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# Irrigation Water Quality for Food Production

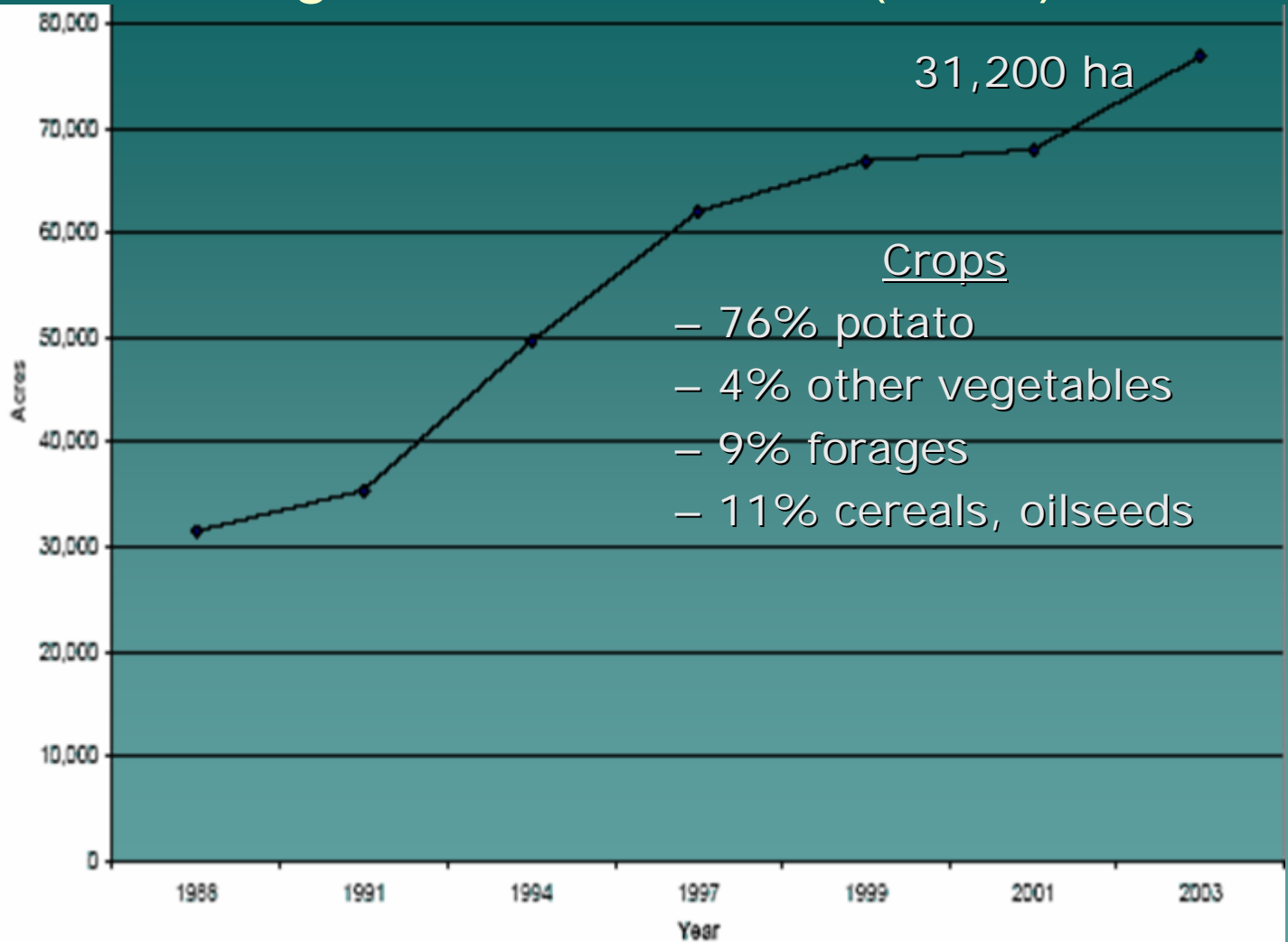
*- Manitoba -*

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# Irrigation in Manitoba (2003)

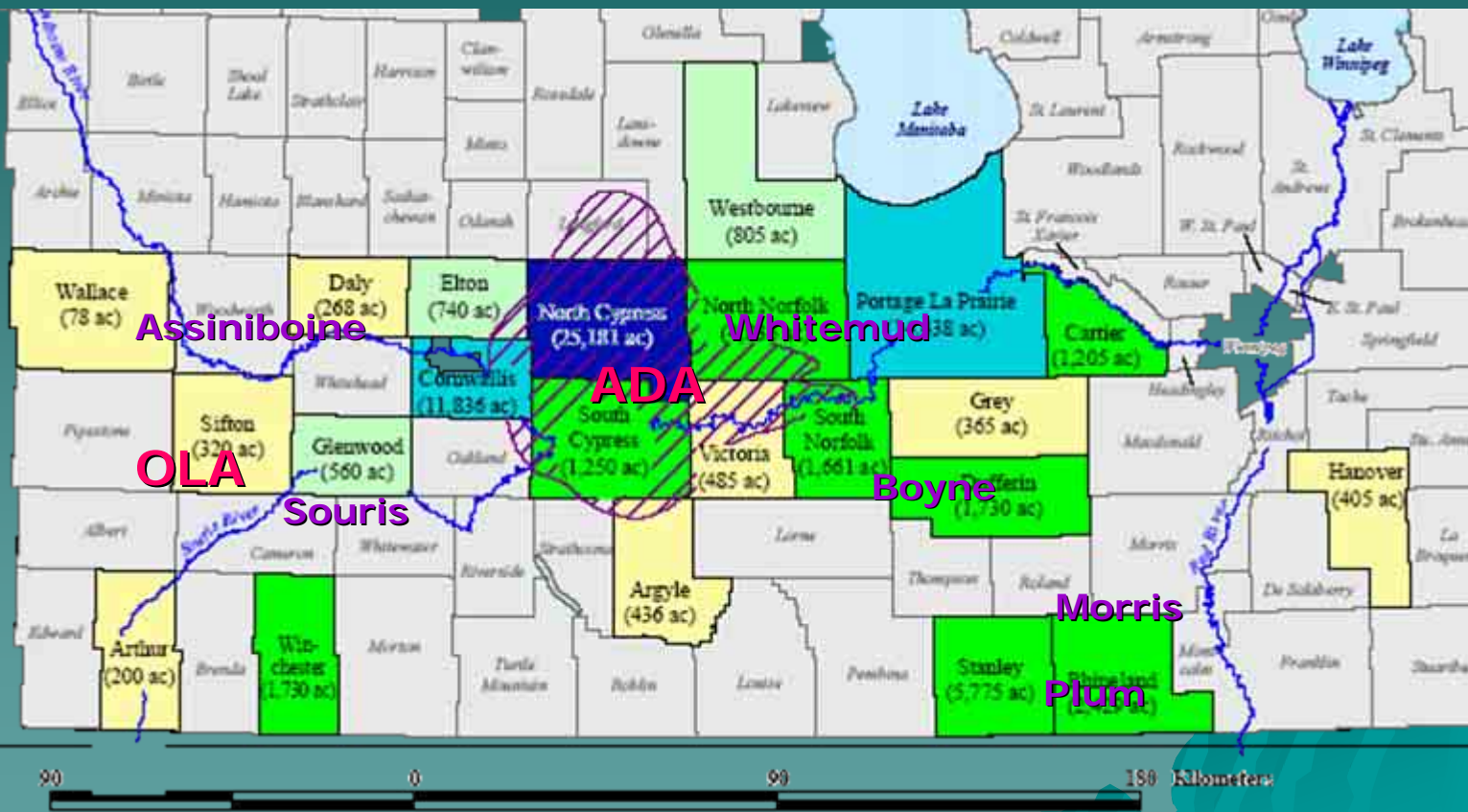


# Irrigation in Manitoba (2003)

## Water Sources

- 48% ground water
  - ◆ 91% from Assiniboine Delta Aquifer
  - ◆ 2% from Oak Lake Aquifer
- 52% surface water
  - ◆ 54% - Assiniboine River
  - ◆ 16% - Morris & Plum River systems
  - ◆ 12% Whitemud River system

# Location of Irrigation in Manitoba



# Ground Water Quality

|                    |      | <u>ADA</u>  | <u>OLA</u>  | <u>Objective<sup>1</sup></u> |
|--------------------|------|-------------|-------------|------------------------------|
| <b>Elec. Cond.</b> | dS/m | <b>0.52</b> | <b>0.94</b> | <1.5                         |
| <b>SAR</b>         |      | <b>0.4</b>  | <b>1.3</b>  | <6.0                         |
| <b>Boron</b>       | mg/L | <b>0.06</b> | <b>0.05</b> | <0.5–6.0                     |
| <b>Chloride</b>    | mg/L | <b>6</b>    | <b>34</b>   | <100-700                     |

<sup>1</sup> Objective or guideline for field irrigation - *Manitoba Water Quality Standards, Objectives, and Guidelines* (Manitoba Conservation, 2002)

# Surface Water Quality

## *Assiniboine River*

|                       |           | <u>Brandon</u> | <u>Portage</u> | <u>Objective</u> <sup>1</sup> |
|-----------------------|-----------|----------------|----------------|-------------------------------|
| <b>Elec. Cond.</b>    | dS/m      | <b>0.79</b>    | <b>0.76</b>    | <1.5                          |
| <b>SAR</b>            |           | <b>1.5</b>     | <b>1.5</b>     | <6.0                          |
| <b>Boron</b>          | mg/L      | <b>0.12</b>    | <b>0.13</b>    | <0.5–6.0                      |
| <b>Chloride</b>       | mg/L      | <b>22</b>      | <b>19</b>      | <100-700                      |
| <b><i>E. coli</i></b> | cfu/100ml | <b>40</b>      | <b>40</b>      | 200                           |

<sup>1</sup> Objective or guideline for field irrigation - *Manitoba Water Quality Standards, Objectives, and Guidelines* (Manitoba Conservation, 2002)

# Surface Water Quality

## *Souris and Boyne Rivers*

|                       |           | <u>Souris</u> | <u>Boyne</u> | <u>Objective</u> <sup>1</sup> |
|-----------------------|-----------|---------------|--------------|-------------------------------|
| <b>Elec. Cond.</b>    | dS/m      | <b>0.76</b>   | <b>0.52</b>  | <1.5                          |
| <b>SAR</b>            |           | <b>1.9</b>    | <b>0.5</b>   | <6.0                          |
| <b>Boron</b>          | mg/L      | <b>0.15</b>   | <b>0.09</b>  | <0.5–6.0                      |
| <b>Chloride</b>       | mg/L      | <b>16</b>     | <b>9</b>     | <100-700                      |
| <b><i>E. coli</i></b> | cfu/100ml | <b>50</b>     | <b>80</b>    | 200                           |

<sup>1</sup> Objective or guideline for field irrigation - *Manitoba Water Quality Standards, Objectives, and Guidelines* (Manitoba Conservation, 2002)

# Surface Water Quality

## *Whitemud River*

|                       |           |             | <u>Objective</u> <sup>1</sup> |
|-----------------------|-----------|-------------|-------------------------------|
| <b>Elec. Cond.</b>    | dS/m      | <b>0.67</b> | <1.5                          |
| <b>SAR</b>            |           | <b>0.7</b>  | <6.0                          |
| <b>Boron</b>          | mg/L      | <b>0.07</b> | <0.5–6.0                      |
| <b>Chloride</b>       | mg/L      | <b>17</b>   | <100-700                      |
| <b><i>E. coli</i></b> | cfu/100ml | <b>70</b>   | 200                           |

<sup>1</sup> Objective or guideline for field irrigation - *Manitoba Water Quality Standards, Objectives, and Guidelines* (Manitoba Conservation, 2002)



# Special Situations/Concerns

- ◆ Effluent irrigation
- ◆ Coliforms in some surface sources (for fresh fruits/vegetables)
- ◆ Ground water temperature?
- ◆ Algae/weeds – mechanical problems
- ◆ Applicability of irrigation water quality criteria to Manitoba (*supplemental* irrigation)

In summary, the major sources of water used for agricultural irrigation in Manitoba are of good quality for the purpose, especially when application rates are considered.





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# Thank-you!

Water quality raw data was provided by  
staff of Manitoba Water Stewardship.