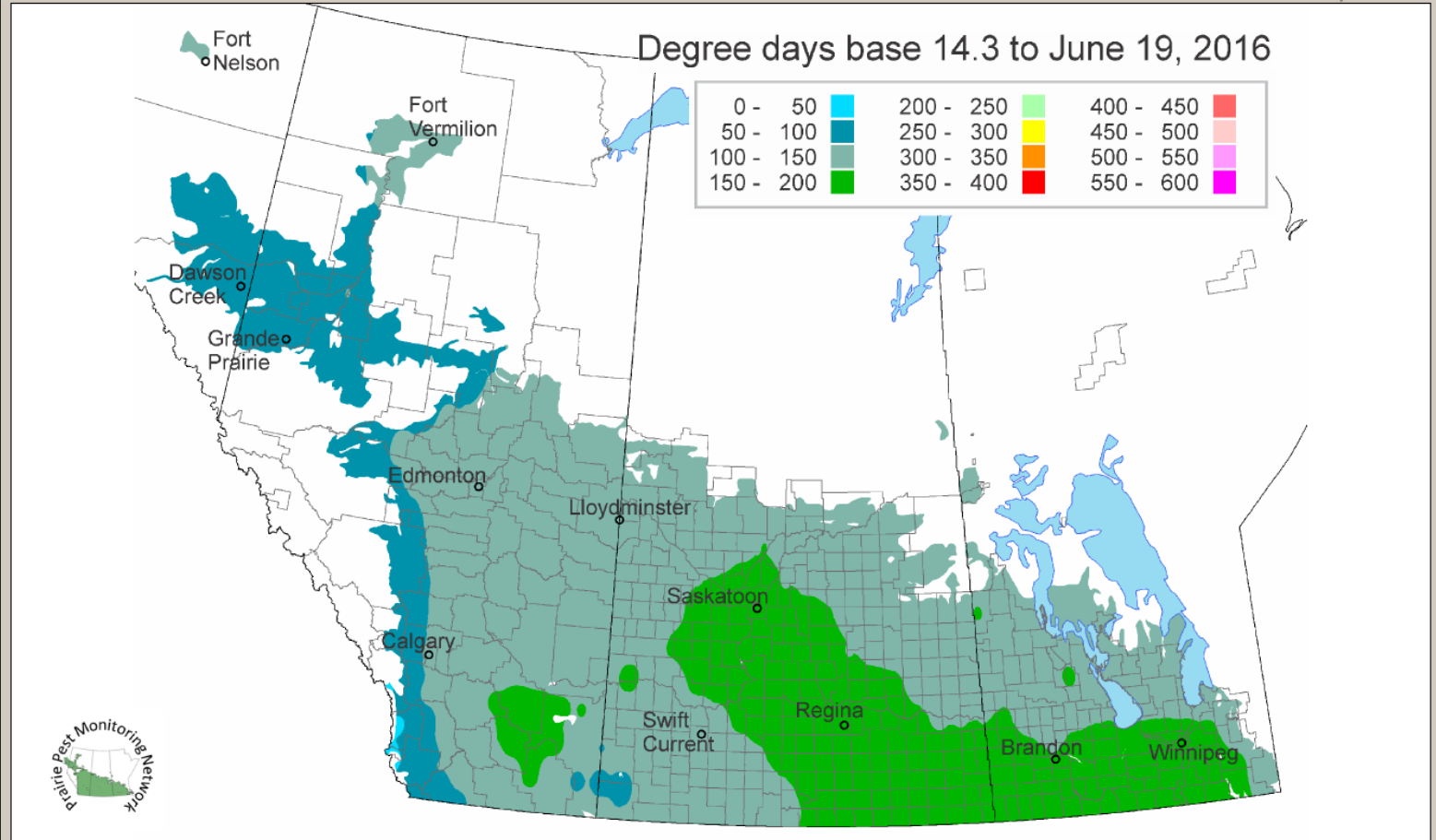
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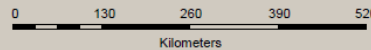


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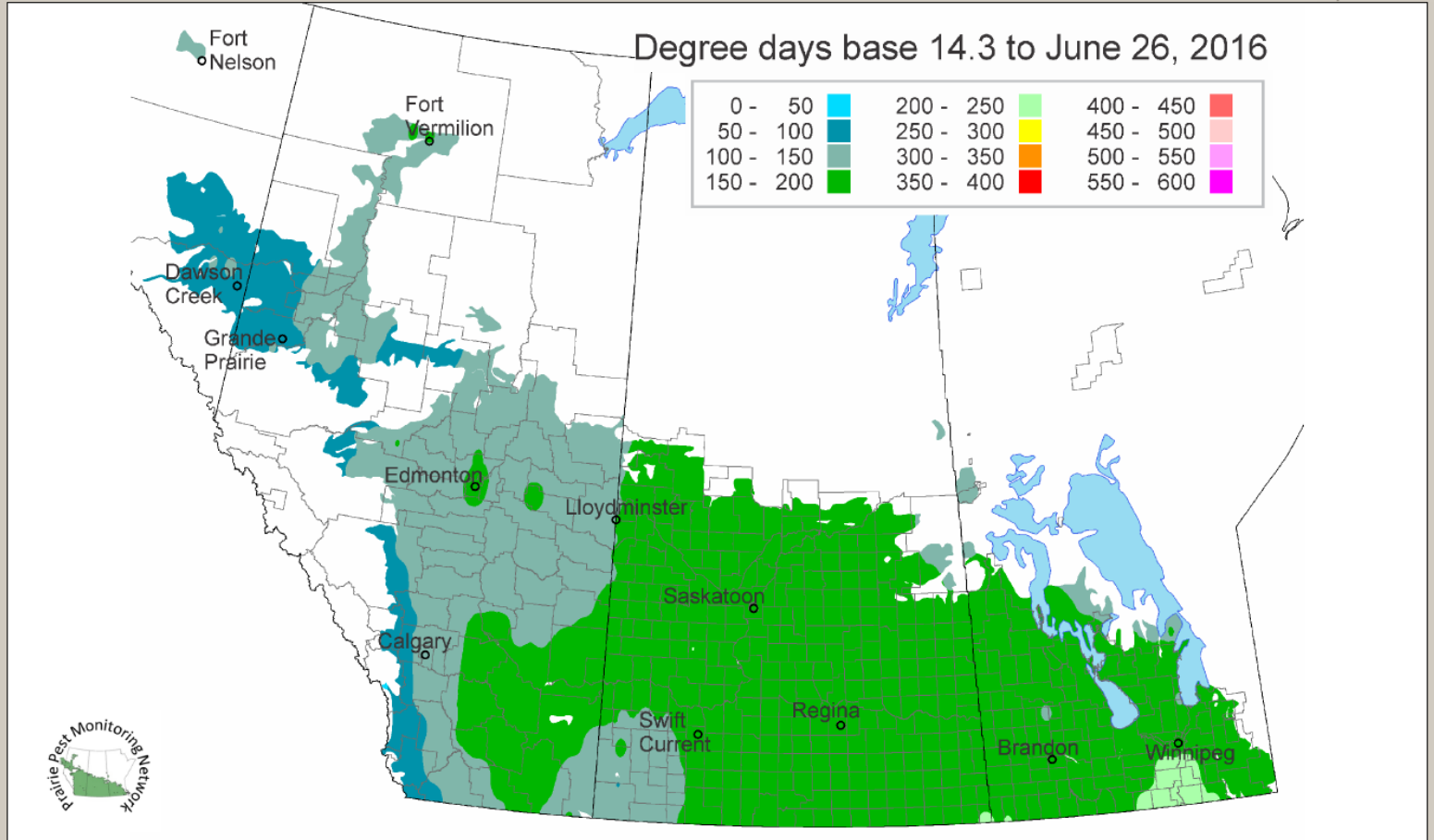
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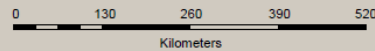
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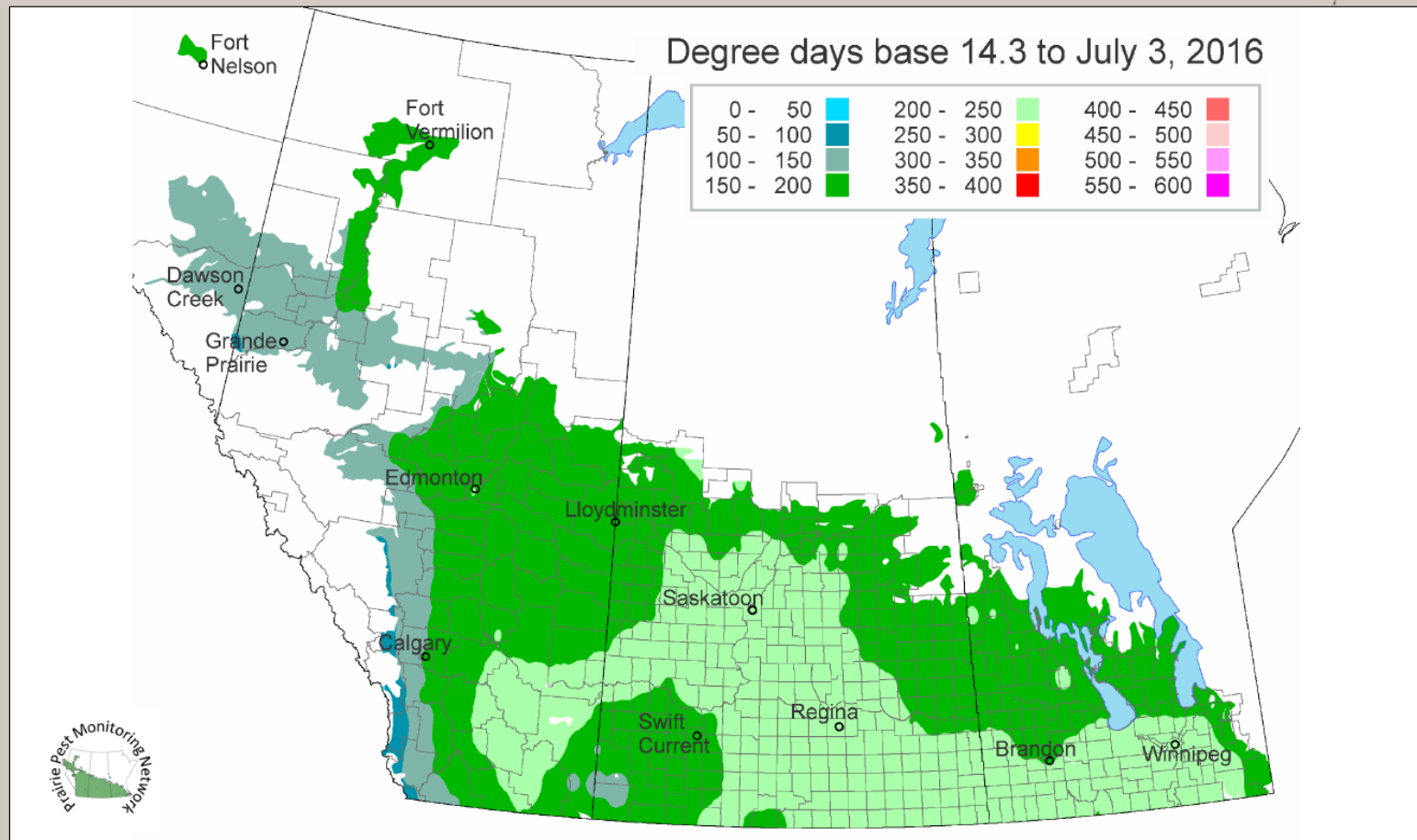
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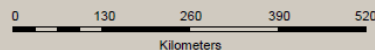
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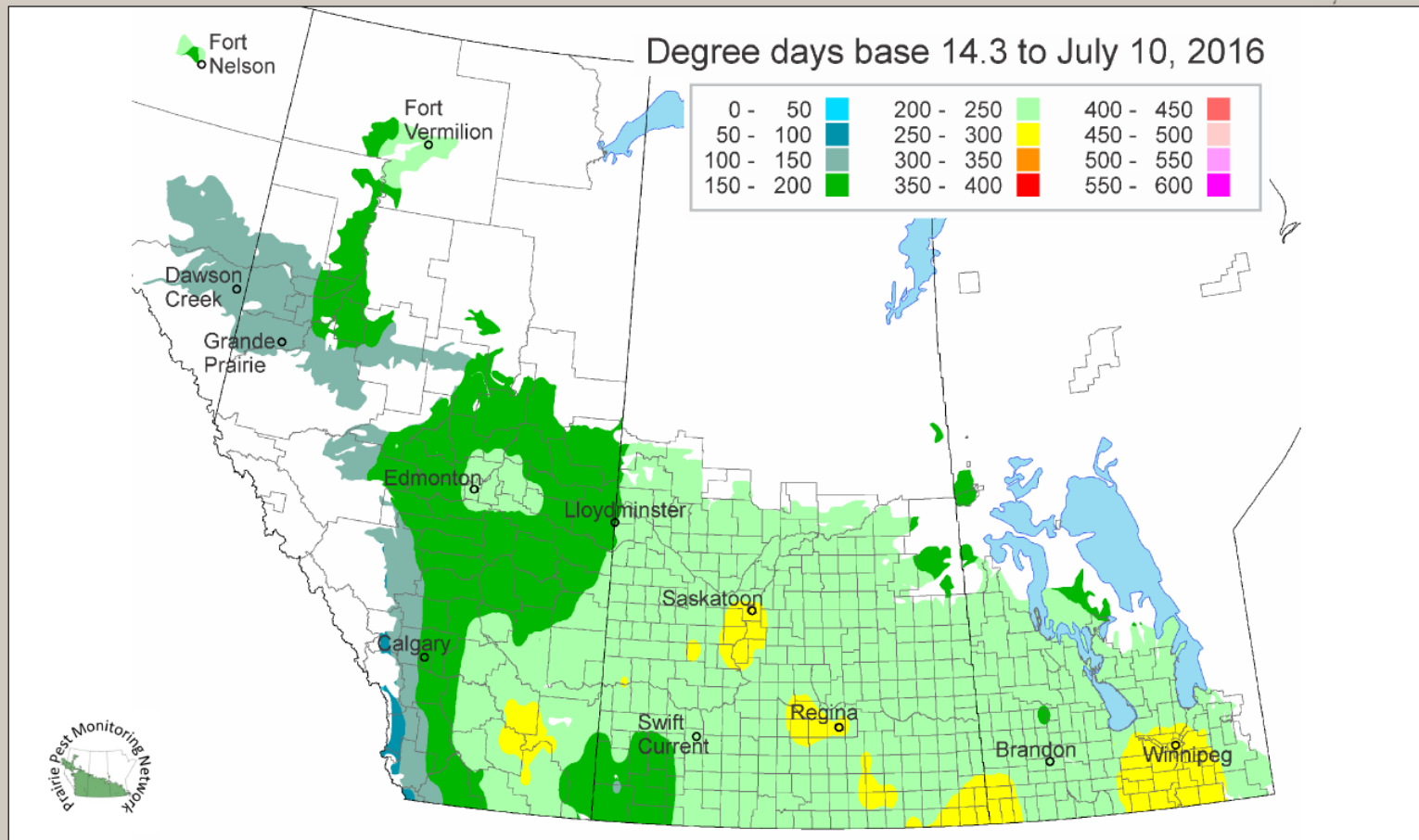
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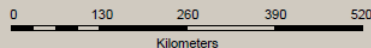


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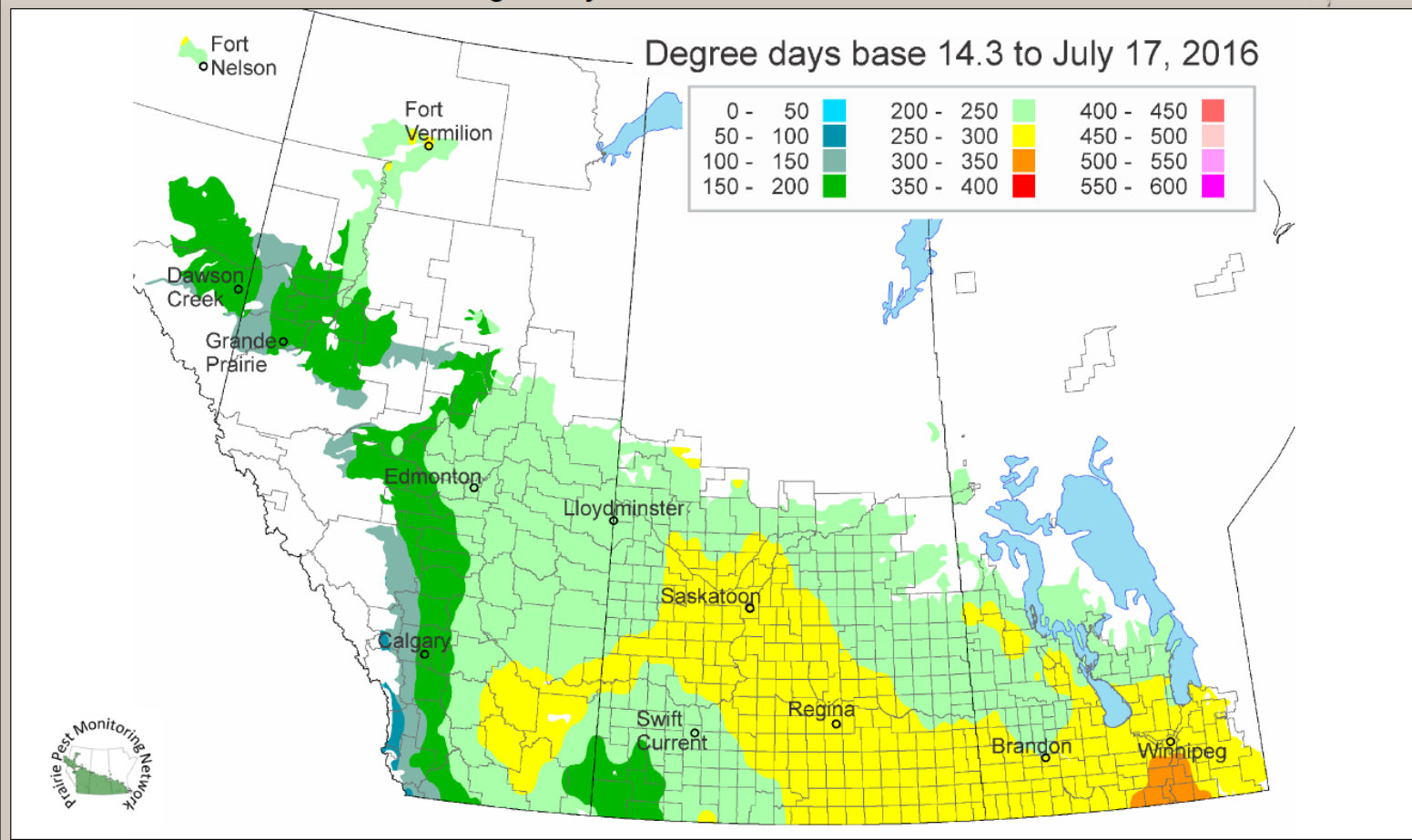
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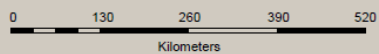
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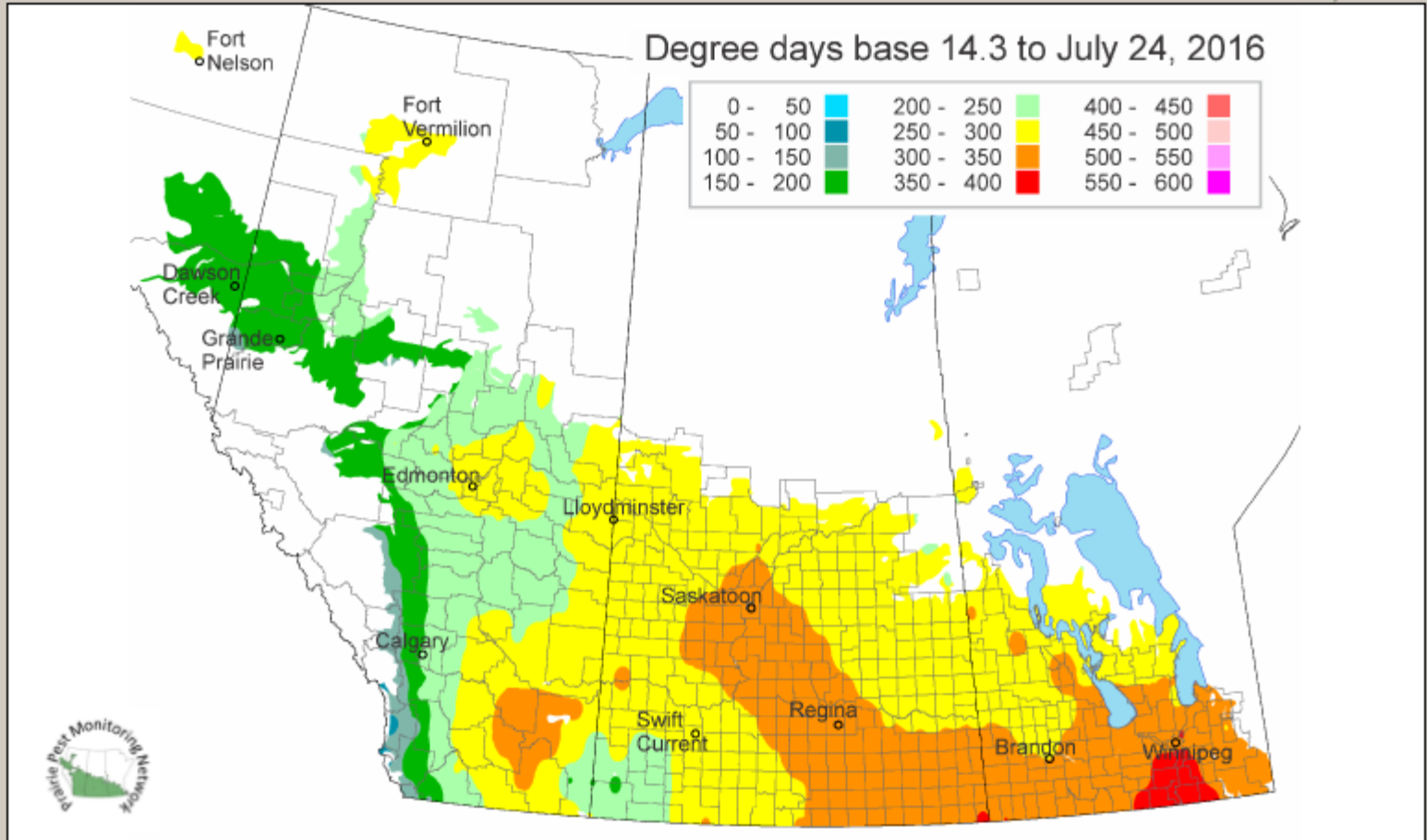
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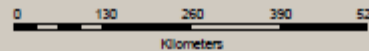


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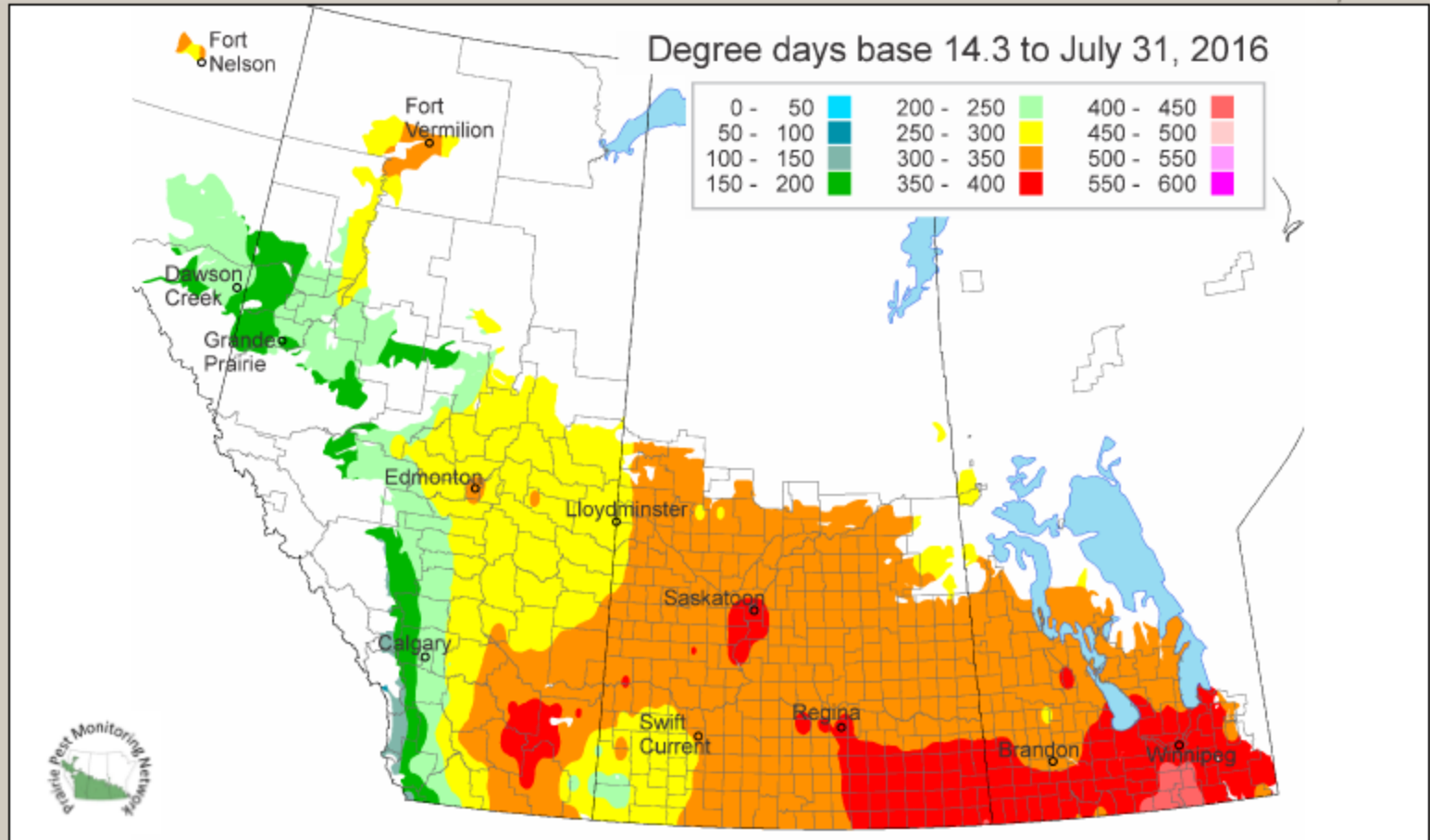
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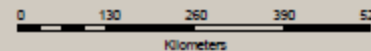


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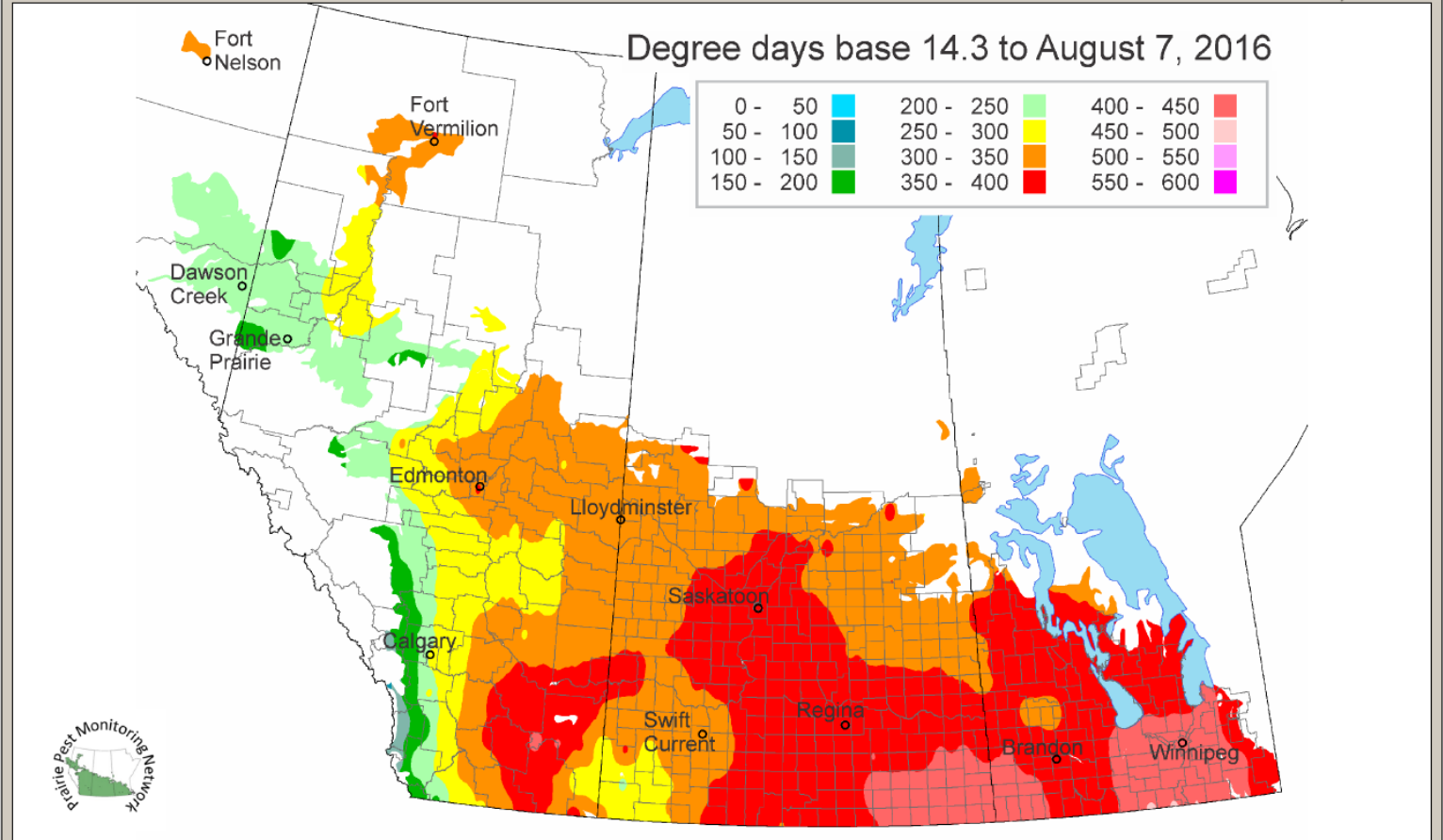
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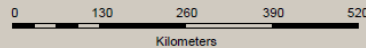


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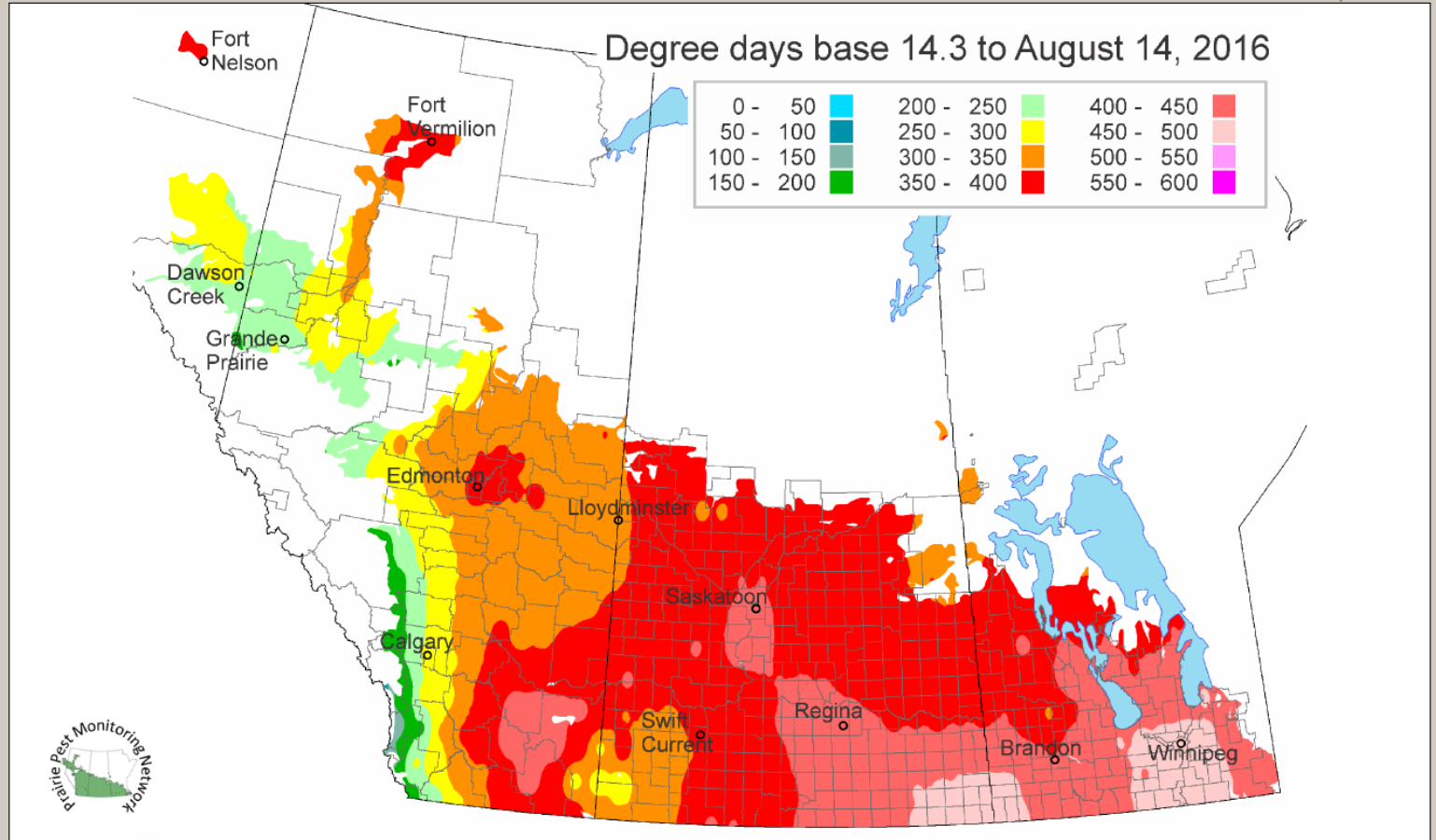
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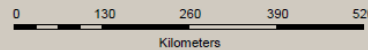
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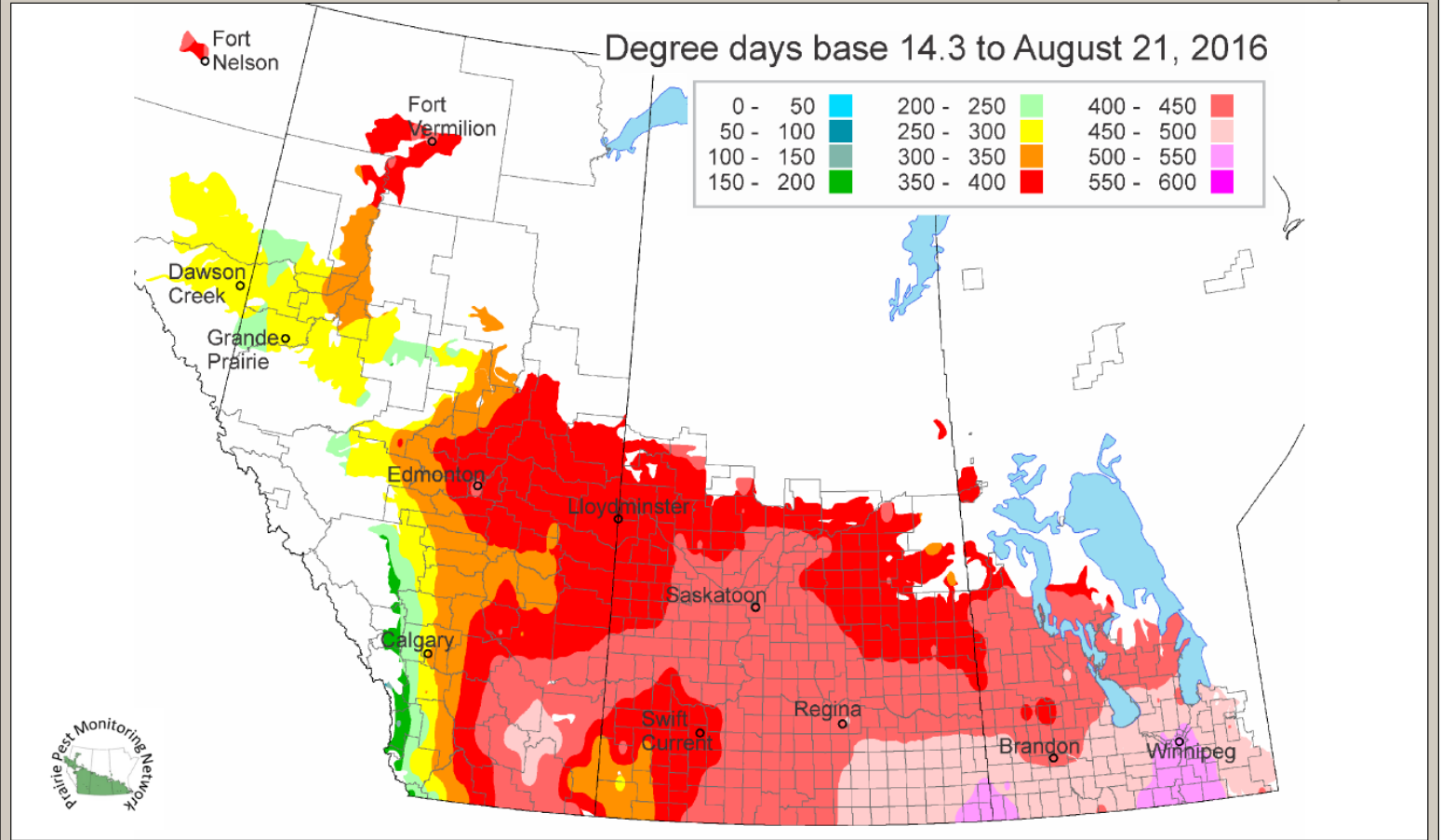
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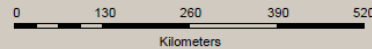


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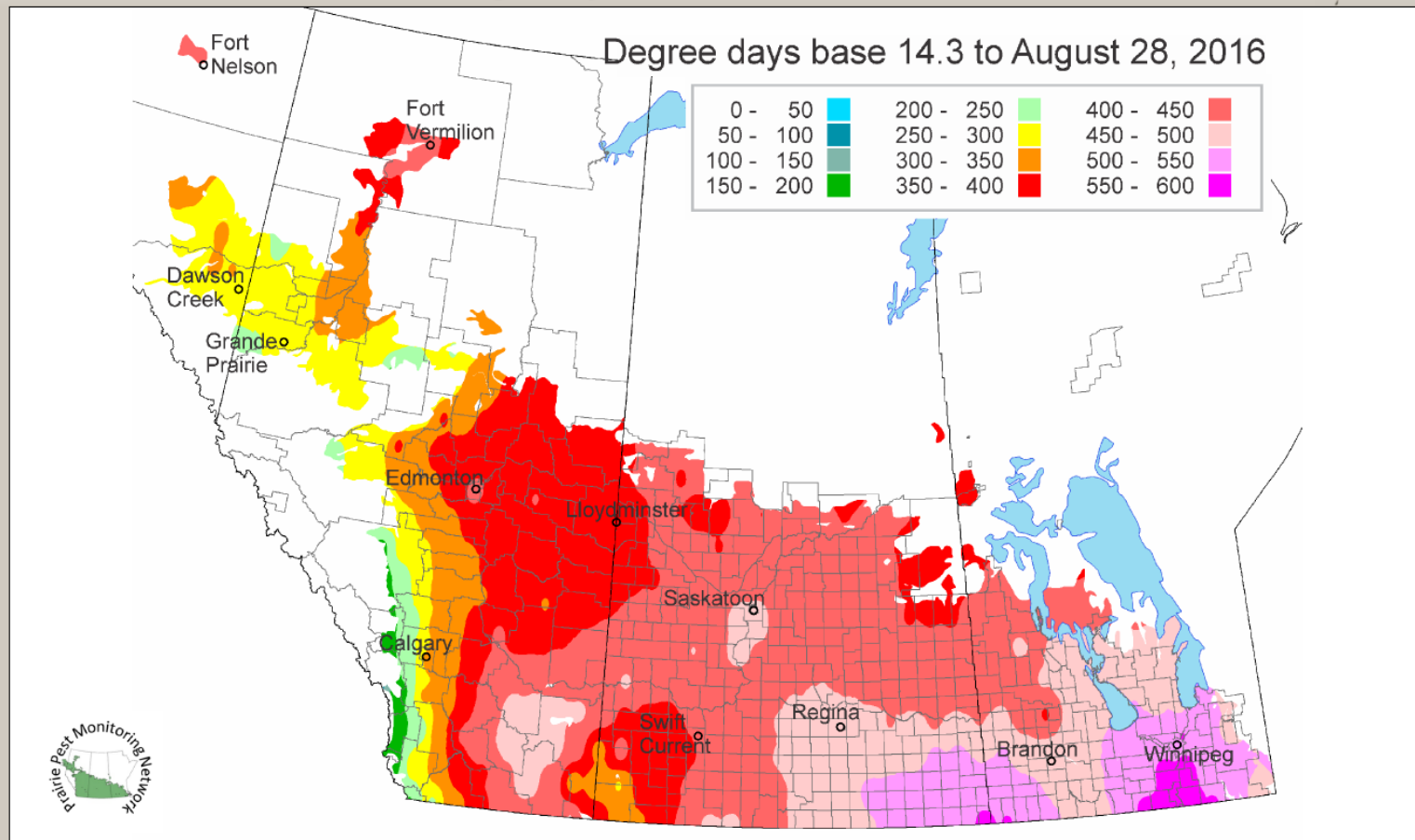
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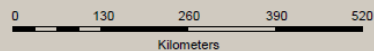
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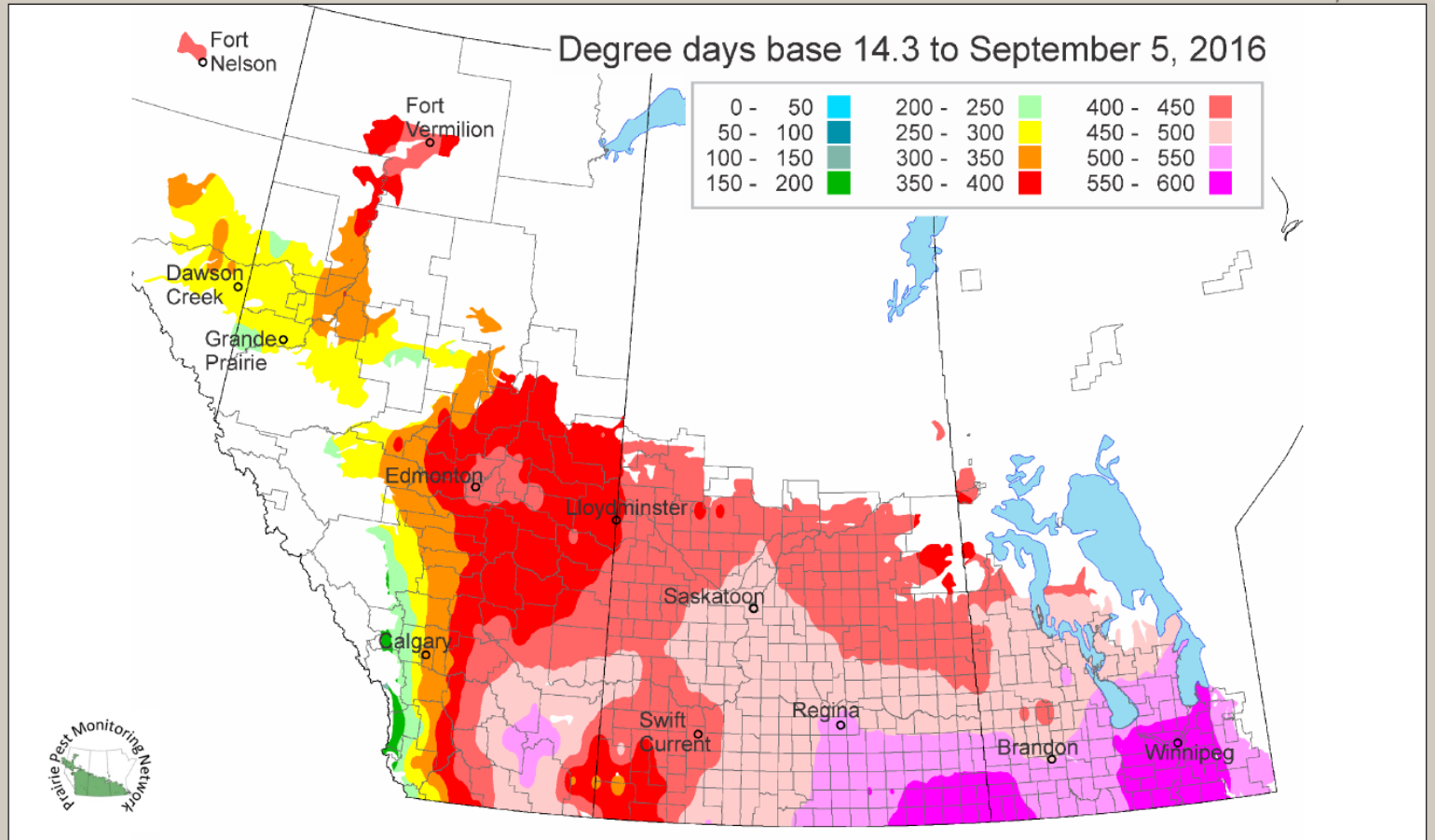
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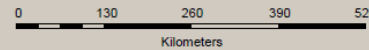


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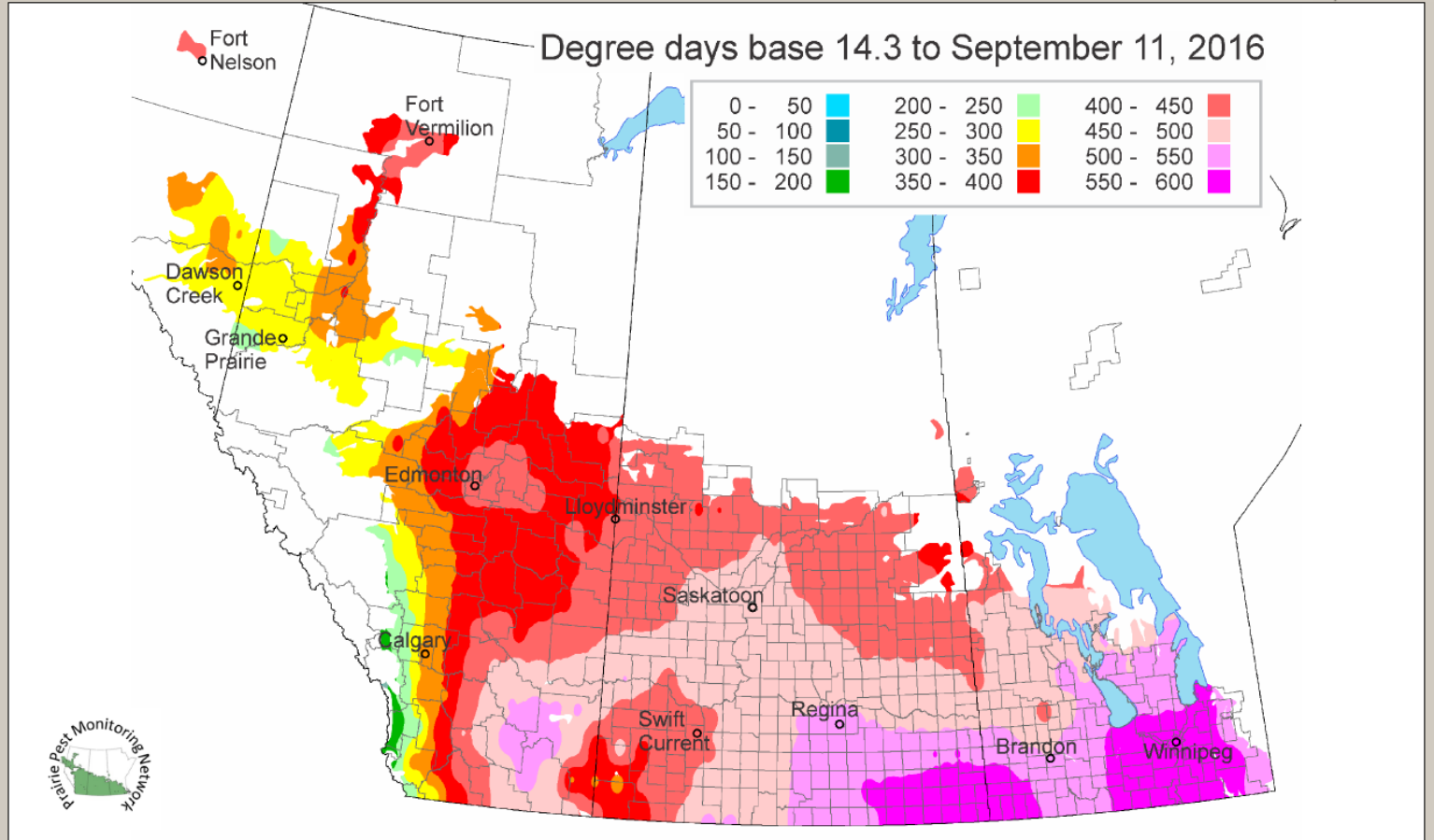
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Selected References

- **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.**