

# Manitoba's Flood of 2011



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Operational Services  
Manitoba Water Stewardship

Manitoba





why was there so much water this year?



why this flood was so different than 1997?



was this a record-breaking year?

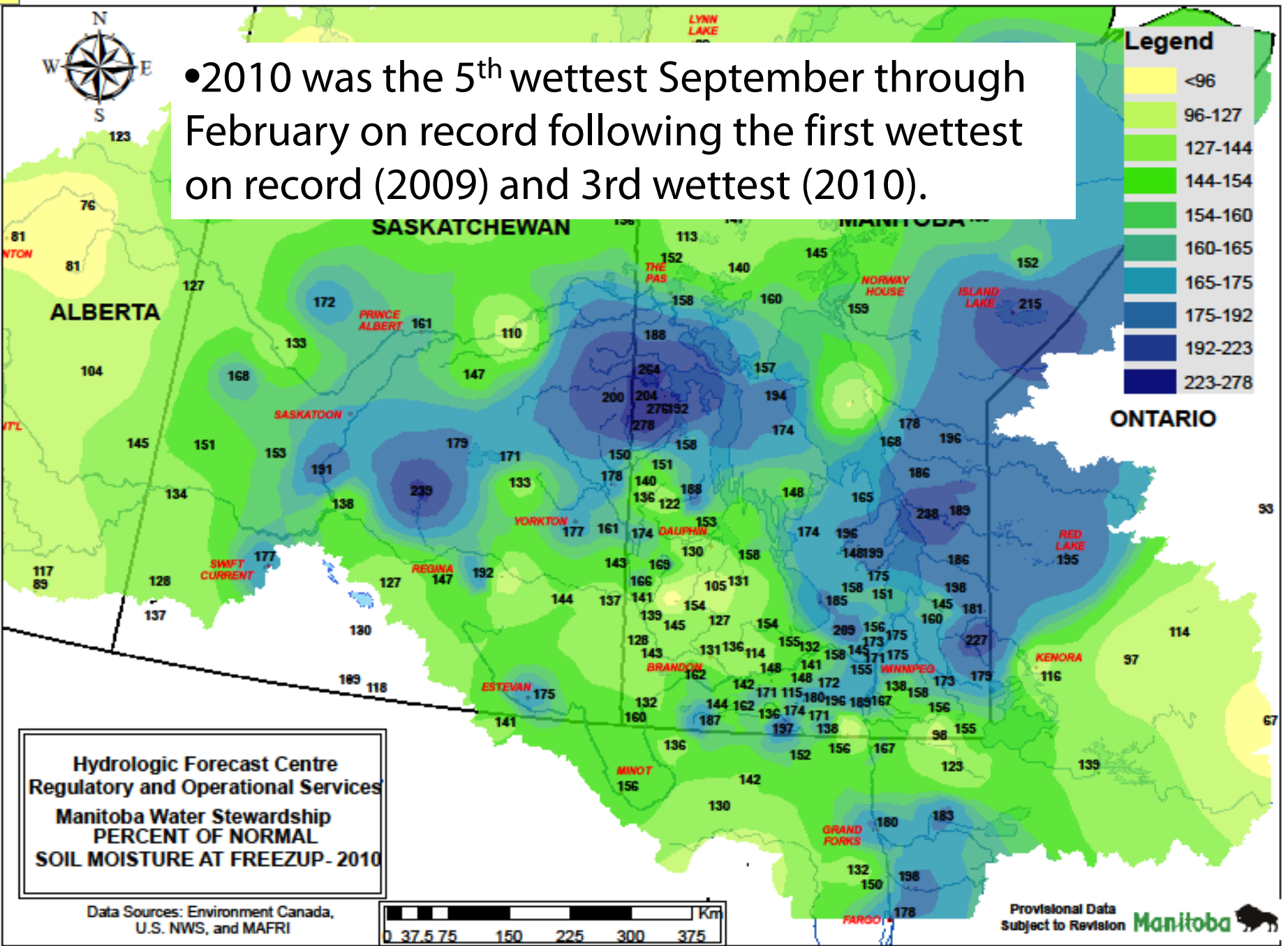
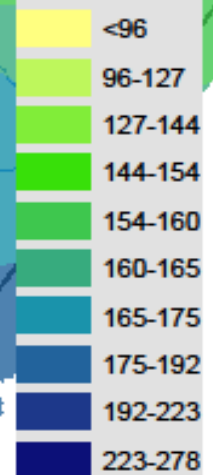
# Why was there so much water?

- Antecedent Soil Moisture
  - April-October 2010



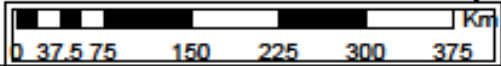
•2010 was the 5<sup>th</sup> wettest September through February on record following the first wettest on record (2009) and 3rd wettest (2010).

**Legend**

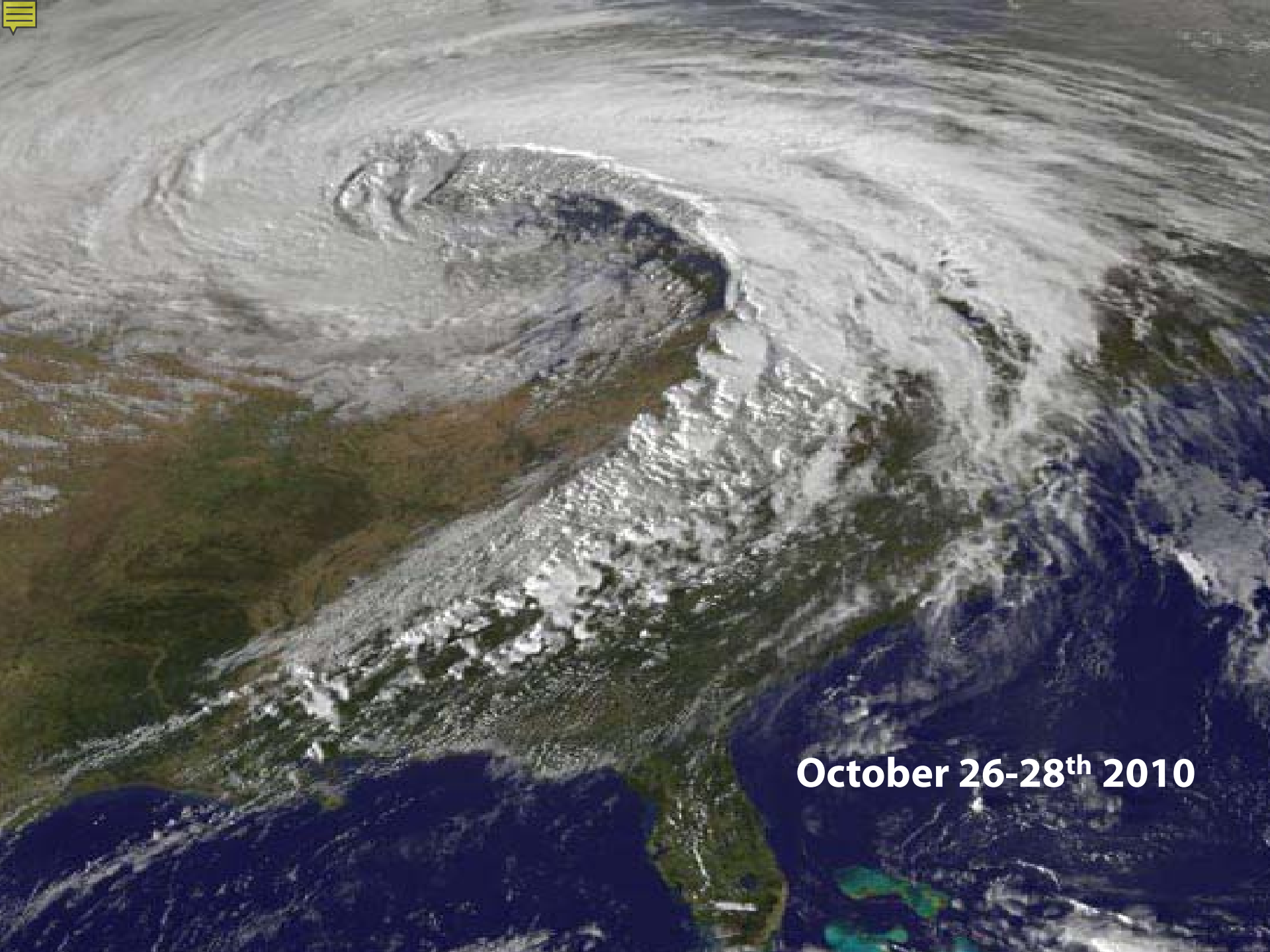


Hydrologic Forecast Centre  
Regulatory and Operational Services  
Manitoba Water Stewardship  
PERCENT OF NORMAL  
SOIL MOISTURE AT FREEZUP - 2010

Data Sources: Environment Canada,  
U.S. NWS, and MAFRI



Provisional Data  
Subject to Revision **Manitoba**



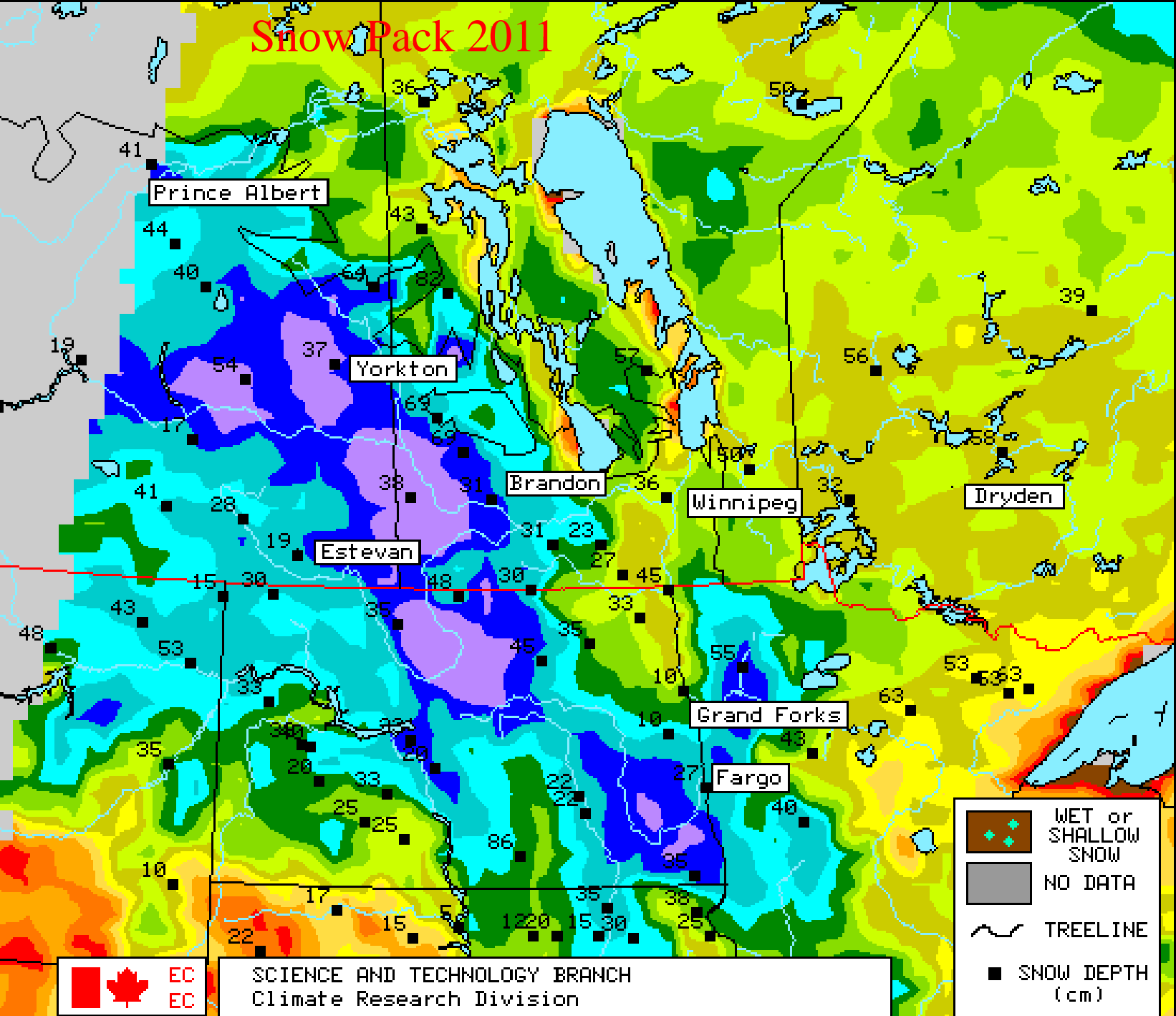
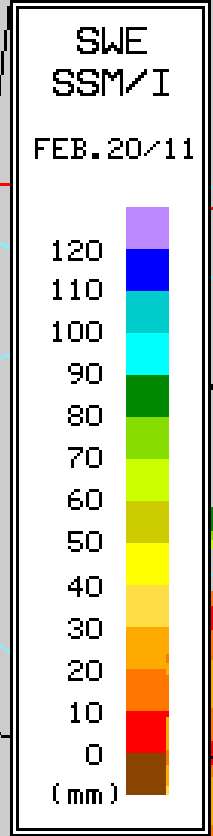
**October 26-28<sup>th</sup> 2010**

# Why was there so much water?

- Antecedent Soil Moisture
  - April-October 2010
- Snow Moisture, Density and Depth



# SnowPack 2011



SCIENCE AND TECHNOLOGY BRANCH  
Climate Research Division

- WET or SHALLOW SNOW
- NO DATA
- TREELINE
- SNOW DEPTH (cm)

- Snowfall totals 75 to 90 inches, nearly double the climatological average.



**Newdale: 6-7 ft  
snow depth**

# Why was there so much water?

- Antecedent Soil Moisture
  - April-October 2010
- Snow Moisture, Density and Depth
- Geography



Fort McMurray

Grande Prairie

Thompson

Edmonton

Flin Flon

The Pas

Red Deer

Saskatoon

Banff

Calgary

Dauphin

Brooks

Swift Current

Moose Jaw

Lethbridge

Regina

Brandon

Winnipeg

Kenora

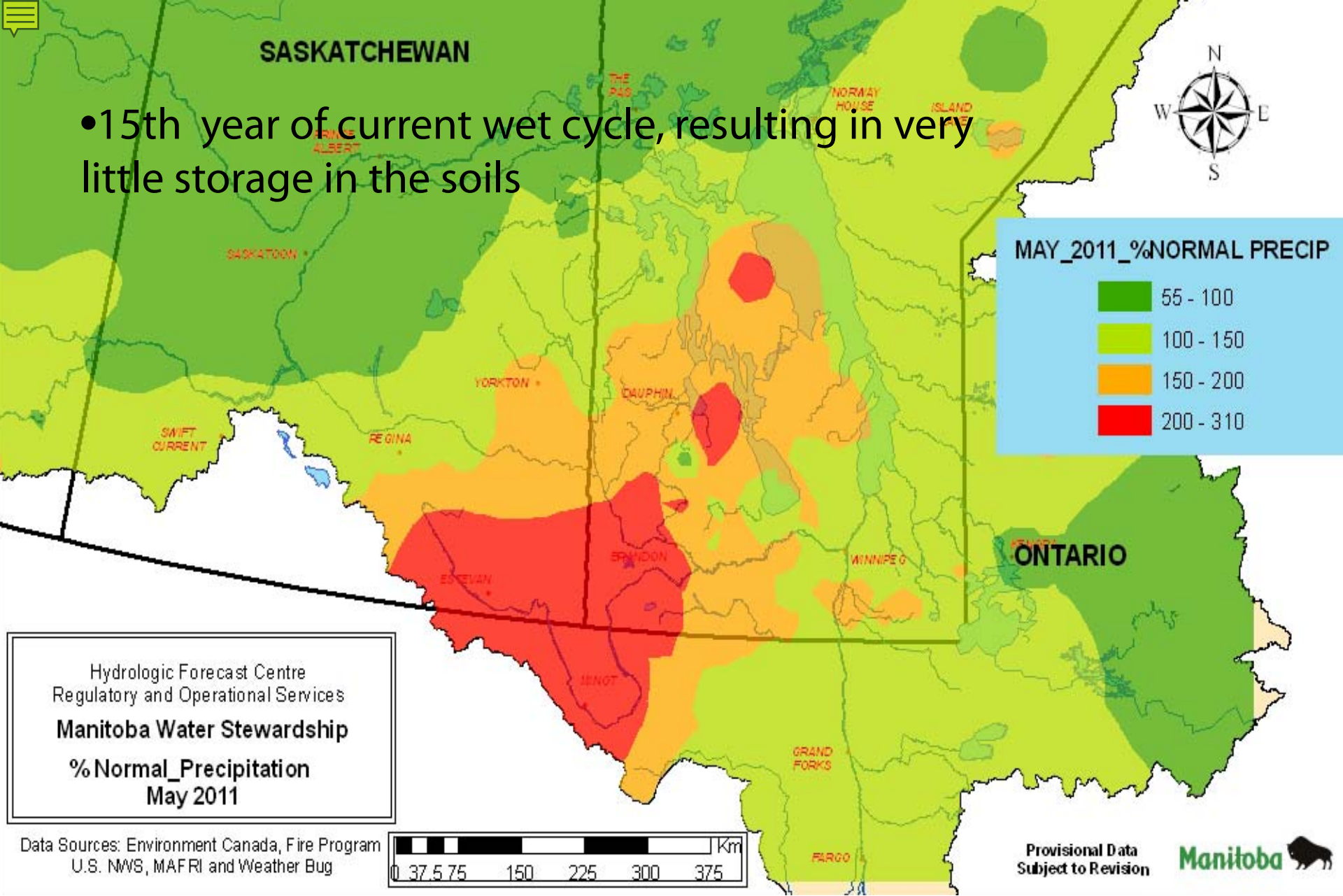
Steinbach

# Lake Winnipeg Watershed

# Why was there so much water?

- Antecedent Soil Moisture
  - April-October 2010
- Snow Moisture, Density and Depth
- Geography
- Precipitation this Spring

•15th year of current wet cycle, resulting in very little storage in the soils



















# Why was there so much water?

- Antecedent Soil Moisture
  - April-October 2010
- Snow Moisture, Density and Depth
- Geography
- Precipitation this Spring
- Storm events at the wrong time

# May



| Sun  | Mon  | Tues   | Wed   | Thurs   | Fri   | Sat   |
|--|--|--|---|---|---|---|
| 1     | 2  | 3  | 4   | 5   | 6   | 7   |
| 8     | 9     | 10    | 11   | 12  | 13  | 14  |
| 15   | 16   | 17   | 18  | 19  | 20   | 21   |
| 22   | 23   | 24   | 25  | 26  | 27  | 28  |
| 29  | 30  | 31  |   |   |   |   |





# Pre-Flood Preparation

- Supplies and Equipment
  - 3 amphibex icebreakers
  - 7 ice cutting machines
  - 3 amphibious ATVs
  - 3 million sandbags
  - 30,000 super sandbags
  - 3 sandbagging units (total of 6)
  - 24 heavy duty steamers (total of 61)
  - 43 km of cage barriers
  - 21 mobile pumps (total of 26)
  - 72 km of water filled barriers
  - and much more....



# Focus on Ice Breaking, Cutting and Clearing



# Focus on Ice Breaking, Cutting and Clearing



# Focus on Ice Breaking, Cutting and Clearing



# Focus on Ice Breaking, Cutting and Clearing



# Assiniboine River Dikes – Massive Effort to Reinforce



# Assiniboine River Dikes – Massive Effort to Reinforce



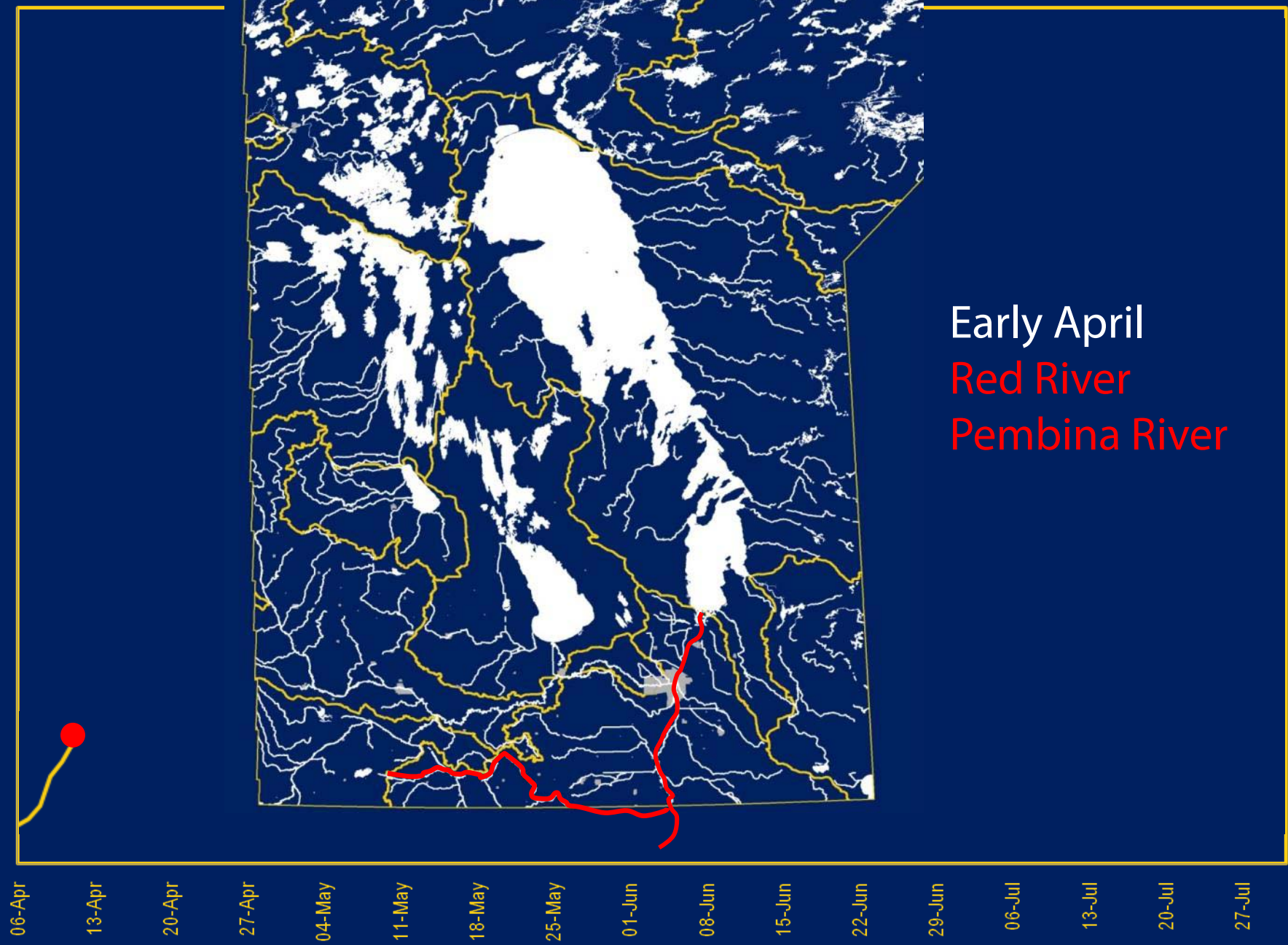


# Assiniboine River Dikes – Massive Effort to Reinforce





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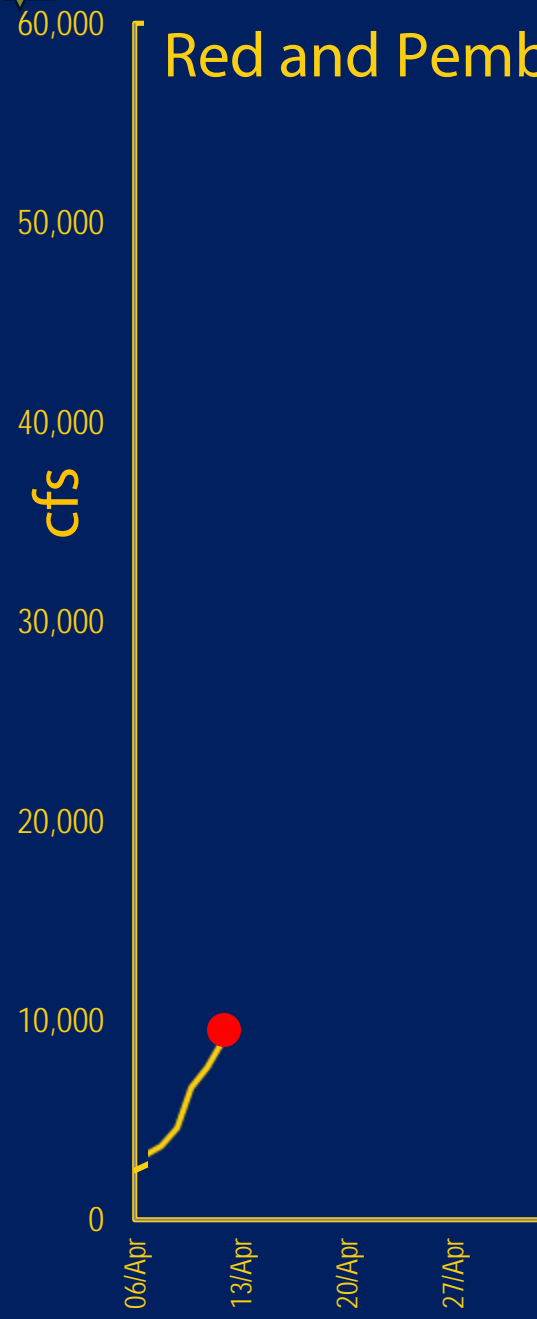


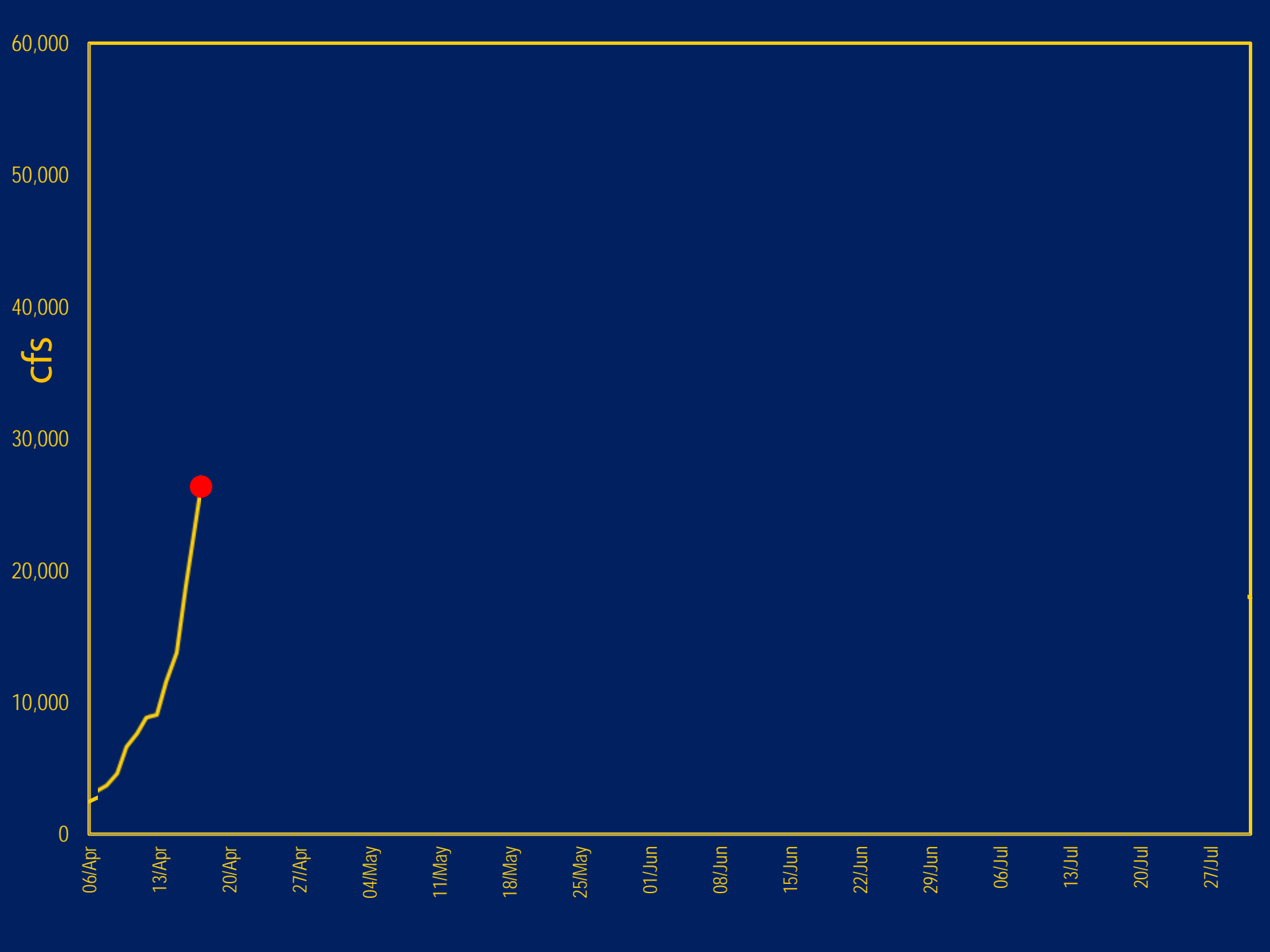
Early April  
Red River  
Pembina River

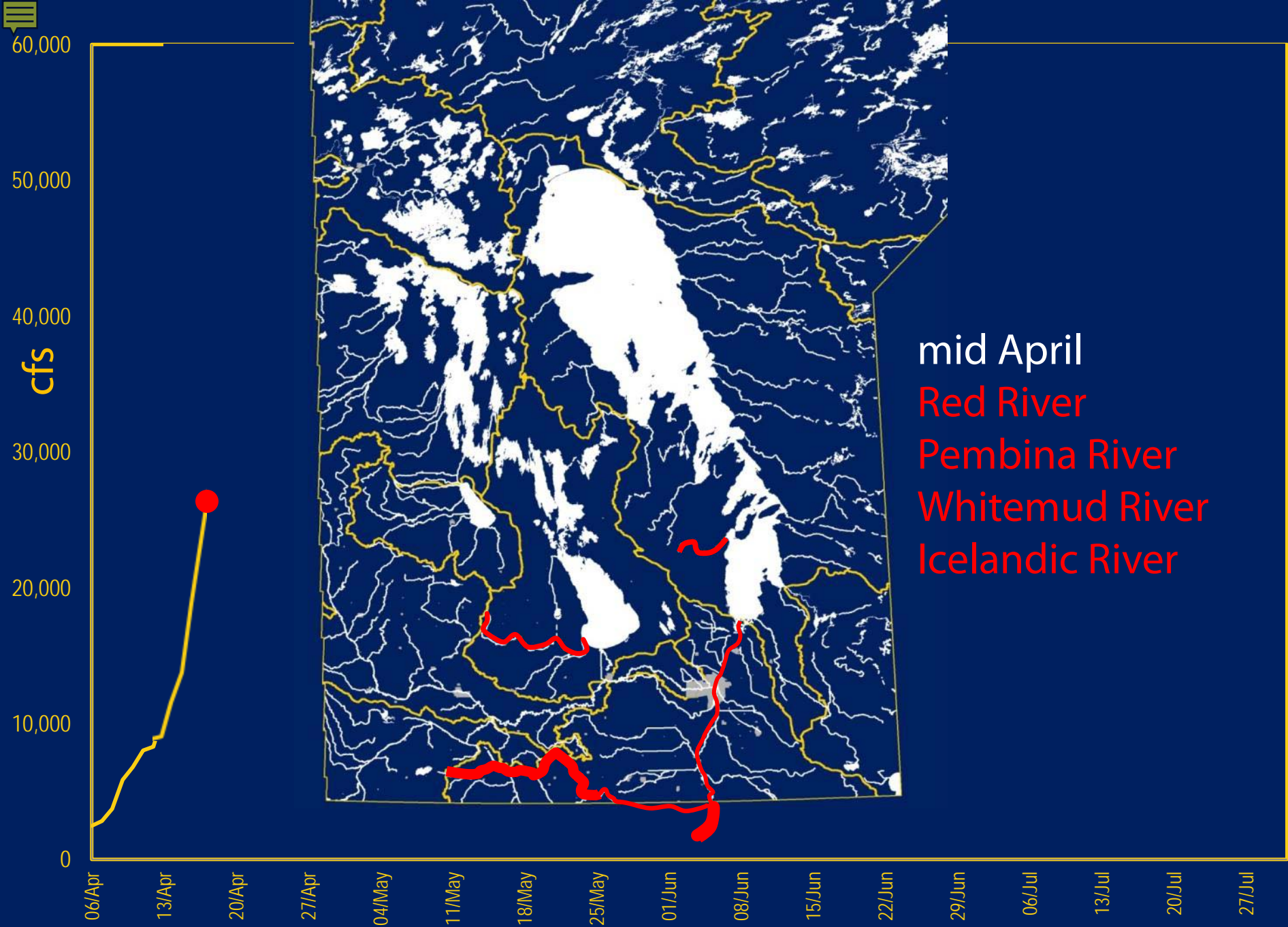
# James Ave reaches Ice-Induced Peak at 20.74 ft April 9<sup>th</sup>



# Red and Pembina Rivers beginning to react







# Whitemud River Rises 3 ft, Hospital Evacuated in Gladstone



# Roads Impacted by Flooding



Over 750 roads affected or closed due to flooding



# Water levels in Rock Lake Historic Peak – 1339.92 ft April 13

60,000

50,000

40,000

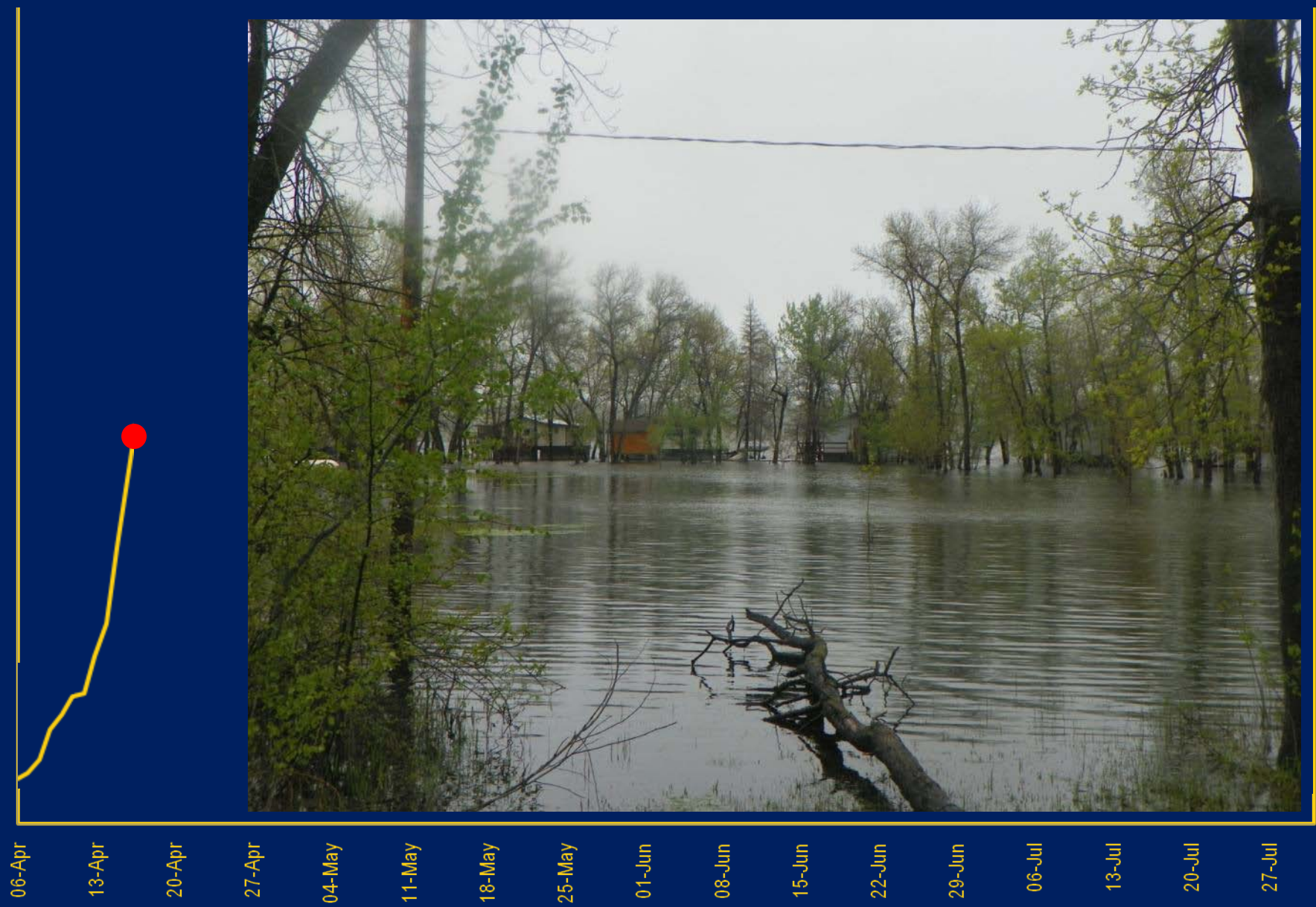
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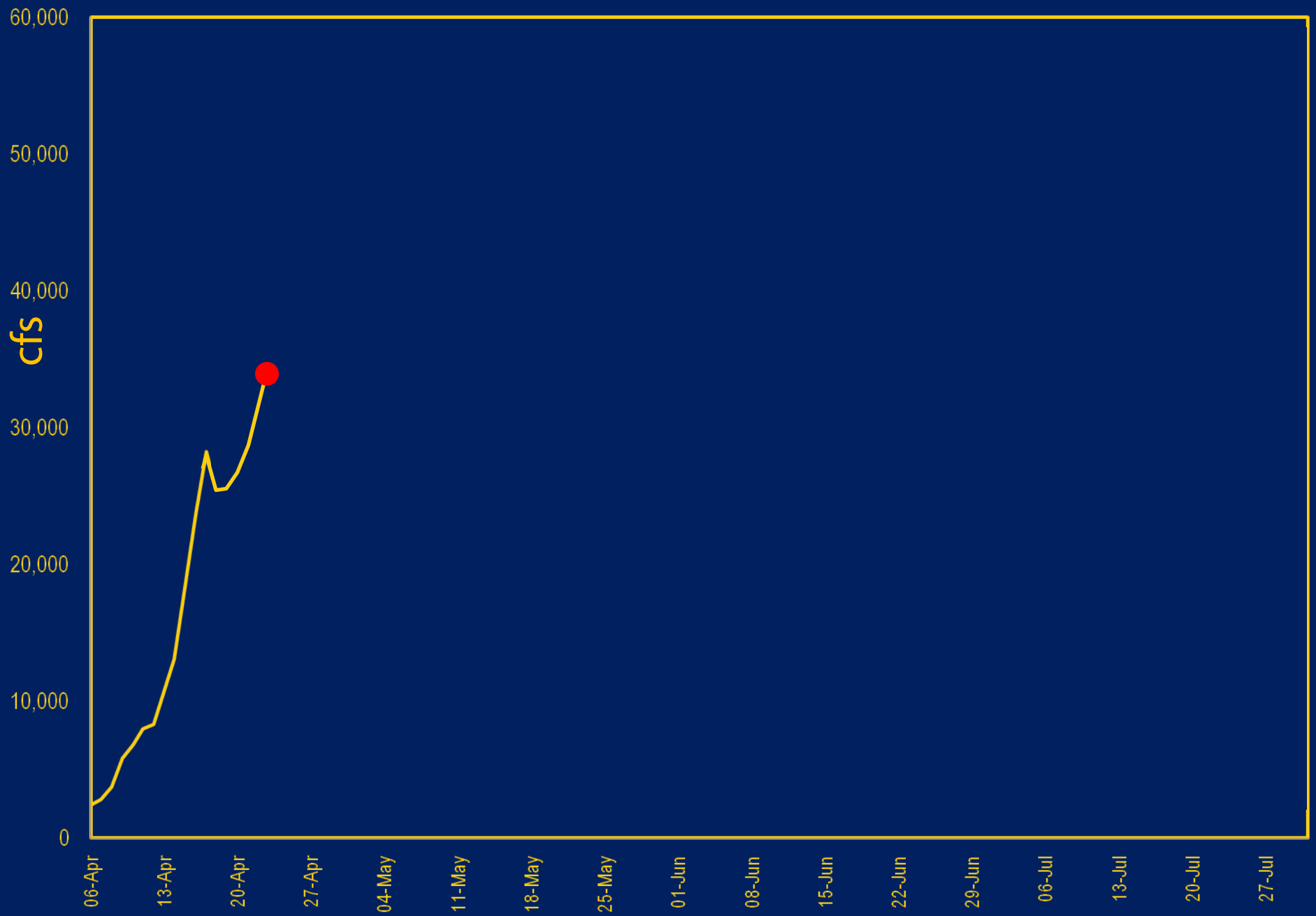
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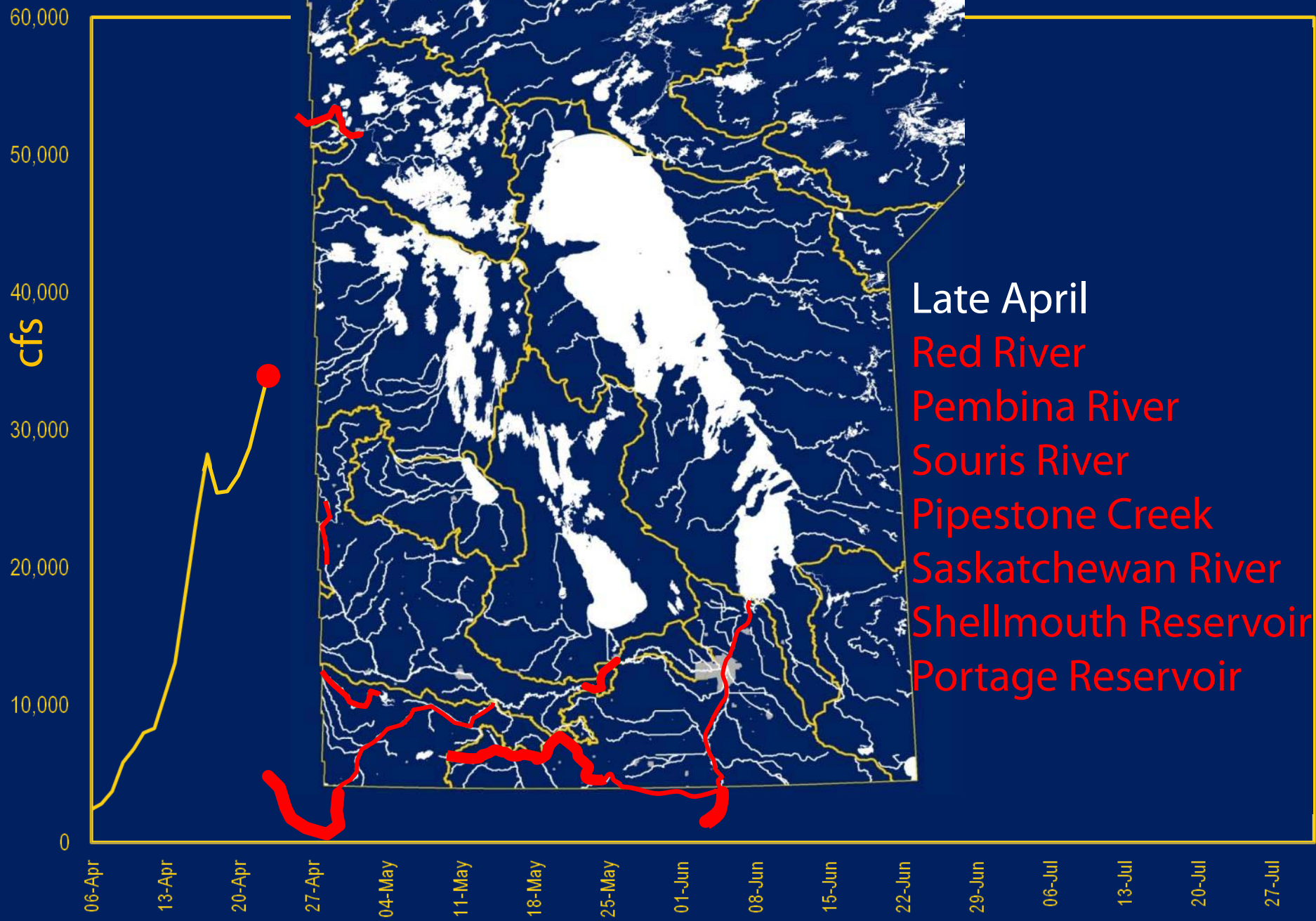
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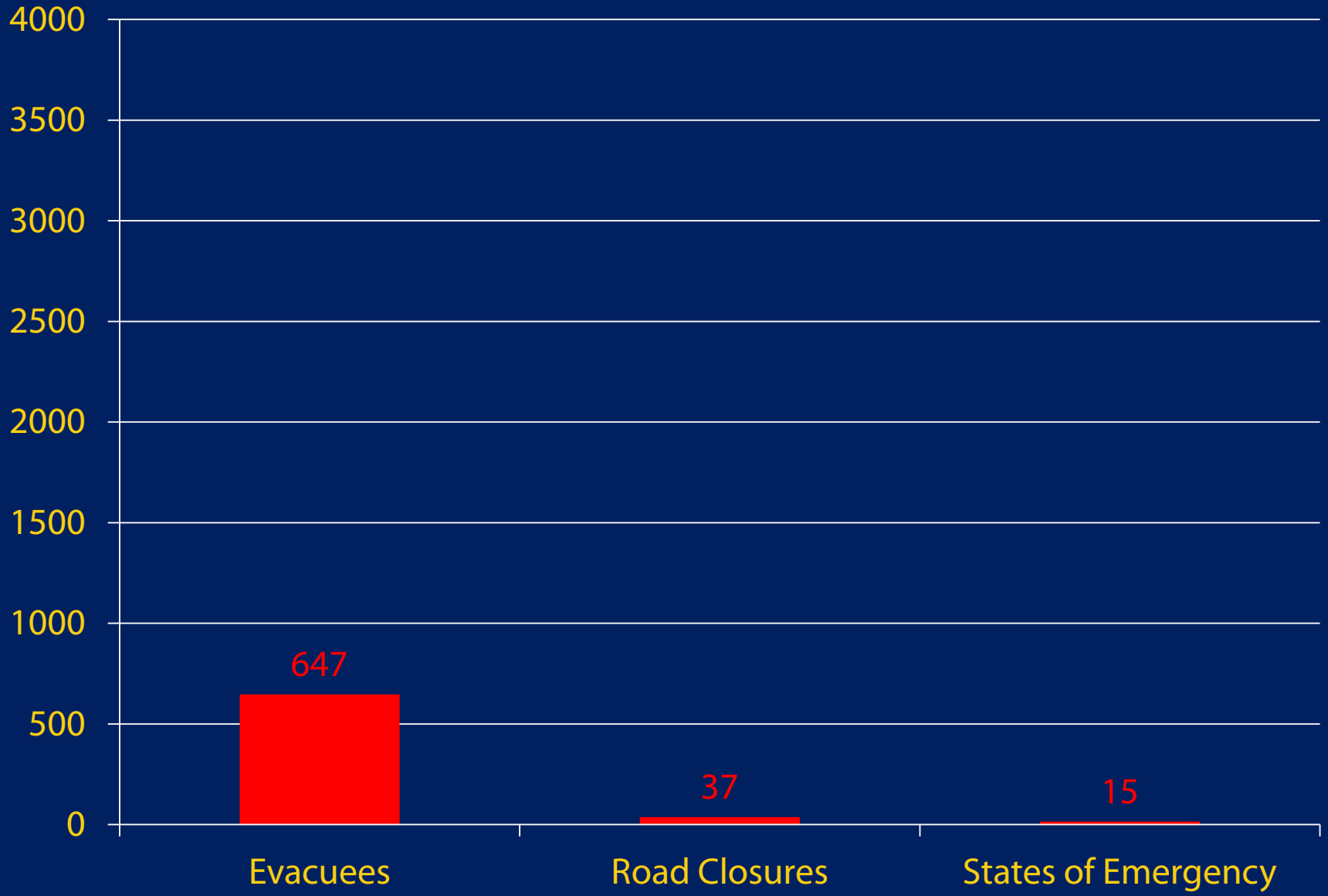




- Late April
- Red River
- Pembina River
- Souris River
- Pipestone Creek
- Saskatchewan River
- Shellmouth Reservoir
- Portage Reservoir



■ 15-Apr



# Souris River Begins 2<sup>nd</sup> Crest – Westhope Record Crest ??

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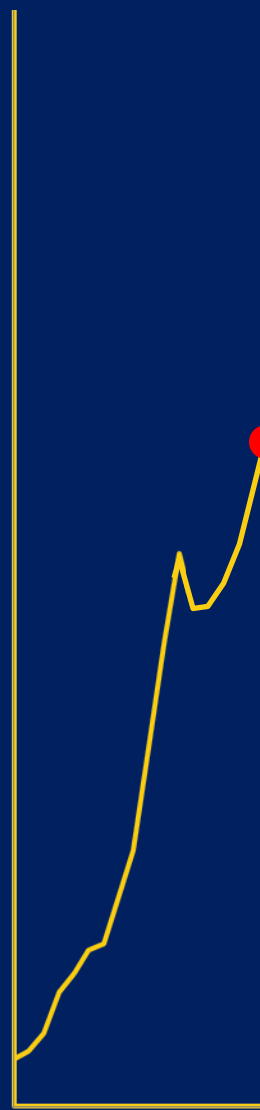
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06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul



# Souris River at Melita looking southeast April 22, 2011

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cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul





# Ice Pan on Assiniboine River – Assiniboine Dikes Damaged

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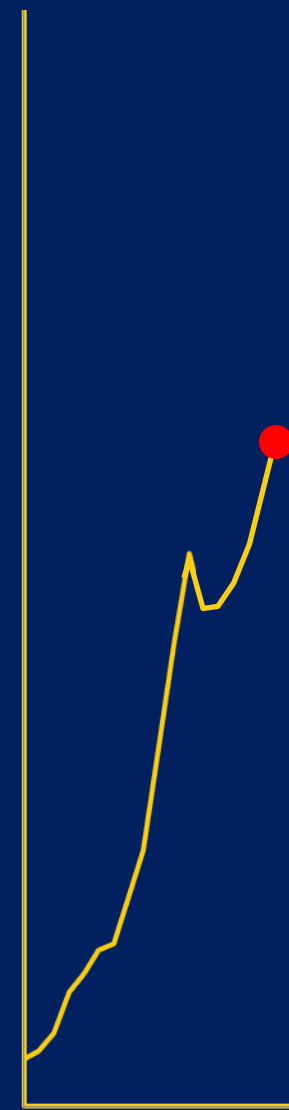




# Ice Pan on Assiniboine River – Fear of Surge in Winnipeg

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cfs



06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul





# Works in Saskatchewan and Carrot River near The Pas

60,000

50,000

40,000

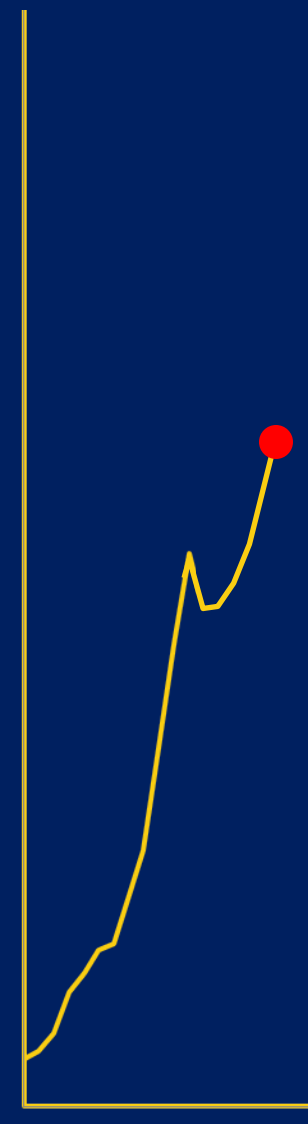
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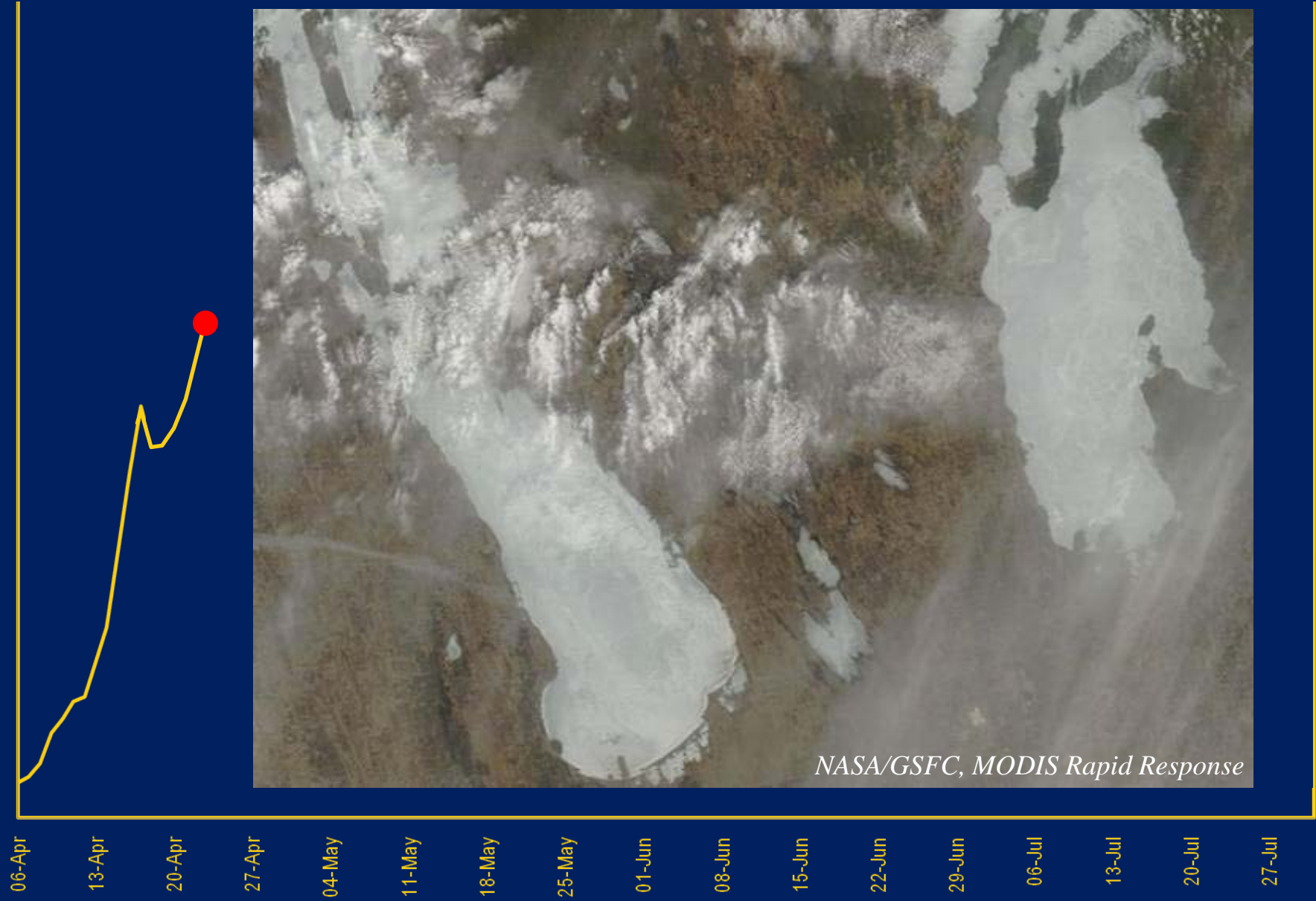




# April 26 – Ice Still on Most Lakes

60,000  
50,000  
40,000  
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20,000  
10,000  
0

cfs



*NASA/GSFC, MODIS Rapid Response*

# MWS Starts Reporting on Risk of Ice Pile-Up on Lakes

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cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul

| Regulatory and Operational Services, Manitoba Water Stewardship   |                              |                                |                 |                            |   |   |                             |                              |                  |                                 |  |           |                                      |
|---|------------------------------|--------------------------------|-----------------|----------------------------|---|---|-----------------------------|------------------------------|------------------|---------------------------------|--|-----------|--------------------------------------|
| Daily Water Levels and Forecasts  |                              |                                |                 |                            |   |   |                             |                              |                  |                                 |  |           |                                      |
| MANITOBA LAKES  |                              |                                |                 |                            |   |   |                             |                              |                  |                                 |  |           |                                      |
| Apr 20, 2011 <span style="float: right;"><a href="http://www.gov.mb.ca/waterstewardship/">http://www.gov.mb.ca/waterstewardship/</a></span> |                              |                                |                 |                            |   |   |                             |                              |                  |                                 |  |           |                                      |
| LOCATION  | LEVEL <sup>3</sup><br>(feet) | Change<br>from Last<br>Reading | Last<br>Reading | Date of<br>Last<br>Reading | Forecasted Peaks <sup>1</sup>                 |   | Flood<br>Level <sup>2</sup> | Desirable<br>Range<br>(feet) | ice conditions   |                                 | forecasted wind<br>conditions for<br>21. April |           | Risk of<br>shore-line<br>ice pile-up |
|   |                              |                                |                 |                            | Favourable<br>weather<br>conditions<br>(feet) | Unfavourable<br>weather<br>conditions<br>(feet) |                             |                              | ice<br>cover (%) | date of<br>satellite<br>imagery | max. wind<br>speed<br>(km/hr) <sup>4</sup>     | wind dir. |                                      |
| Dauphin Lake  | 856.29                       | 0.06                           | 856.23          | 19-Apr                     |   |   |                             | 853-854.8                    | 100              | 19-Apr                          | 23   | ↑         | low                                  |
| Lake Winnipeg   | 714.98                       | 0.04                           | 714.94          | 19-Apr                     | 715.6   | 716.1   |                             | 711-715                      | 100              | 19-Apr                          | 29   | ↑         | low                                  |
| Lake Manitoba   | 813.29                       | 0.07                           | 813.23          | 19-Apr                     | 813.7   | 814.0   | 814                         | 810.9-812.9                  | 100              | 19-Apr                          | 26   | ↑         | low                                  |
| Lake Winnipegosis   | 833.46                       | 0.00                           | 833.46          | 19-Apr                     | 833.7   | 835.0   |                             |                              | 100              | 19-Apr                          | 30   | ↑         | low                                  |
| Lake St. Martin   | 802.46                       | 0.00                           | 802.46          | 19-Apr                     | 803.0   | 803.4   | 805-806                     | 798-802                      | 100              | 19-Apr                          | 24   | ↑         | low                                  |
| Oak Lake  | 1411.58                      | 0.33                           | 1411.25         | 19-Apr                     |   |   | 1411.4                      | 1409-1410.5                  | 100              | 14-Apr                          | 27   | ↑         | low                                  |
| Pelican Lake  |                              |                                | 1353.31         | 19-Apr                     | 1353.5  | 1353.8  | 1354                        | 1350-1351.5                  | 90               | 18-Apr                          | 33   | ↑         | low                                  |
| Rock Lake   | 1337.65                      | -0.18                          | 1337.83         | 19-Apr                     | peaked 13-Apr. at 1339.6 ft                   |   |                             | 1328-1330                    | 80               | 14-Apr                          | 30   | ↑         | low                                  |
| Swan Lake   |                              |                                |                 |                            |   |   |                             |                              | 100              | 19-Apr                          | 12   | ↗         | low                                  |
| Red Deer Lake   | <b>861.11</b>                | 0.69                           | 860.42          | 17-Apr                     | 863.9   | 864.4   | 865.5                       |                              | 100              | 19-Apr                          | 10   | ↑         | low                                  |
| North Shoal Lake  | <b>860.01</b>                | 0.04                           | 859.97          | 18-Apr                     |   |   |                             |                              | 100              | 19-Apr                          | 31   | ↑         | low                                  |
| East Shoal Lake   | <b>860.41</b>                | 0.04                           | 860.37          | 18-Apr                     |   |   |                             |                              | 100              | 19-Apr                          | 31   | ↑         | low                                  |
| West Shoal Lake   | <b>860.35</b>                | 0.11                           | 860.24          | 18-Apr                     |   |   |                             |                              | 100              | 19-Apr                          | 31   | ↑         | low                                  |

<sup>1</sup>wind-effect eliminated levels

<sup>4</sup>daily maximum values based on 10 minute averages

<sup>2</sup>flood management level or lowest dike height

<sup>3</sup>readings in **bold** from 19. April (pm)



# Assiniboine River – Very High & Climbing Higher

60,000

50,000

40,000

30,000

20,000

10,000

0

cfs

06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

29-Jun

06-Jul

13-Jul

20-Jul

27-Jul





60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0

May 1- May 14

PROVINCE-WIDE FLOODING

- Red River
- Pembina River
- Souris River
- Pipestone Creek
- Ochre River
- Turtle River
- Vermillion River
- Whitemud River
- Saskatchewan River
- Elgin Creek
- Plum Creek
- Little Saskatchewan River
- Assiniboine River at Russle, Briswold, Sioux Valley
- Portage Reservoir
- Shoalmouth Reservoir
- Portage Reservoir



06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul

Portage Reservoir

# Another Major Storm – 50 mm of precip in Roblin, more to come

60,000

50,000

40,000

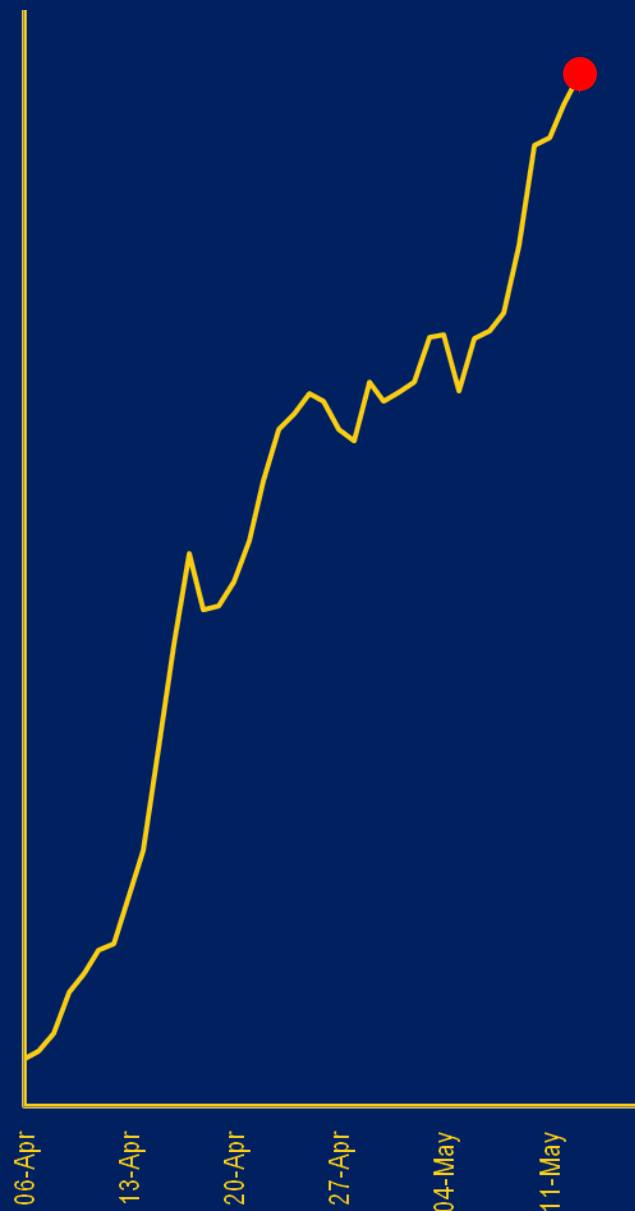
30,000

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cfs



**Stewardship**

**FLOOD REPORT FOR MANITOBA**

*April 30, 2011*

**Flood Warning\*:**

- The Souris River from Melita and all downstream reaches
- The Assiniboine River downstream of Shellmouth Bridge to Portage la Prairie
- Pipestone Creek, all reaches, Oak Lake and Plum Lakes, Plum Creek to the Souris River (including the Town of Souris)

**Flood Watch\*:**

- The Assiniboine River downstream of Portage la Prairie
- The Qu'Appelle River in St-Lazare area

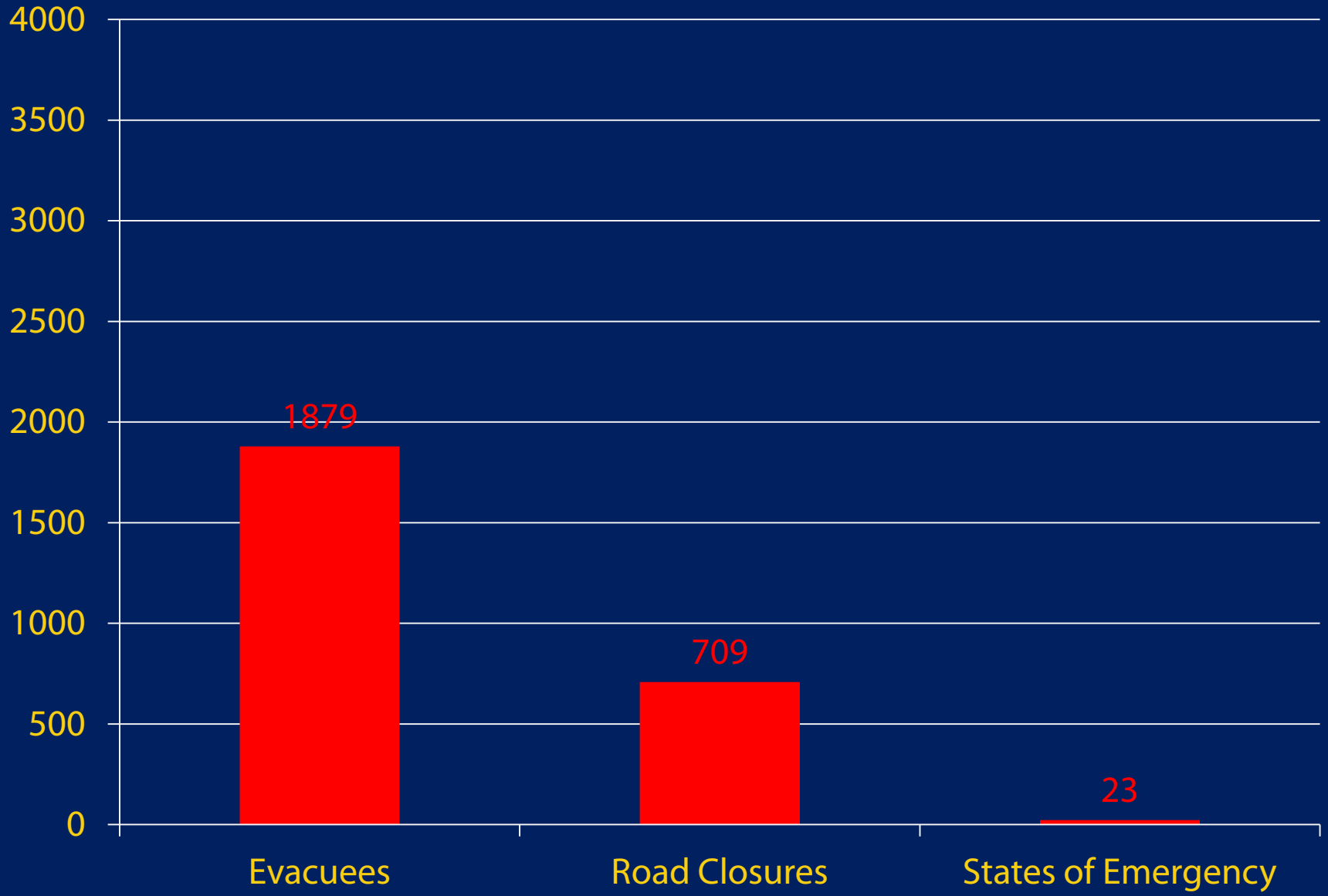
**Summary**

- A winter storm warning is in effect for much of western Manitoba and the north interlake area. Significant rainfall has accumulated over the last 24 hours. The follow lists accumulated precipitation today, so far:
  - Winnipeg 14 mm
  - Brandon 12 mm
  - Portage la Prairie 20 mm
  - Gladstone 21 mm
  - Roblin 46 mm (in last 24 hours)
  - Souris 27 mm
  - Eriksdale 16 mm
  - Fisher Branch 20 mm
- Due to high wind gusts forecast across Manitoba tomorrow, those properties with flood protection works and exposed to north winds can expect wind set-up and wave action and are advised to assess the need for flood protection reinforcements.

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul



01-May





# Assiniboine River Dikes in Bad Shape

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50,000  
40,000  
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20,000  
10,000  
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cfs







# Assiniboine River Dikes in Bad Shape

60,000

50,000

40,000

30,000

20,000

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0

cfs

06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

29-Jun

06-Jul

13-Jul

20-Jul

27-Jul





# Canadian Armed Forces Called In to Help

60,000

50,000

40,000

30,000

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cfs



# Canadian Armed Forces Called in to Help

60,000

50,000

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cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul





# Portage Diversion Reaches 10,000 cfs Above Capacity

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0

cfs





# Portage Diversion Reaches 10,000 cfs Above Capacity

60,000

50,000

40,000

30,000

20,000

10,000

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cfs



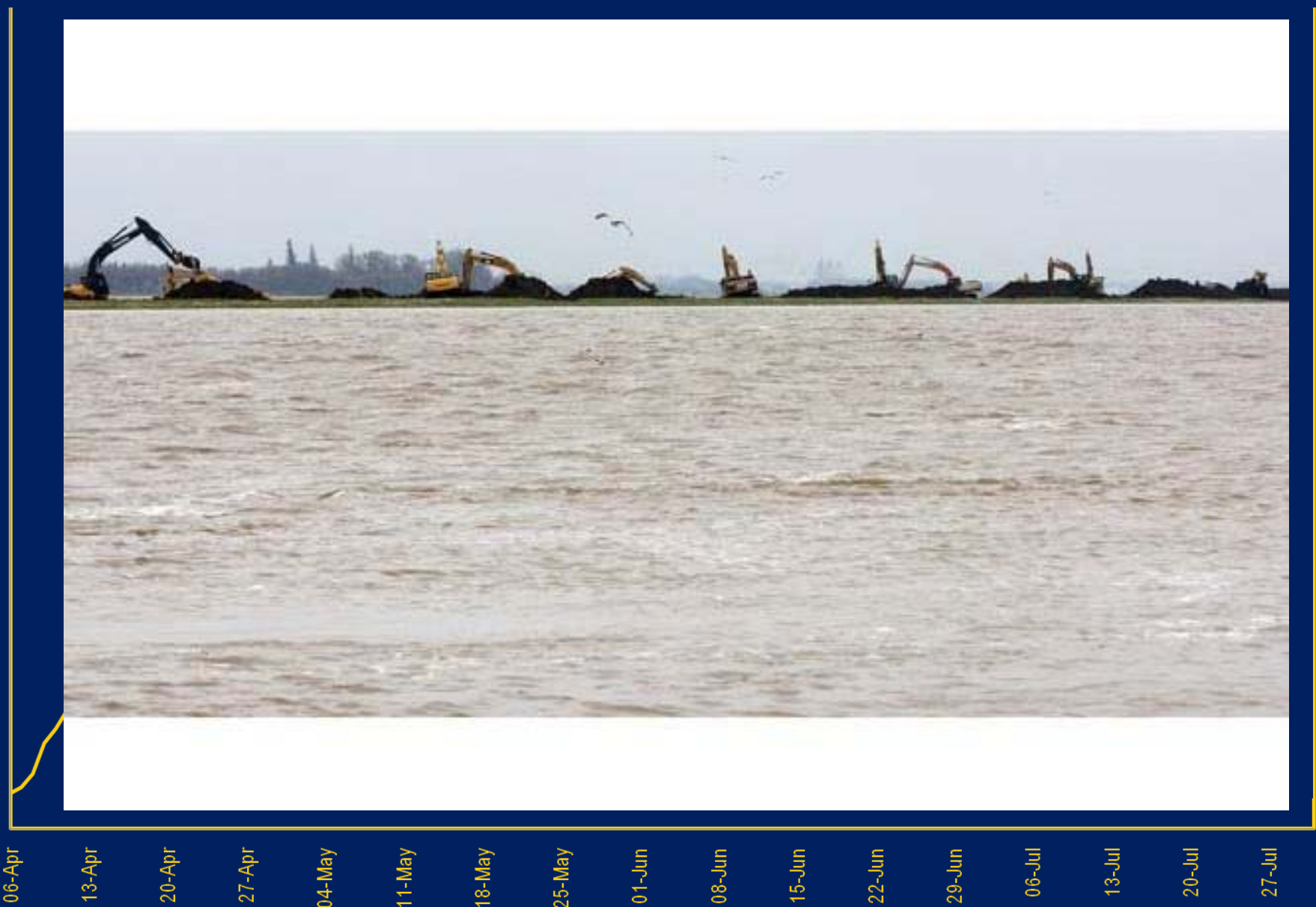
06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul

# Portage Diversion Reaches 10,000 cfs Above Capacity

60,000  
50,000  
40,000  
30,000  
20,000  
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cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul





# Portage Diversion Reaches 10,000 cfs Above Capacity

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0

cfs



# Assiniboine River Inundating Homes Between Portage and Wpg

60,000

50,000

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30,000

20,000

10,000

0

cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul







# Serious Decision Making

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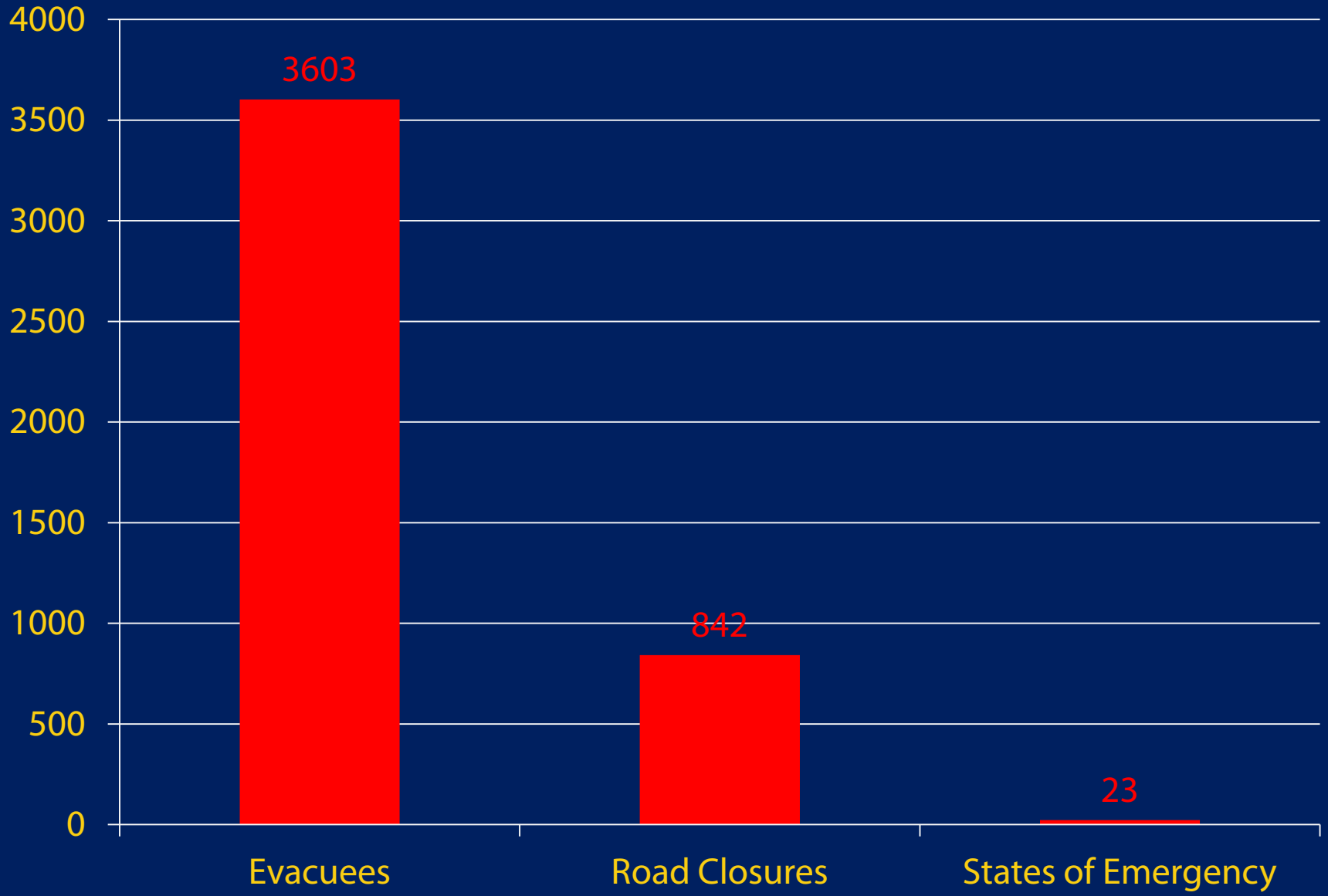
cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul

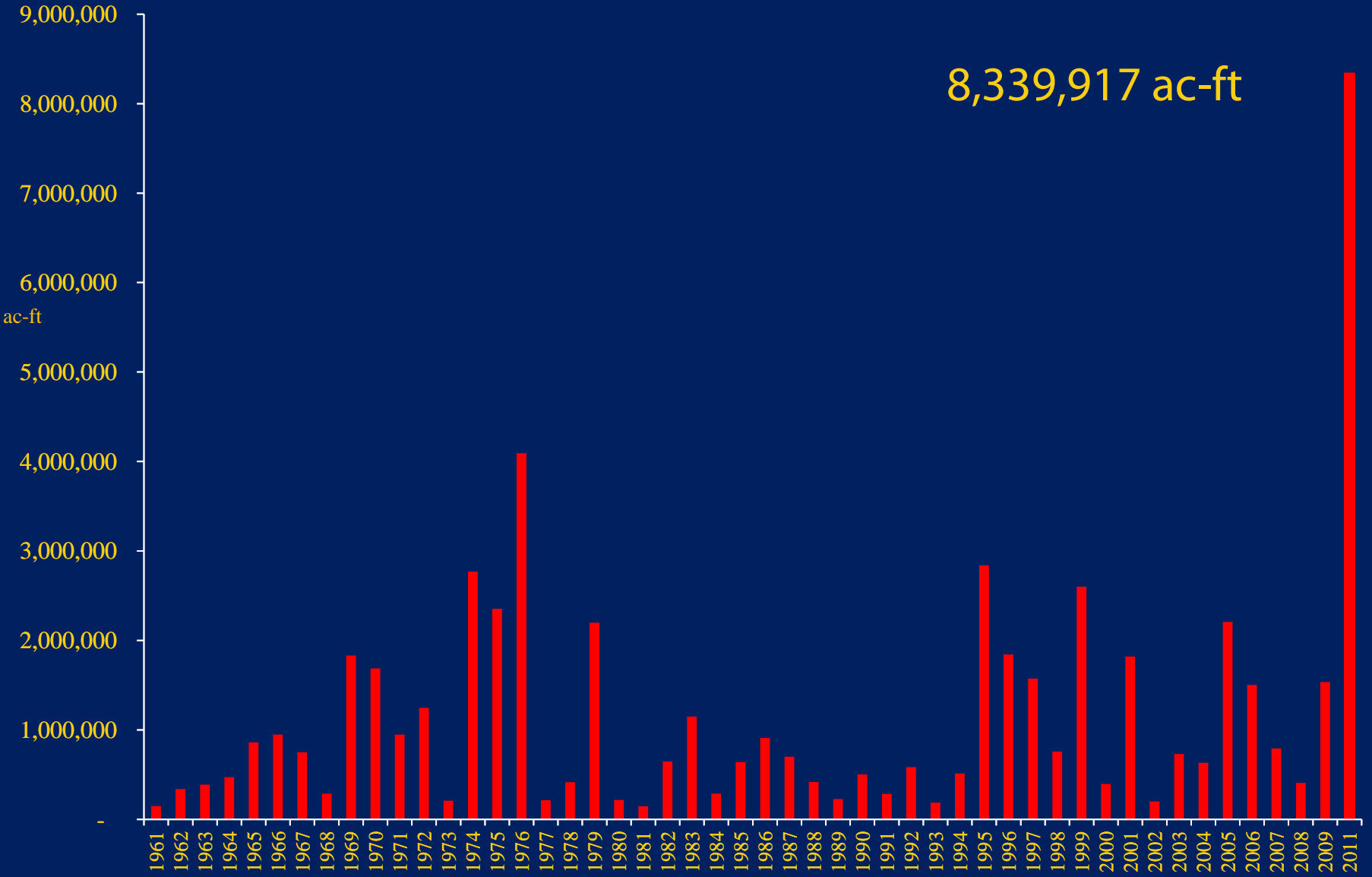




■ 15-May



# Total Volume of Water Flowing Down the Assiniboine River Between April and July Annually



# Serious Decision Making

60,000

50,000

40,000

30,000

20,000

10,000

0

cfs

## Portage Reservoir

May 11 Forecast: 54,000 normal conditions - 56,000 cfs upper decile

May 14 Actual: 52,300 cfs (within 3% of n.c. forecast)

## Assiniboine River

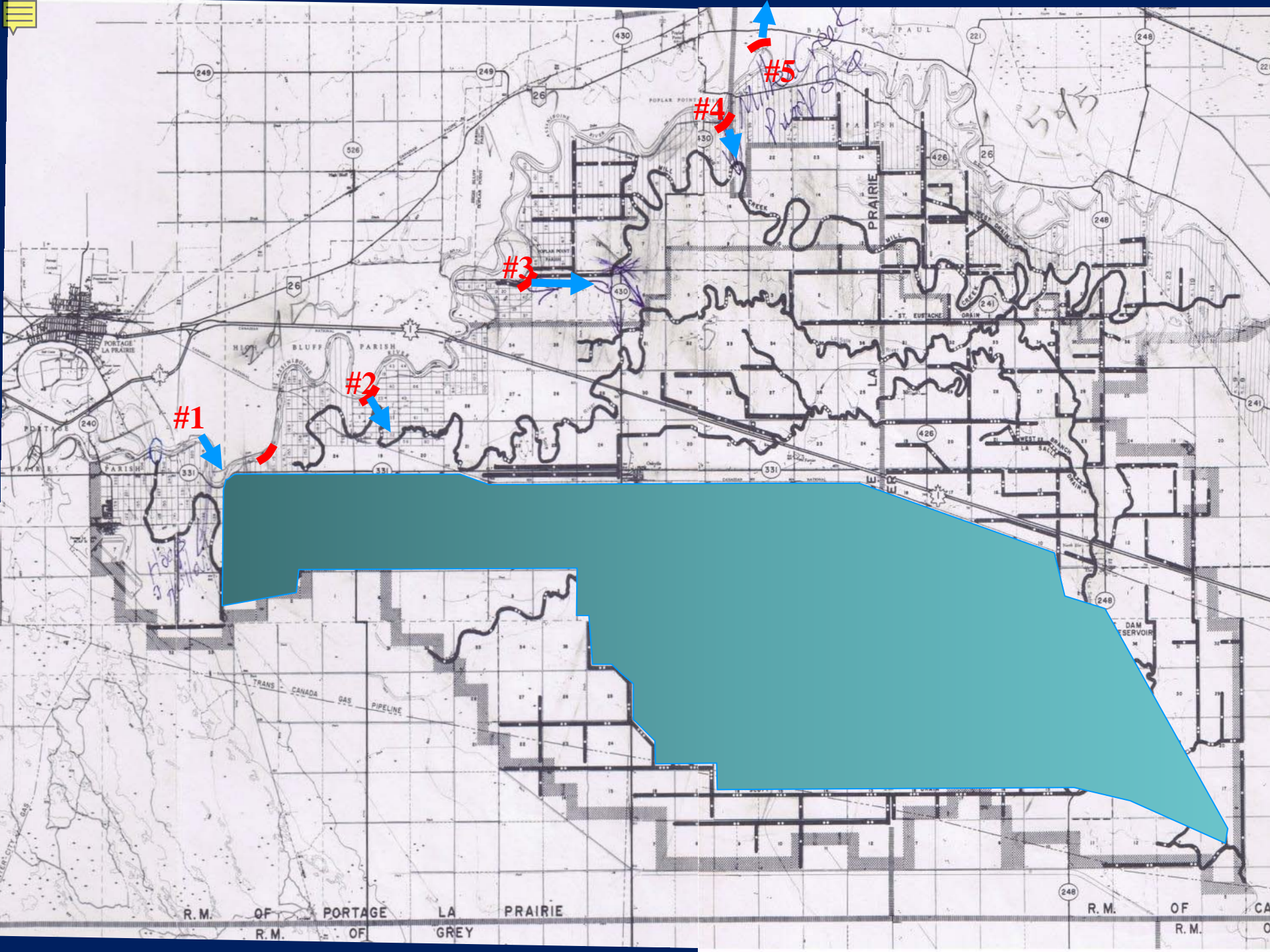
Actual: 18-19,000 cfs

## Portage Diversion

Actual: 34,000 cfs

If we get the upper decile, where will the remaining 3,000 cfs go?

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul



#1

#2

#3

#4

#5



*Handwritten blue notes and scribbles*

*Handwritten blue notes and scribbles*

*Handwritten blue notes and scribbles*

R.M. OF PORTAGE LA PRAIRIE  
R.M. OF GREY

R.M. OF CA  
R.M. OF O



60,000

# Media Attention

50,000

40,000

30,000

20,000

10,000

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cfs

06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

29-Jun

06-Jul

13-Jul

20-Jul

27-Jul



06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

29-Jun

06-Jul

13-Jul

20-Jul

27-Jul



River at Hoop and Bend east of Portage la Prairie will begin a.m. today. The province has employees who work hours and h

**SIX DAYS AGO**, weary officials learned a 'catastrophic and unpredictable' disaster loomed on the Assiniboine River. They were left with **ONE CHOICE** — the desperate gamble of deliberately flooding out homes and farms southeast of Portage la Prairie to save hundreds more properties.

**THAT DECISION WAS TO BECOME A REALITY THIS MORNING**

# The great sacrifice



SS®



e

take to se and Lake F vich's pro go, the l ng 19,00





# National News

60,000

50,000

40,000

30,000

20,000

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cfs

06-Apr  
13-Apr





# Hoop and Holler

60,000

50,000

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30,000

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cfs



06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

29-Jun

06-Jul

13-Jul

20-Jul

27-Jul

# Hoop and Holler

60,000

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0

cfs



06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul

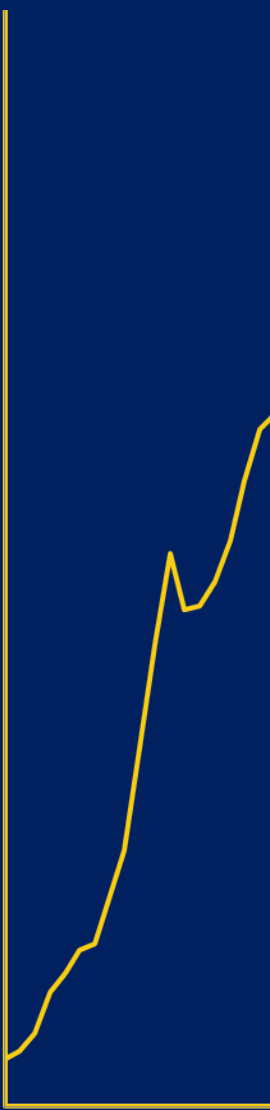


# Hoop and Holler

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0

cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul





# Hoop and Holler

60,000

50,000

40,000

30,000

20,000

10,000

0

cfs



06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

29-Jun

06-Jul

13-Jul

20-Jul

27-Jul



# Water levels begin to decline....really?

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0

cfs





60,000

# Brandon

50,000

40,000

30,000

20,000

10,000

0

cfs

06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

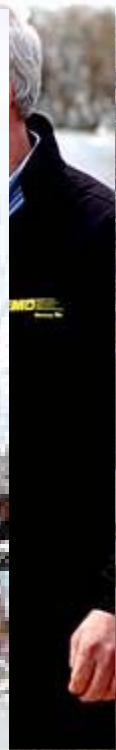
29-Jun

06-Jul

13-Jul

20-Jul

27-Jul



# News Changes For Awhile...

60,000

50,000

40,000

30,000

20,000

10,000

0

cfs

06-Apr

13-Apr

20-Apr

27-Apr

## NHL returns to Winnipeg with Thrashers sale

POSTMEDIA NEWS MAY 31, 2011 COMMENTS (90)

STORY

PHOTOS (7)



More Images »

Hockey fans celebrate the return of NHL hockey in Winnipeg, Manitoba May 31, 2011. Canada reclaimed one of its lost NHL franchises on Tuesday when the Atlanta Thrashers were sold to True North Sports and Entertainment and relocated to Winnipeg, triggering wild celebrations in the Prairie city.

MORE ON T

● Winnipeg ready to buy tickets

● Winnipeg the odd one out

● Thrashers expected to seam

● B.C. may run the poll

● NHL's Winnipeg bittersweet

● Live NHL in

27-Jul

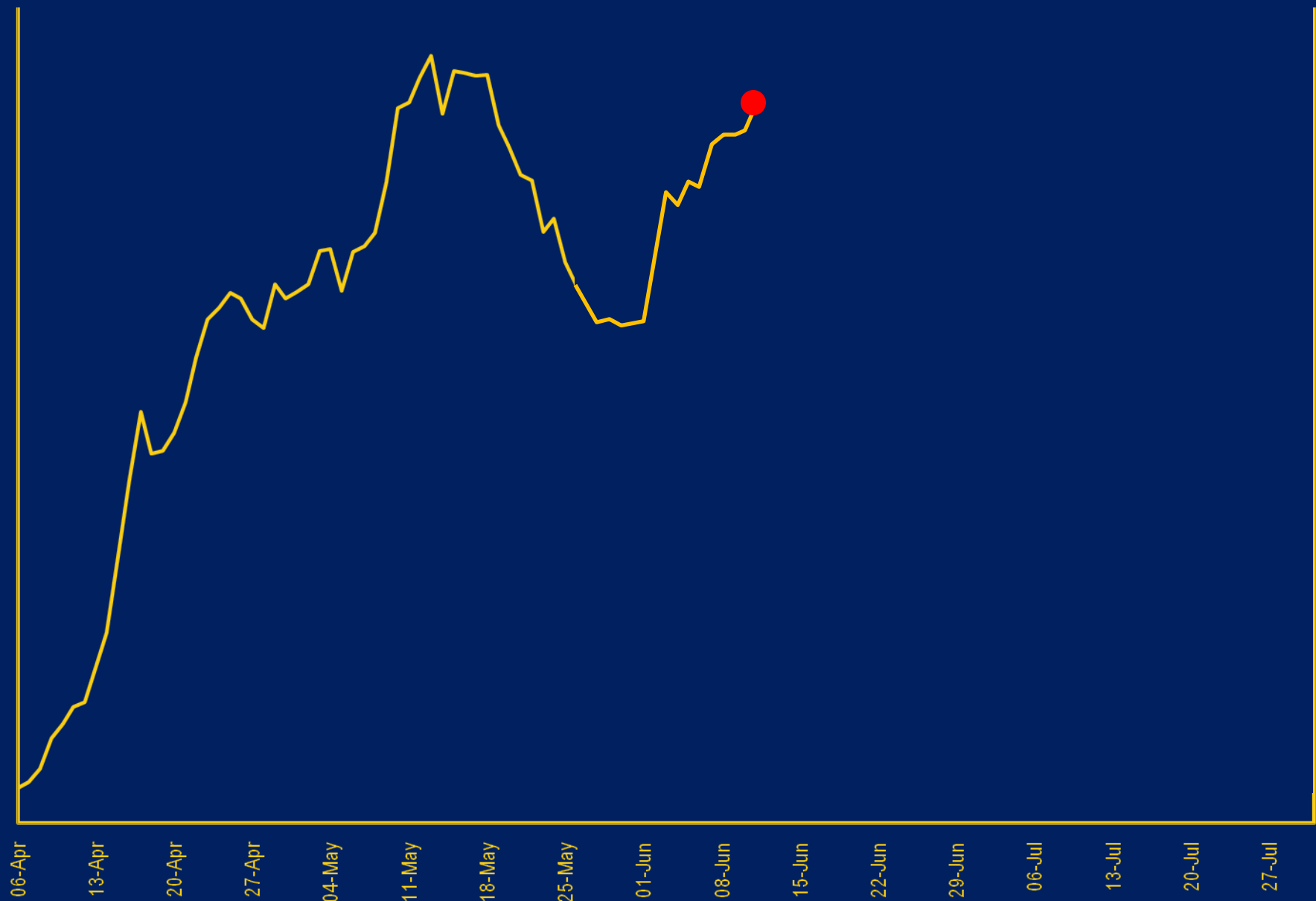




# May 27 – June 1 storms

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0

cfs



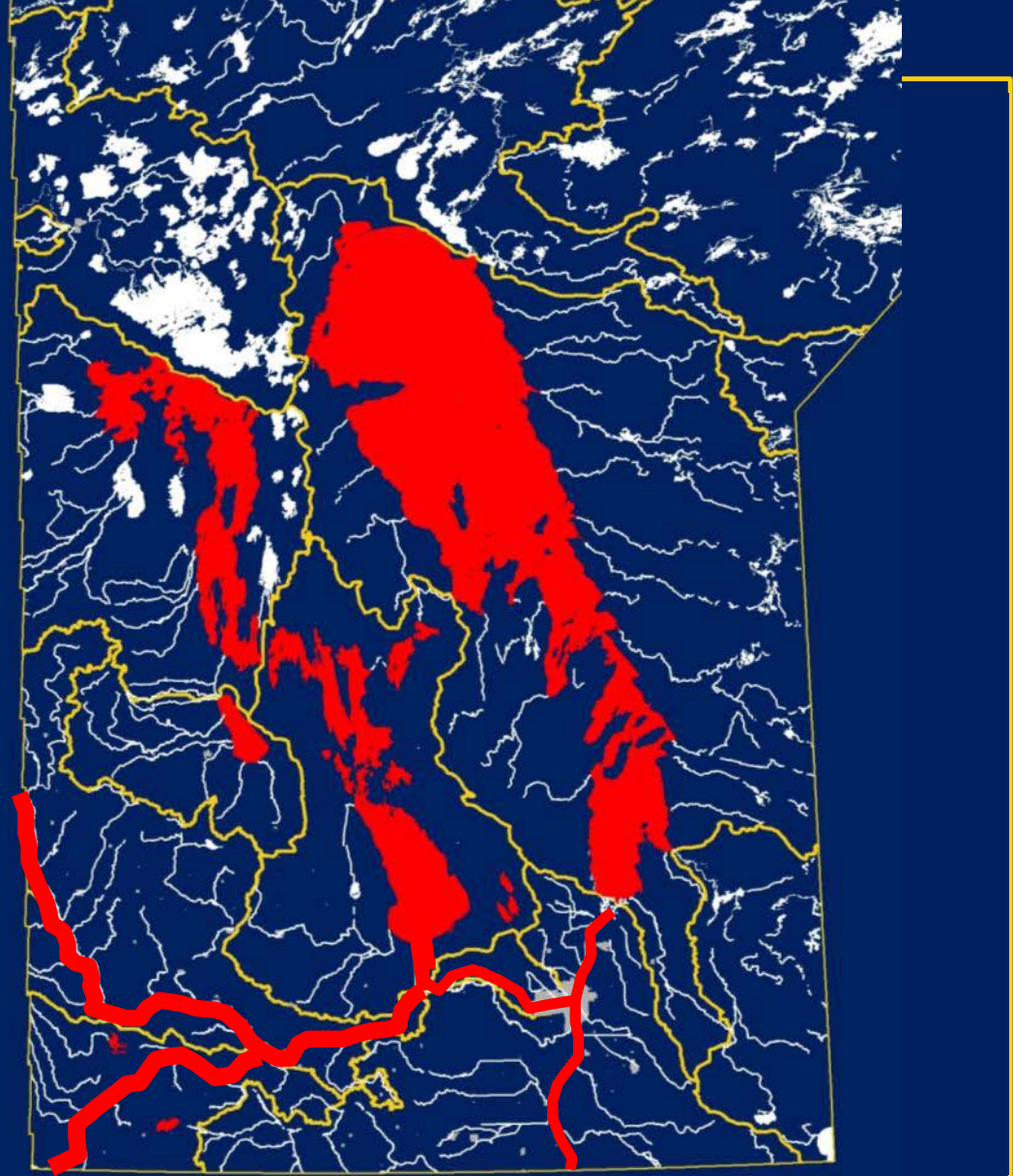
06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul



60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0



**Lakes Inundate Land**  
**Lake Manitoba**  
**Lake St. Martin**  
**Dauphin Lake**  
**Oak Lake**  
**Lake Winnipegosis**  
**Whitewater Lake**  
**Shoal Lakes**  
**Lake Winnipeg**  
**Assiniboine River**  
**Souris River**



25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul



# May 31 Storm

60,000

50,000

40,000

30,000

20,000

10,000

0

cfs

06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

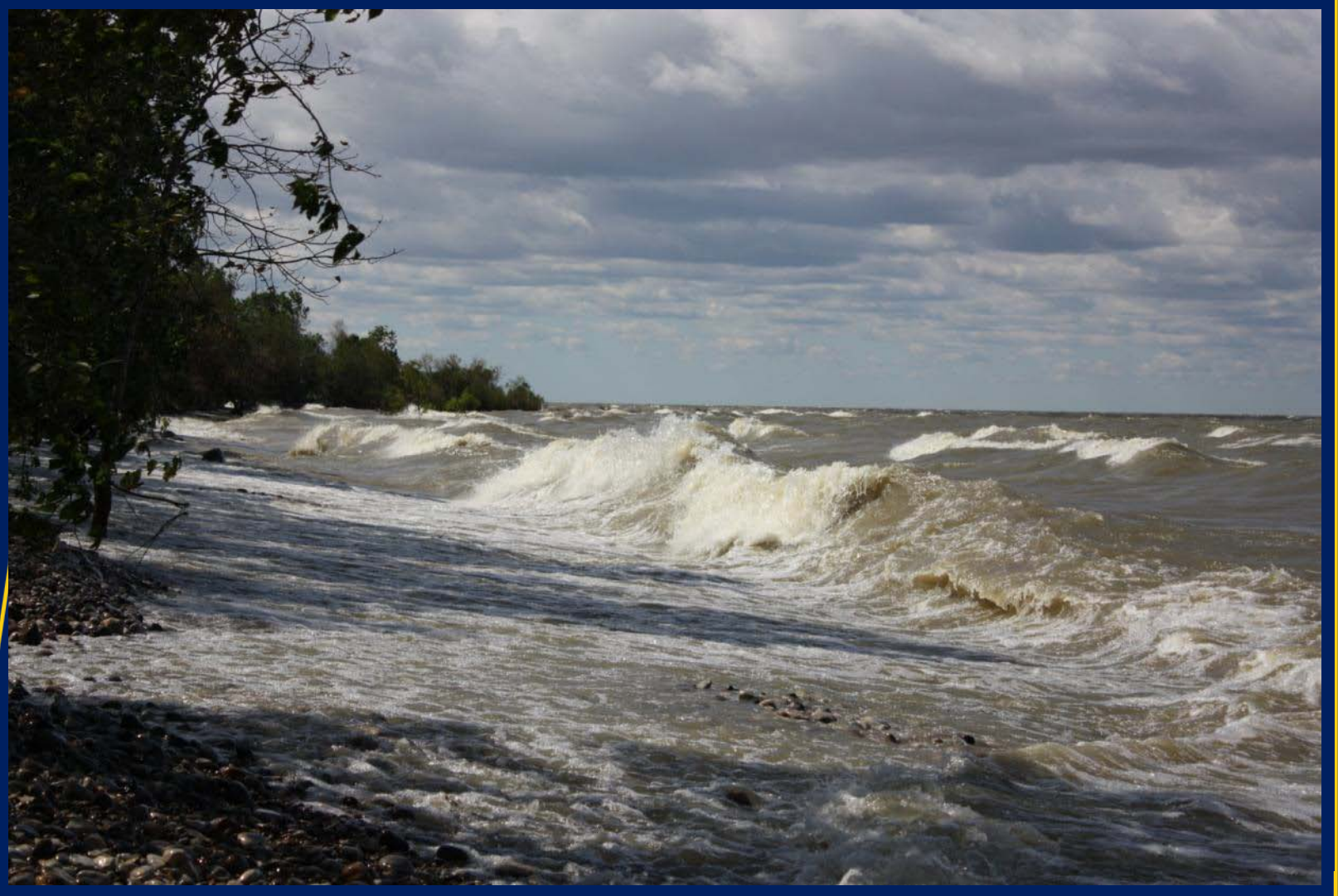
29-Jun

06-Jul

13-Jul

20-Jul

27-Jul





# May 31 Storm

60,000

50,000

40,000

30,000

20,000

10,000

0

cfs

06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

29-Jun

06-Jul

13-Jul

20-Jul

27-Jul





# May 31 Storm

60,000

50,000

40,000

30,000

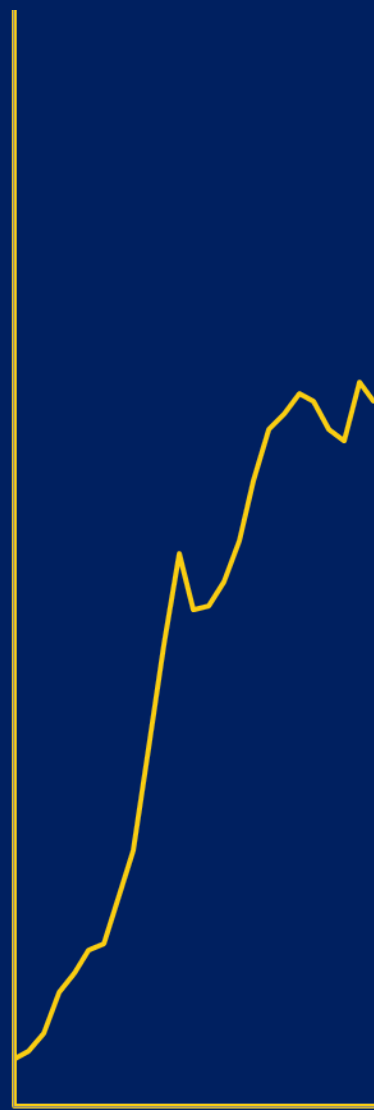
20,000

10,000

0

cfs

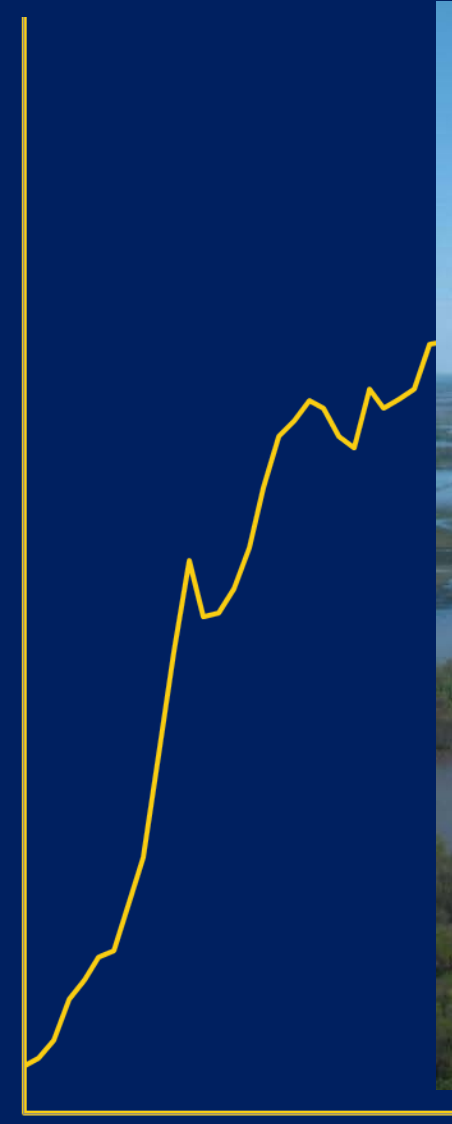
06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul





# May 31 Storm

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0



06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul



# May 31 Storm

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0



06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul

# May 31 Storm

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0



06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul





60,000

Lake Winnipeg peaked at 716.9 feet on July 30<sup>th</sup> (wind eliminated)

50,000

40,000

30,000

20,000

10,000

0

cfs

06-Apr 13-Apr



60,000

Lake Manitoba peaked at 817.15 ft btwn July 12 - 25 (*wind eliminated*)

50,000

40,000

30,000

20,000

10,000

0

cfs

06-Apr

1

2

2

0

1

1

2

0

0

1

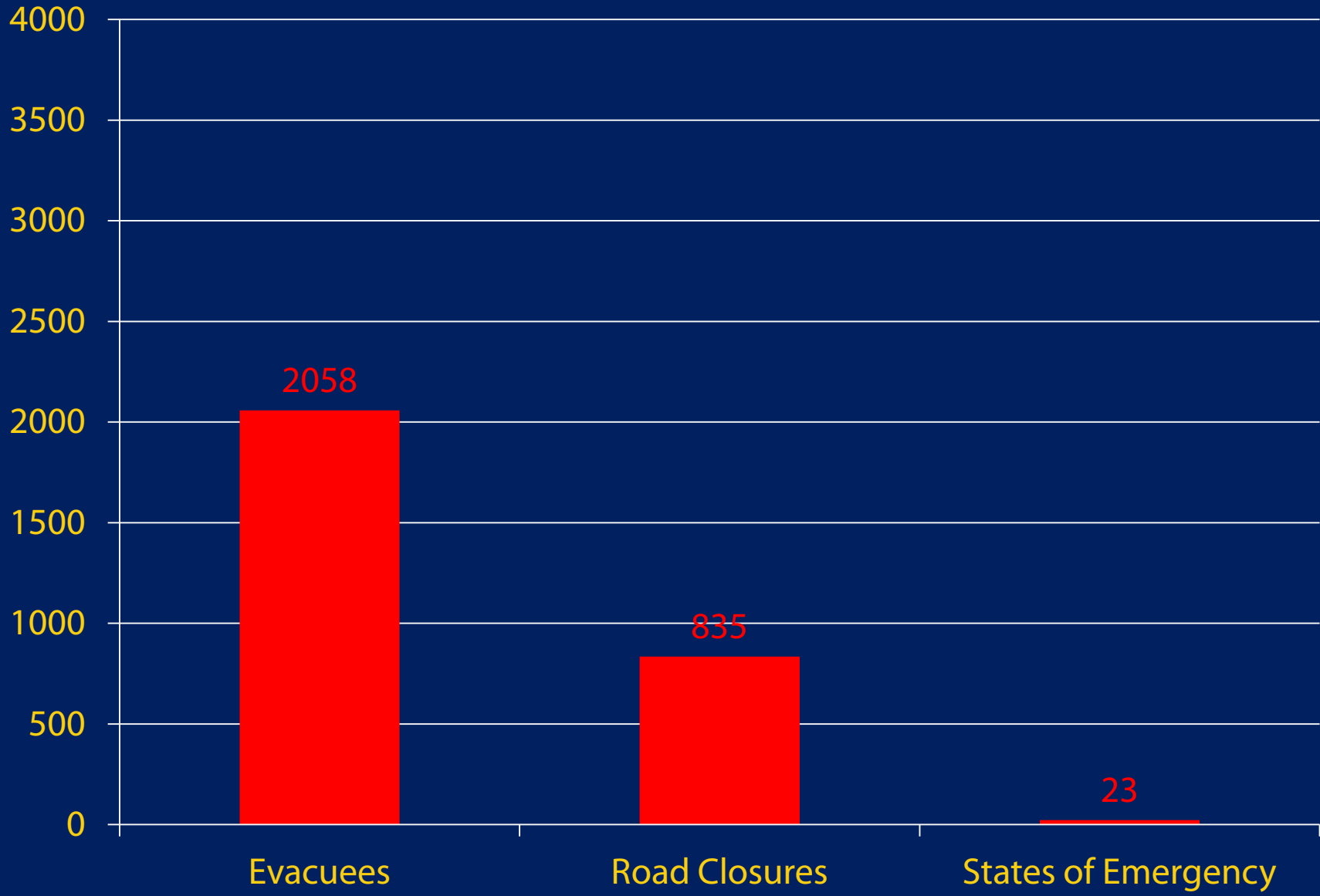
2

2





06-Jun



# Lakes – Inundation, Wind and Wave Damage

60,000

50,000

40,000

30,000

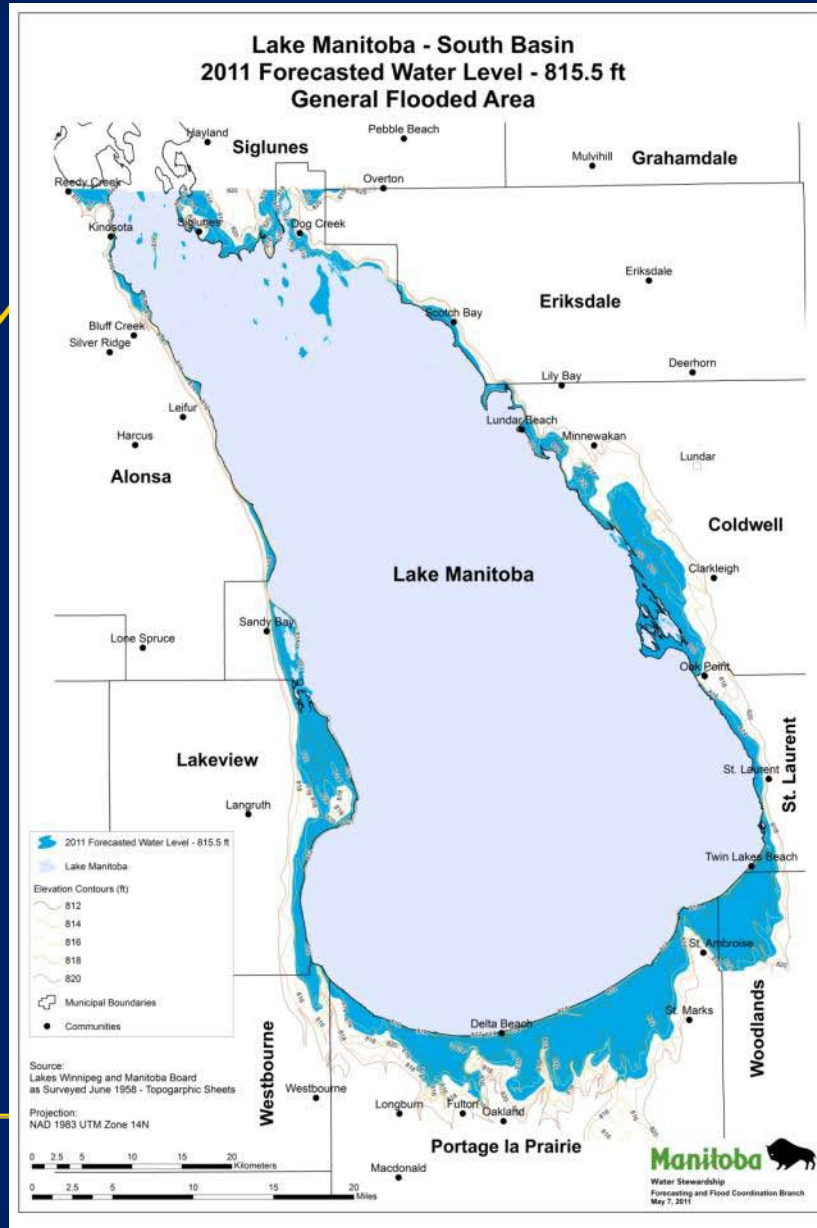
20,000

10,000

0

cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May



20-Jul

27-Jul

# Developed and Wind Alert System

60,000

50,000

40,000

30,000

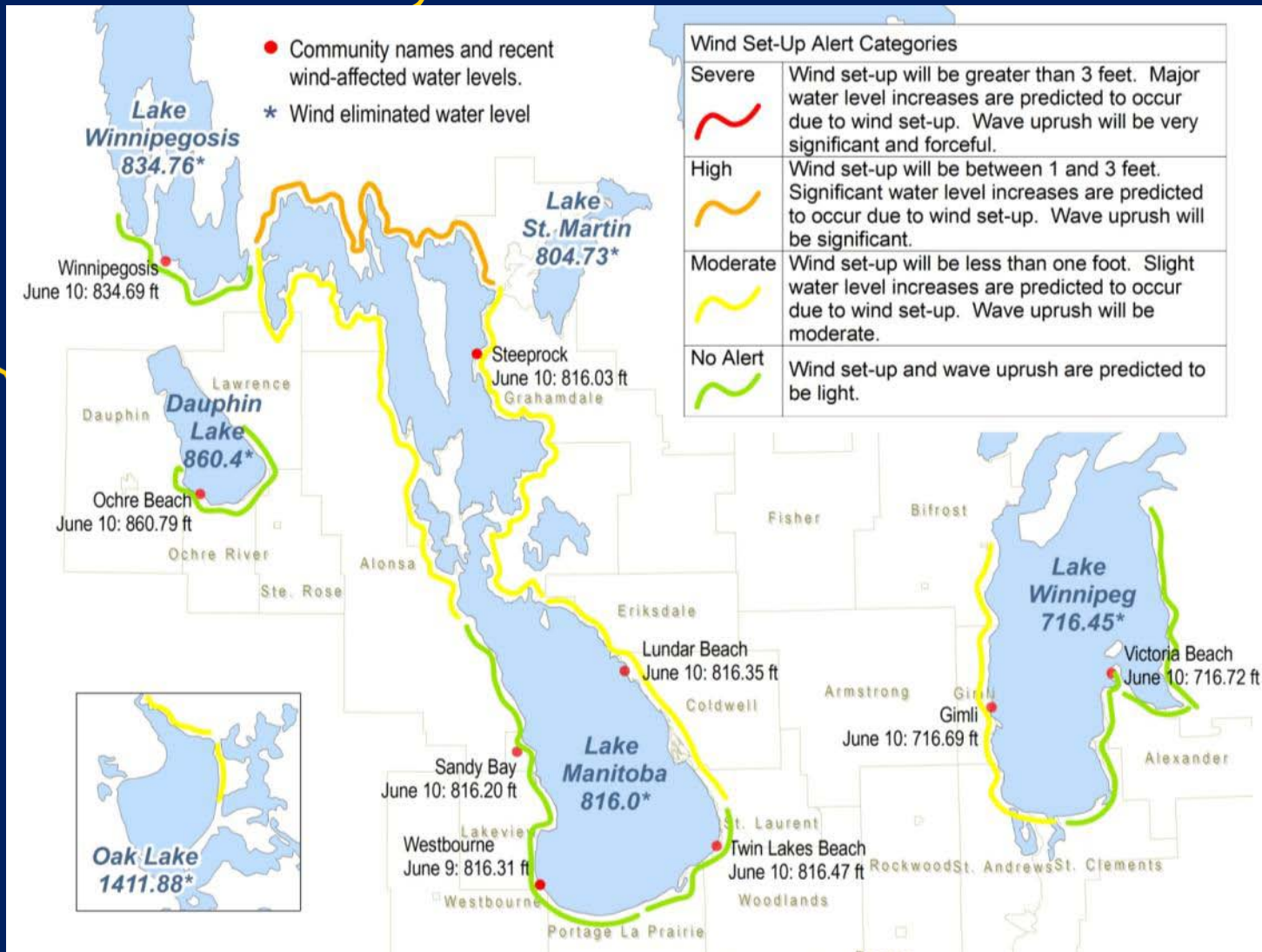
20,000

10,000

0

cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May 11-May 18-May 25-May 01-Jun 08-Jun 15-Jun 22-Jun 29-Jun 06-Jul 13-Jul 20-Jul 27-Jul

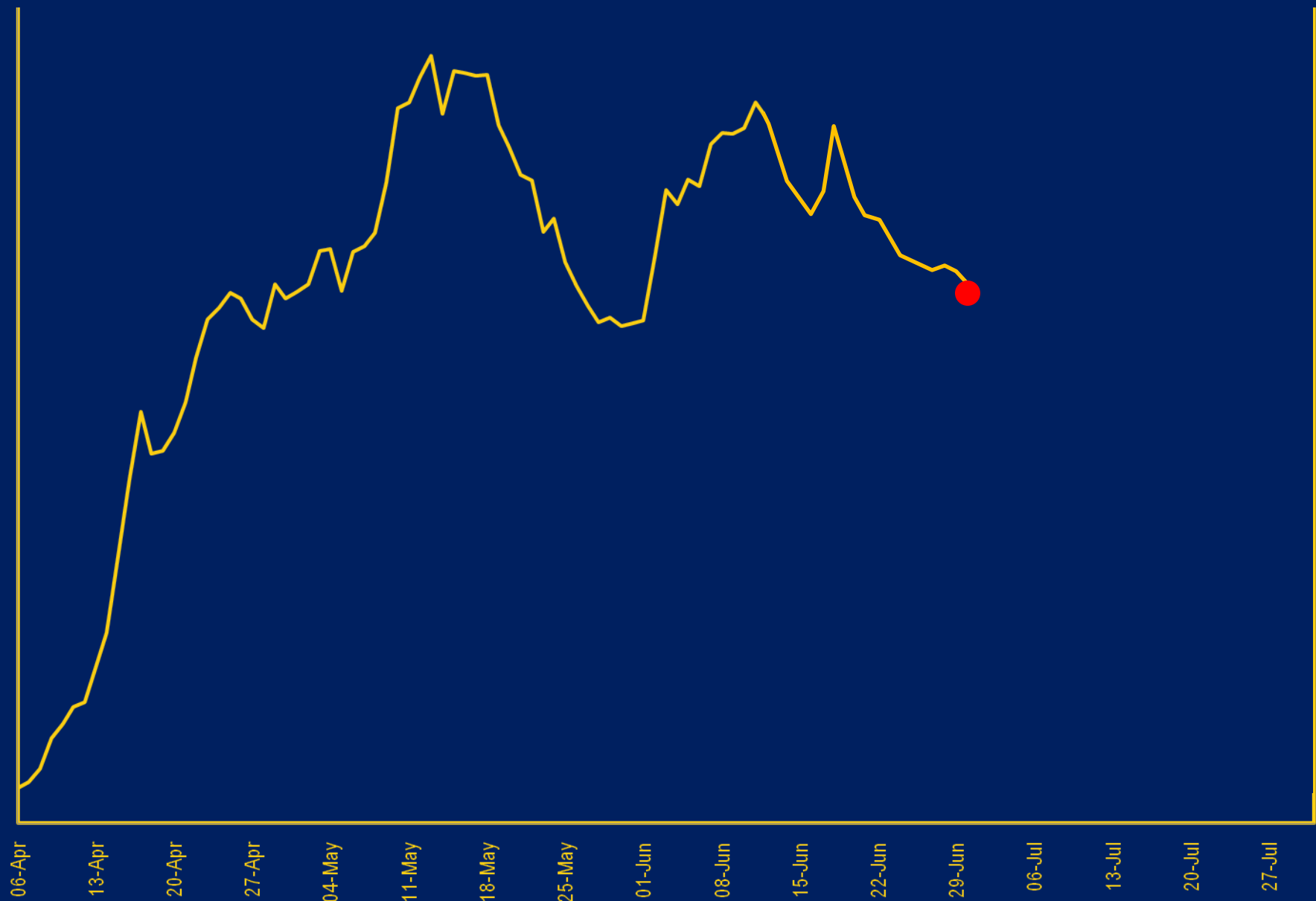




# Assiniboine River declines mid-June

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0

cfs



06-Jul  
13-Jul  
20-Jul  
27-Jul

# Major Storm Across Alberta, Saskatchewan and Western MB

60,000

50,000

40,000

30,000

20,000

10,000

0

cfs

06-Apr

13-Apr

20-Apr

27-Apr

04-May

11-May

18-May

25-May

01-Jun

08-Jun

15-Jun

22-Jun

29-Jun

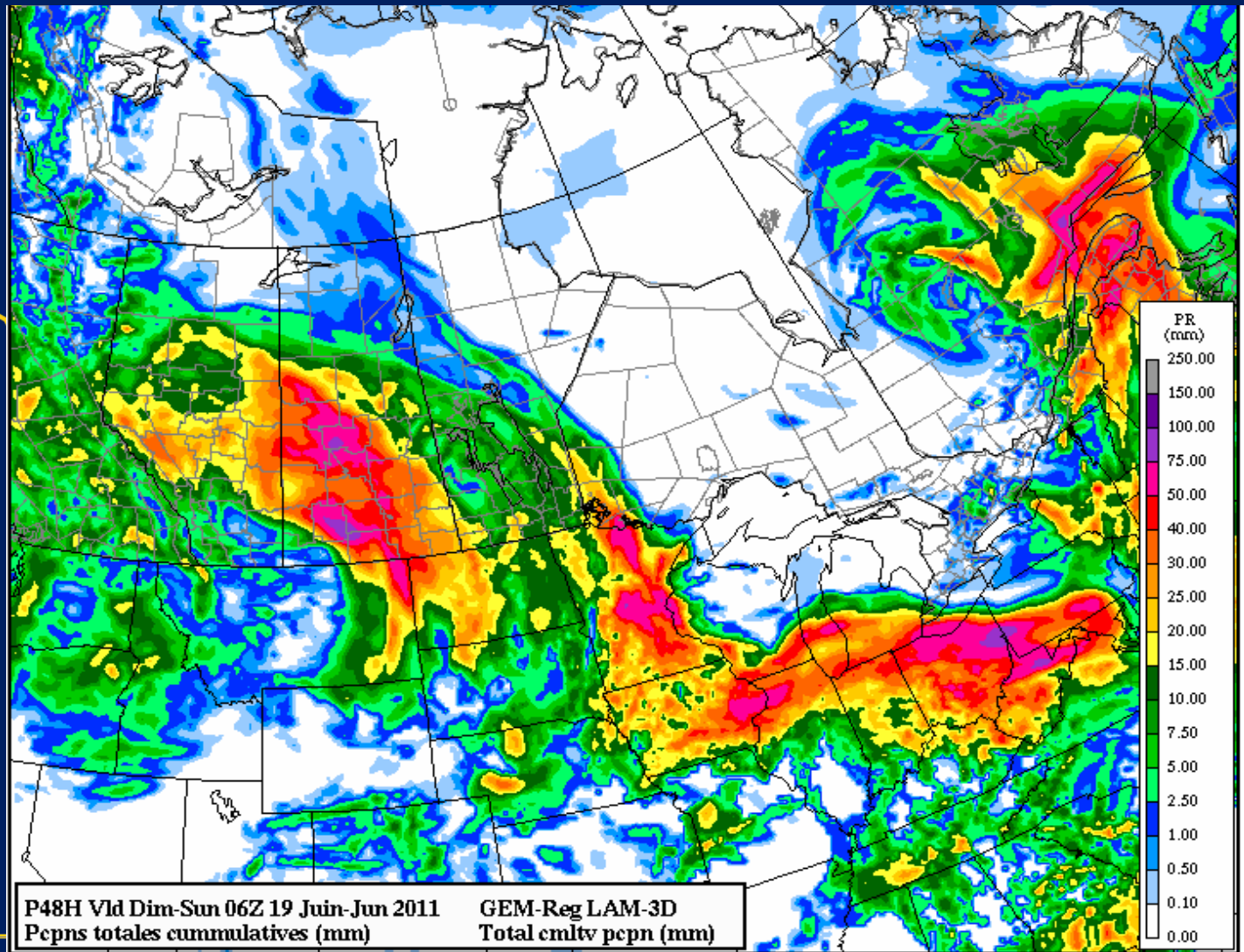
06-Jul

13-Jul

20-Jul

27-Jul

P48H Vld Dim-Sun 06Z 19 Juin-Jun 2011 GEM-Reg LAM-3D  
Pcpns totales cummulatives (mm) Total emltv pcprn (mm)



# Upper portion of Souris River Basin Gets Slammed

60,000

50,000

40,000

30,000

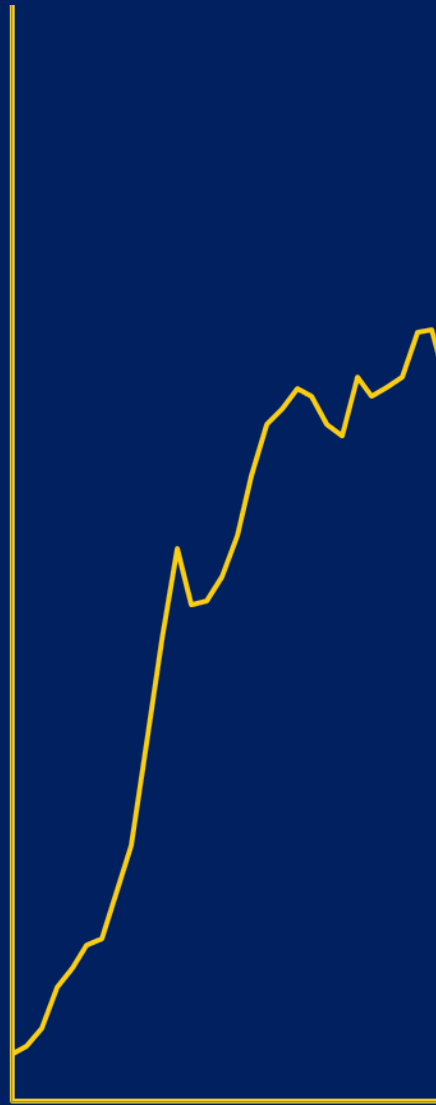
20,000

10,000

0

cfs

06-Apr 13-Apr 20-Apr 27-Apr 04-May



CBCnews | Canada

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Canada SK Photo Galleries

## New flood threat in southern Saskatchewan

CBC News Posted: Jun 18, 2011 2:31 PM CST | Last Updated: Jun 18, 2011 8:08 PM CST 34



The town of Yellow Grass was hit with a flash flood on Friday night. (CBC)

The release of rising waters from reservoirs along the Souris River is threatening to flood homes near Estevan, Sask., residents say.

The danger comes on the heels of a torrential downpour in southern

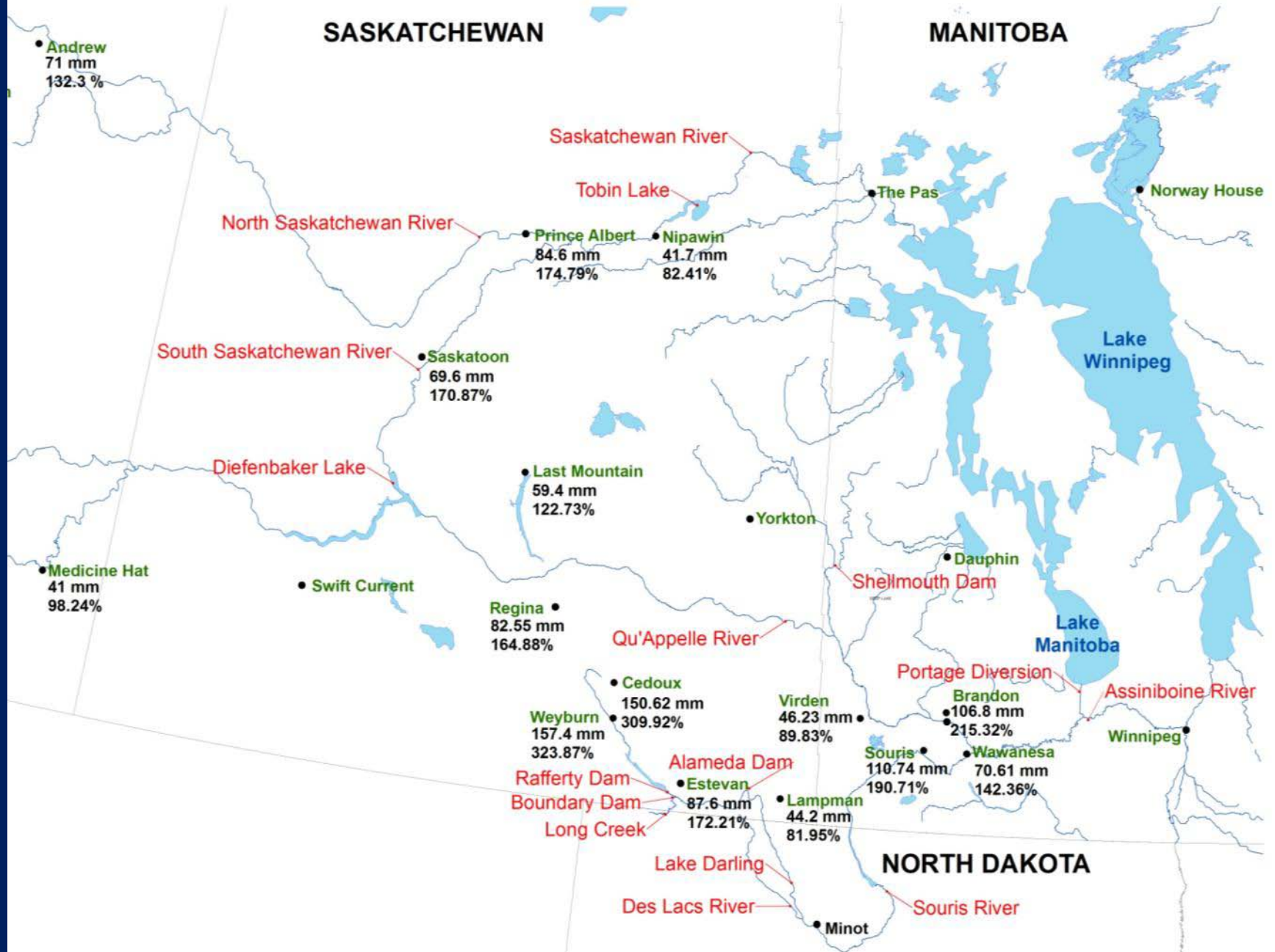


27-Jul



# June 2011 Precipitation (mm) and Percent of Normal (%)

60,000  
50,000  
40,000  
30,000  
20,000  
10,000  
0



60,000

# Minot, North Dakota



06 13 20 27 04 11 18 25 01 08 15 22 29 0 1 2 2

# Record-Breaking Year ?

|  | 1997                   | 2011   |
|--|------------------------|--|
| MB Emergency Coordination Centre         | 33 days open           | 103 days open  |
| State of Emergencies & Prevention Orders | 16                     | 102  |
| Total Evacuees                           | 28,000                 | 7,165  |
| Sandbags                                 | ??                     | 10 million +   |
| Army Personnel                           | ~ 8,000                | 1200 Assiniboine + 300 Souris  |
| Hydrometric crews                        | 4                      | 13 (Prov) + 7 (WSC) = 20   |
| Reporting                                | ~ 1-3 flood sheets/day | Daily Risk of Ice Pile-Up Reports<br>Daily Wind Alerts<br>11 different flood sheets/day at one point |

# Record-Breaking Year - YES

| River                    | Recurrence Interval in Years of Peak Flow |
|--------------------------|---|
| Assiniboine at Brandon*  | 333 (highest ever recorded)               |
| Assiniboine at Portage*  | 217 (highest ever recorded)               |
| Souris at Westhope       | 213 (highest ever recorded)               |
| Souris at Melita         | 153 (likely behind 1882)                  |
| Qu'Appelle at Welby      | 139 (highest ever recorded)               |
| Elgin Creek              | 83 (highest ever recorded)                |
| Assiniboine at Russell * | 69 (second highest ever)                  |
| Oak Creek                | 50 (highest ever recorded)                |
| Pembina at Neche         | 43 (third highest ever)                   |
| Red River at James Ave*  | 30 (sixth highest ever)                   |

## Why this flood was different than '97

- Landowners on lakes significantly impacted
- 1997 flood much shorter duration
- Geographically extensive flood
- 'High tech' flood management
  - sat imagery
  - ice breaking
  - forecasting
  - rapid deployment of emergency flood protection equipment
  - monitoring networks
  - real-time information
  - communications

# Lessons Learned

- **Preparation is essential**

- Met with Emergency Coordinators in March
- Broke ice early
- Assiniboine River dike upgrades
- 800 provincial staff dedicated to flood fighting
- More monitoring - increase in # of hydrometric crews

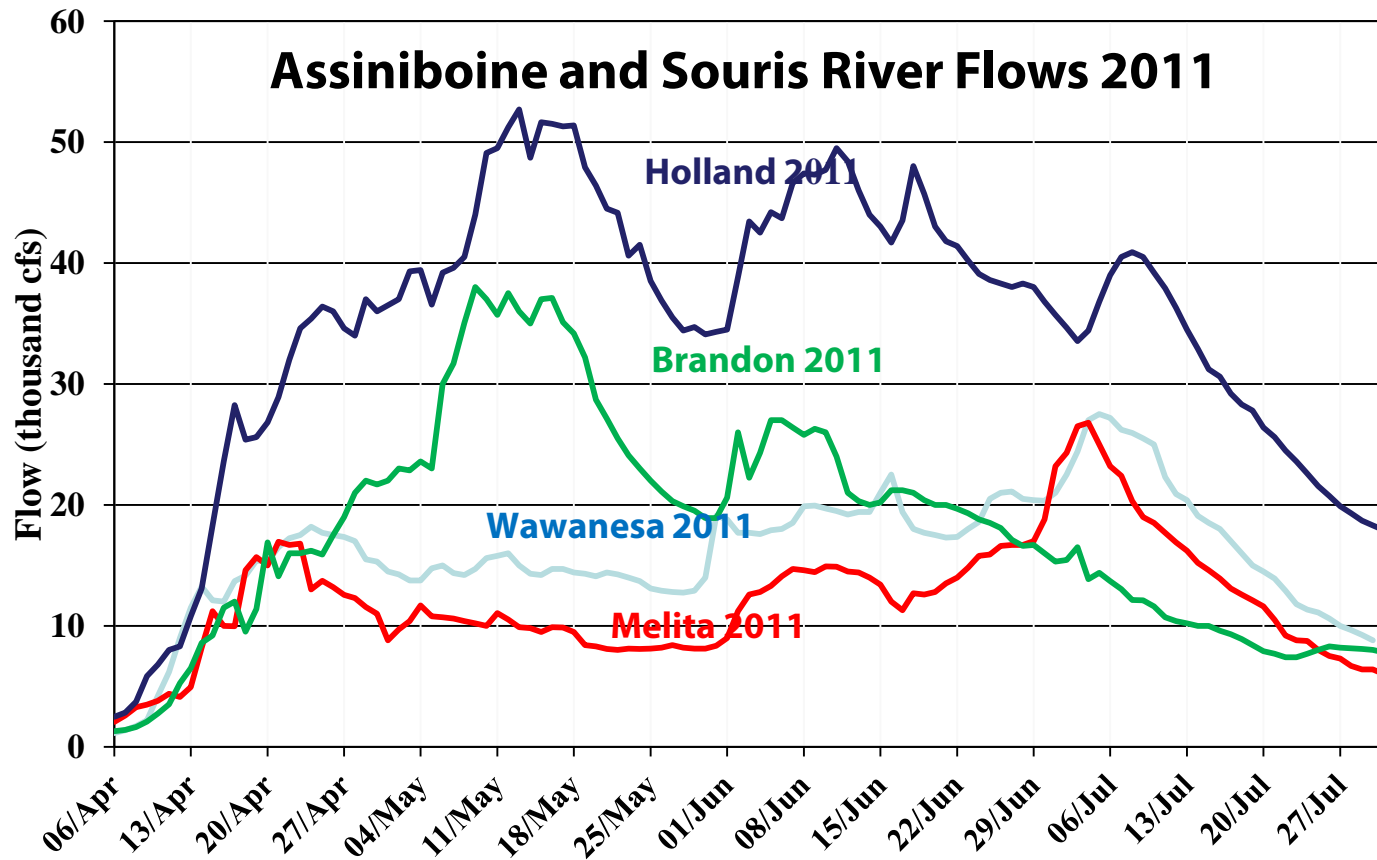


# Lessons Learned

- **Flood Protection Infrastructure – it works**
  - Shellmouth Dam: Water levels at Brandon on May 1<sup>st</sup> experienced 11,500 cfs reduction (reduction of 2.6 ft at 1<sup>st</sup> Street)
  - Red River Floodway and Portage Diversion: Water levels at James Avenue in Winnipeg on May 4<sup>th</sup> experienced 36,700 cfs reduction (reduction of 8.2 ft)

# Lessons Learned

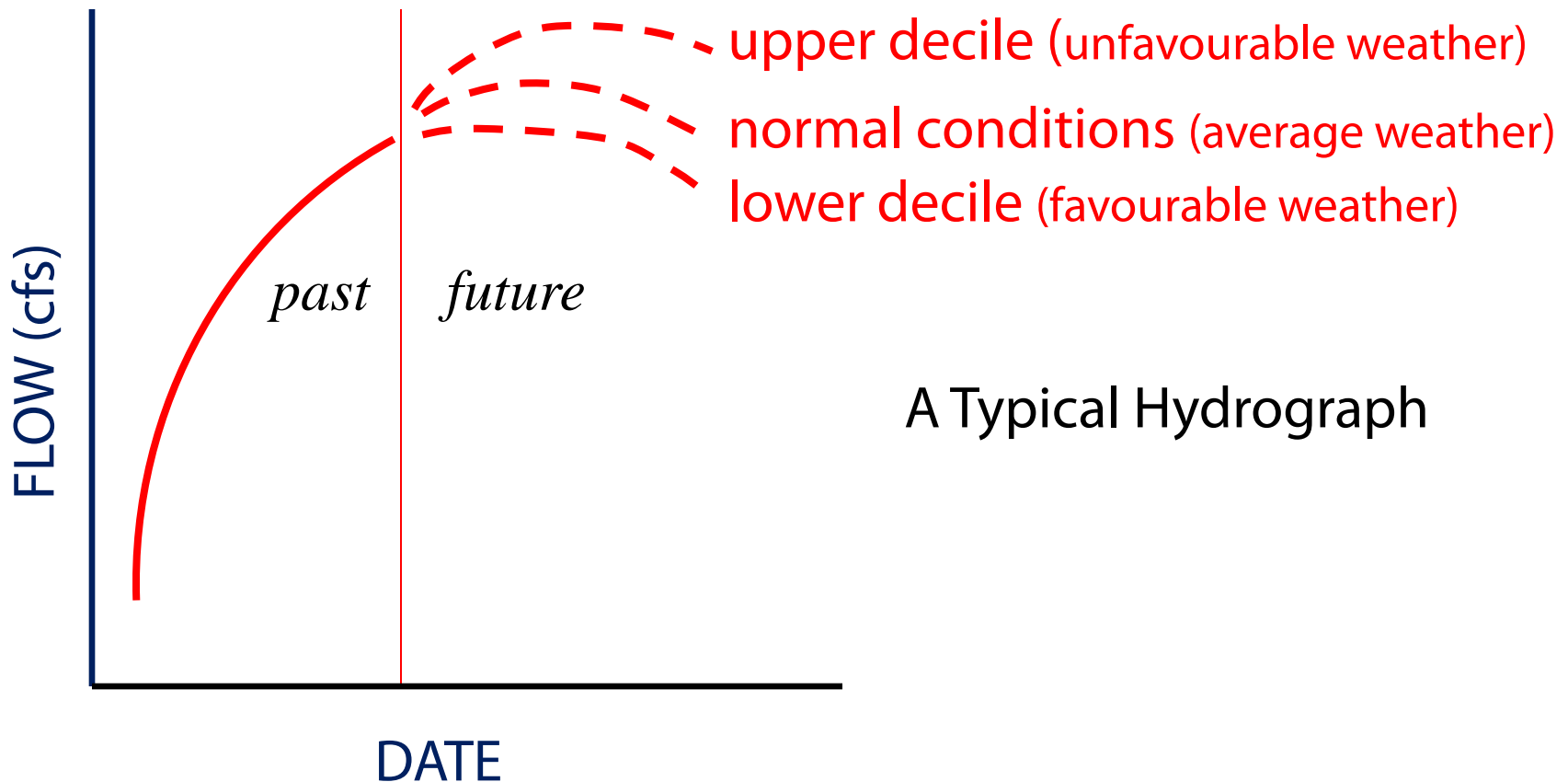
- Public wants to know *'Which day will it peak?'*
  - But sometimes the peak is longer than one day, or there are multiple peaks.





# Lessons Learned

- Forecasting peaks in ranges can be difficult to understand.



# Lessons Learned

- More scrutiny with development on floodplains



Brandon Corral  
Centre 2011



Breezy Point - 2011

Brandon: "Flats" Flood  
Plain Evacuation



# Lessons Learned

- Educate on how to build a sandbag dike
- Sometimes good dikes fail



# Lessons Learned

- Communicating Issues Very Important
- Public, Municipalities, Departmental
- Web Access to All Reports
- In Places with no Web Access, Fax Daily Reports
- Daily Media Reports

|                   |      |
|-------------------|------|
| Flood Reports     | 130+ |
| Situation Reports | 117  |
| Media Bulletins   | 98   |
| Media Briefings   | 75   |

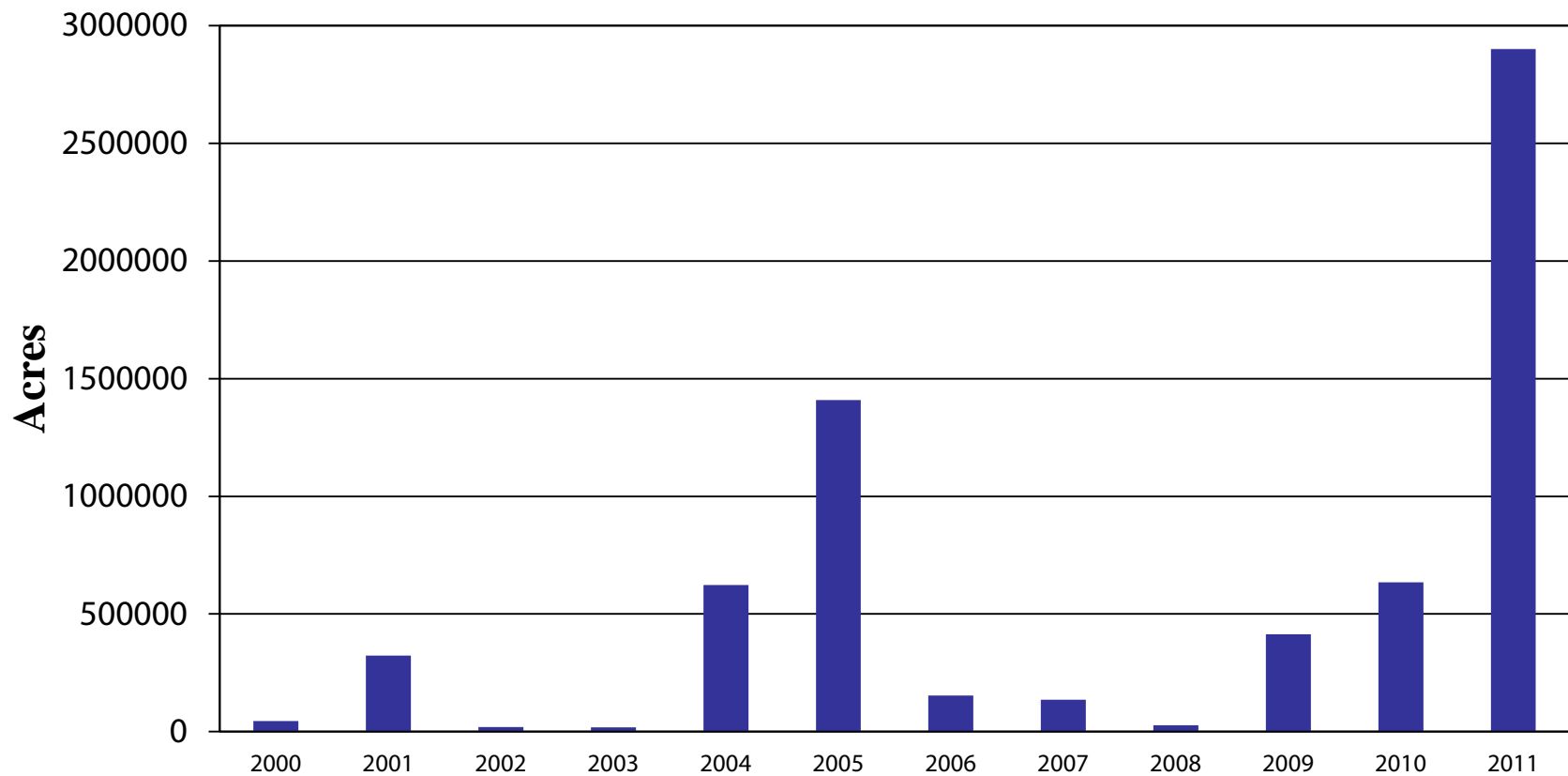
# Lessons Learned

- Manitobans spirit shines through



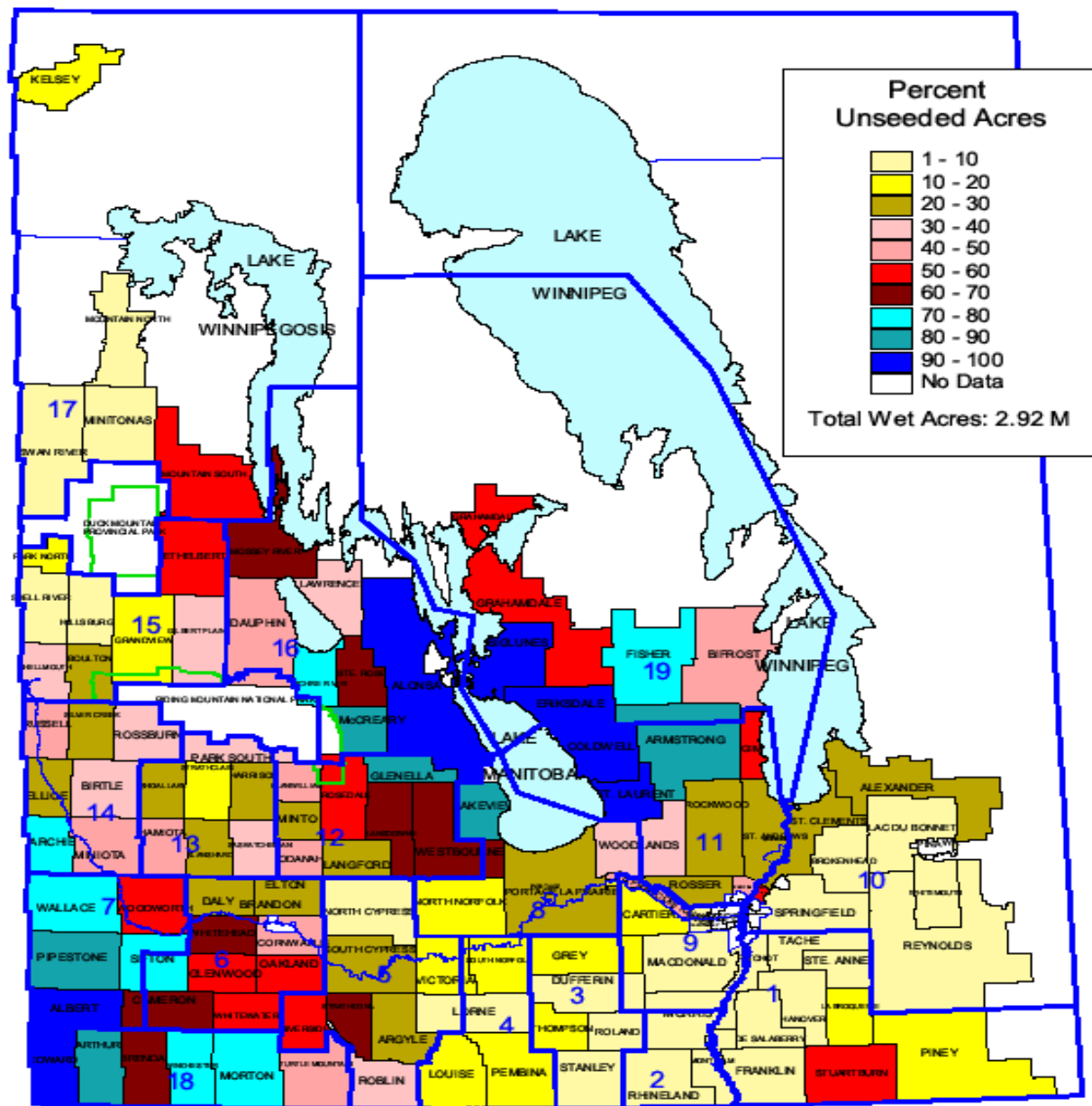
# Manitobans Impacted

## 2011 Un-seeded Acres In Manitoba



# Percent Unseeded Acres Due to Excess Moisture 2011

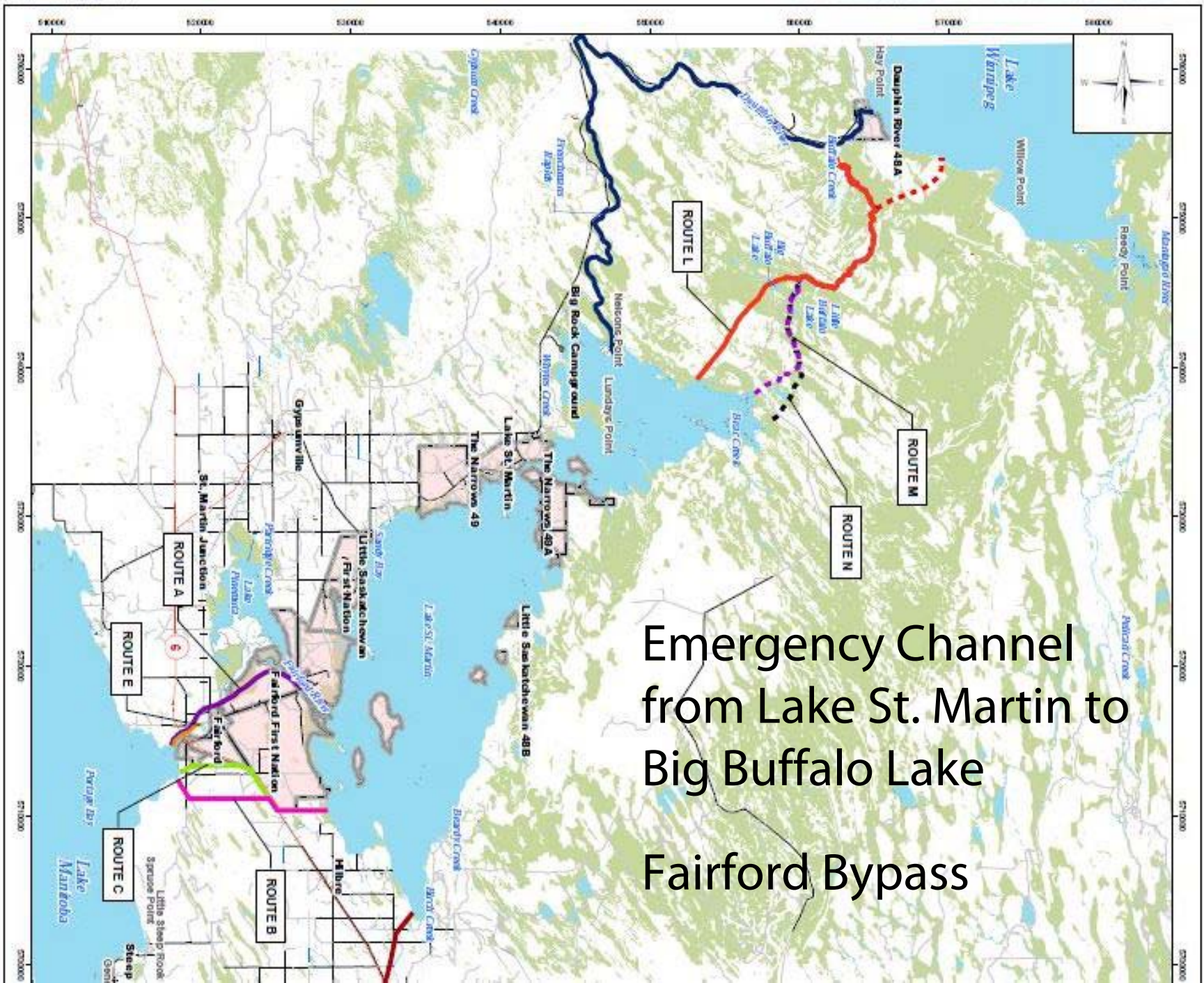
■ Relative to Total Insurable Acres - As of July 22, 2011



Agriculture  
Impacted

2.92 million  
acres un-seeded

Many pastures  
under water



Emergency Channel  
 from Lake St. Martin to  
 Big Buffalo Lake  
 Fairford Bypass















2011/10/21 10:45



2011/10/19 11:12



2011/10/18 11:35

# Flood Fighting Continues...

- Lake levels are still high
- Today there are still 2188 Evacuees (2,115 of those are First Nations) as well as 257 housing units evacuated under MASC.
- Fall storms could result in high wind set-up and waves on major lakes
- Flood protection on major lakes are still underway
- Threat of flooding in 2012 remains



# Flood Mitigation / Recovery

- Manitoba Water Stewardship/ MIT Flood Protection ~ **\$290M**
  - Individual Flood Protection – \$75M
  - New community flood protection - \$30M
  - Converting emergency dikes into permanent dikes – \$20M
  - Wave Breaking Trial Program Grant - \$8M
  - Lake St. Martin emergency channel - \$100M
  - Fairford Control Bypass - \$60M
- Building and Recovery Action Plan ~ **\$175M**
  - Hoop and Holler Compensation
  - Property Tax Relief
  - Lake Manitoba Financial Assistance Program
    - Business, Principal and Non-Principal Residence
    - Manitoba Pasture Flooding Assistance
    - Lake Manitoba Ag Infrastructure, Transportation and Crop/Forage Loss
  - Shoal Lakes Agriculture Flooding Assistance
  - Excess Moisture Economic Stimulus
  - Dauphin River Flood Assistance (for commercial fishers)
- Disaster Financial Assistance ~ **\$45M**

Over 1 Billion  
dollars in flood  
mitigation \$

Thank You

Questions?