

# Vulnerability Assessment for Agriculture in the Lake Simcoe Watershed



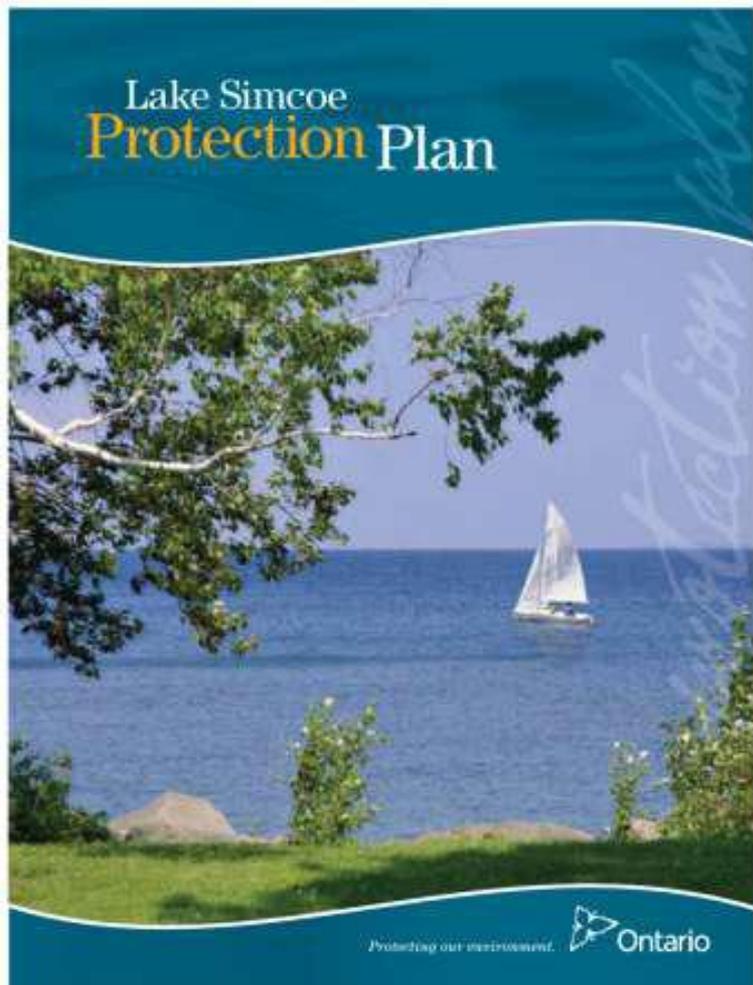
**Climate Change Workshop, Barrie, 24 Aug 2011**

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**&**

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# Lake Simcoe Protection Plan



## Lake Simcoe Protection Plan

- Goal to protect and restore the ecological health of the LS watershed
- Long term undertaking with several additional commitments over time, e.g.:
  - Phosphorus Reduction Strategy
  - Assessment of Water Quality Trading
  - Climate Change Adaptation Strategy
    - Vulnerability Assessments
    - For agriculture, based on available data, it's more of a Sensitivity Analyses
    - First of its kind for the sector in Ontario and should be viewed as a first step only



# Indicator # 1: Number of Animals

- Based on number of animals per quaternary watershed
- If summer temperatures increase, issues around heat stress on livestock could be exacerbated
- The greater the density of animals the greater potential for heat stress to occur under warmer conditions



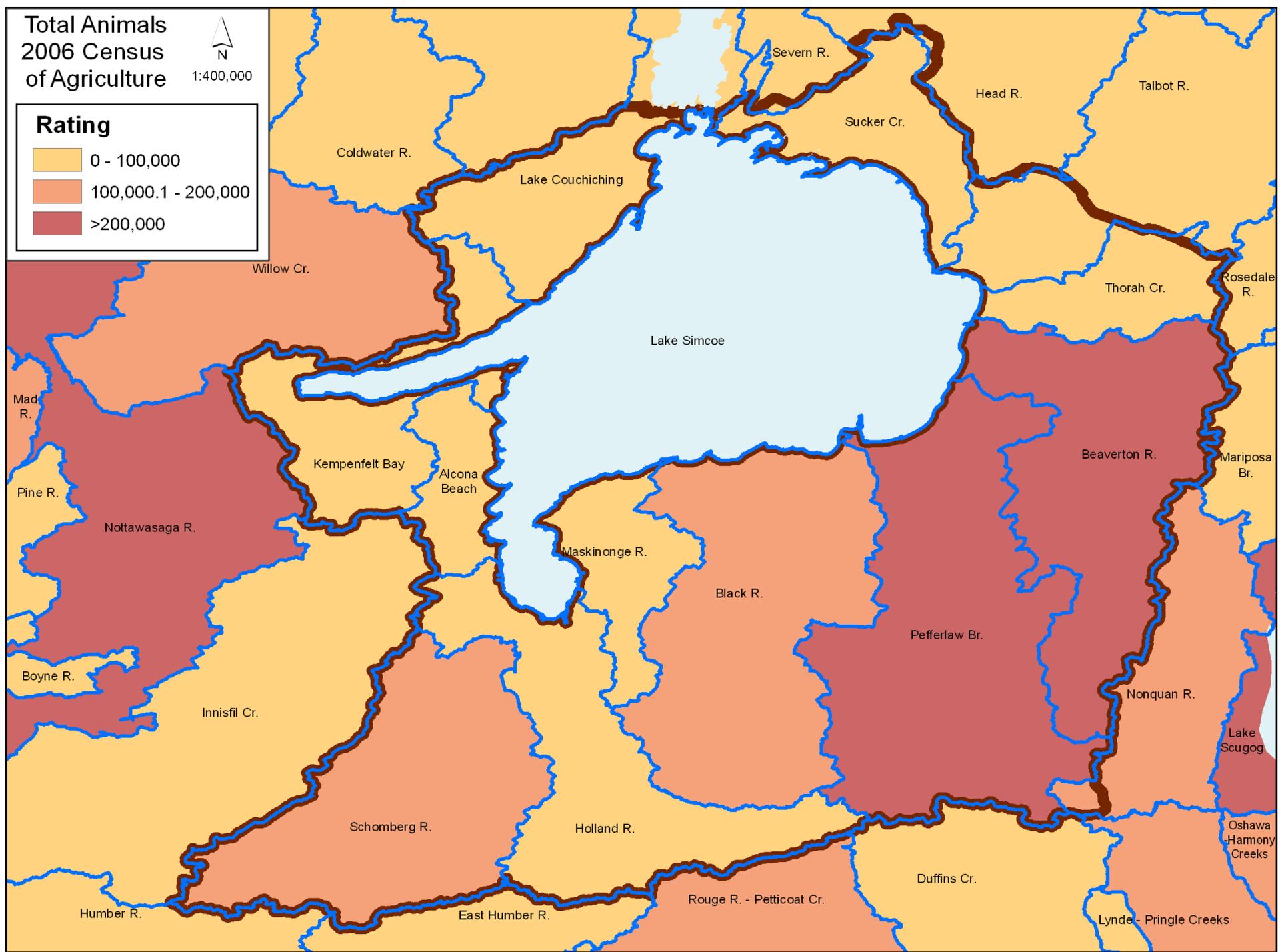
**OMAFRA Engineer Harold House**

# Total Animals 2006 Census of Agriculture

1:400,000



Rating	
	0 - 100,000
	100,000.1 - 200,000
	>200,000



# Indicator # 2: Irrigated Hectares

- Based on number of irrigated hectares per quaternary watershed
- Used as a proxy for agricultural water use
- Assumes that climate change will lead to more extreme droughts, which impact water availability under irrigated conditions



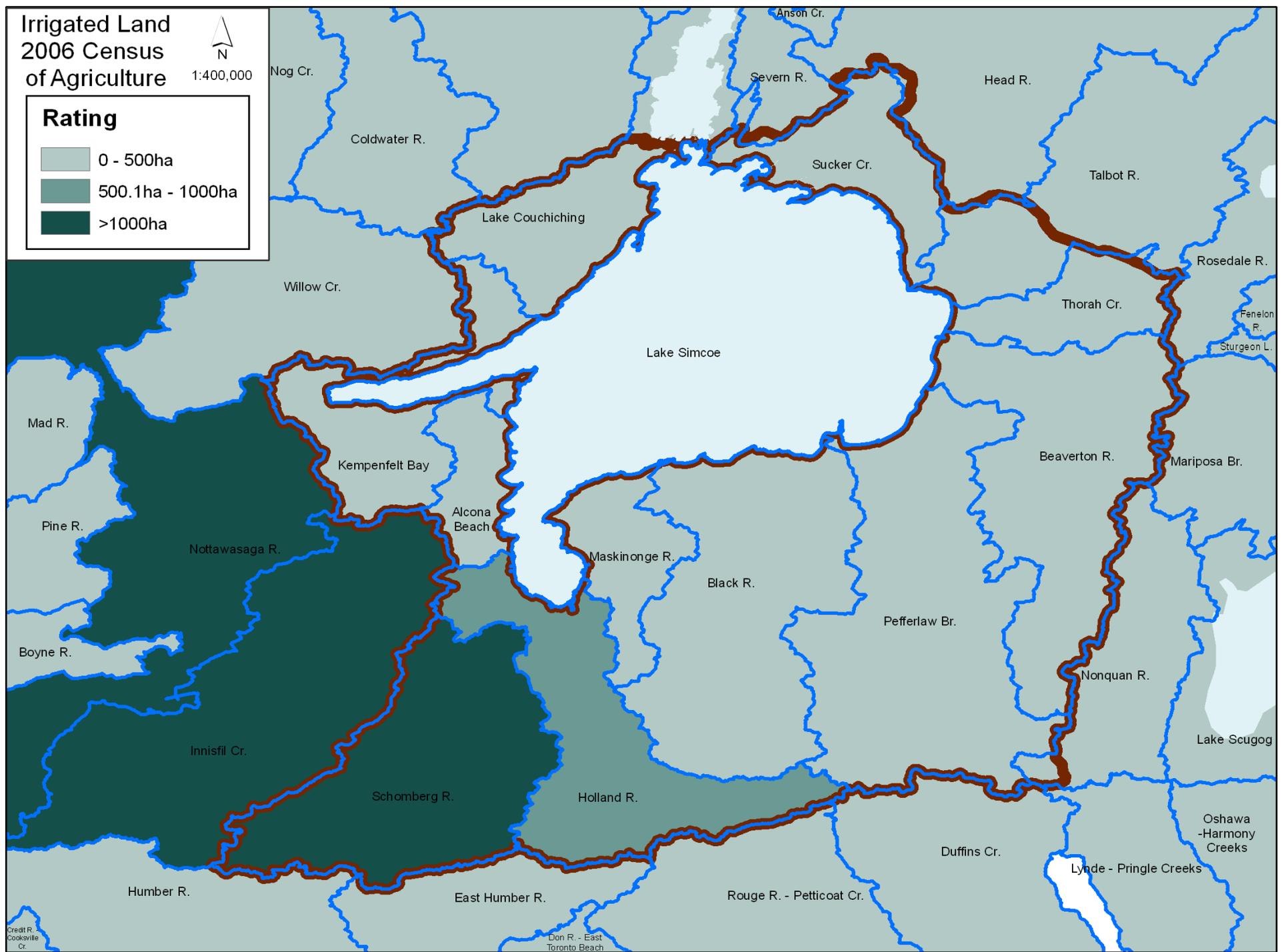
# Irrigated Land 2006 Census of Agriculture

1:400,000



**Rating**

- 0 - 500ha
- 500.1ha - 1000ha
- >1000ha



Nog Cr.

Coldwater R.

Lake Couchiching

Willow Cr.

Mad R.

Kempfenfelt Bay

Pine R.

Nottawasaga R.

Boyne R.

Alcona Beach

Maskinonge R.

Black R.

Innisfil Cr.

Schomberg R.

Holland R.

Humber R.

East Humber R.

Rouge R. - Petticoat Cr.

Anson Cr.

Severn R.

Head R.

Sucker Cr.

Talbot R.

Rosedale R.

Thorah Cr.

Fenelon R.  
Sturgeon L.

Beaverton R.

Mariposa Br.

Pefferlaw Br.

Nonquan R.

Lake Scugog

Oshawa-Harmony  
Creeks

Lynde - Pringle Creeks

Credit R.  
Cooksville Cr.

Don R. - East  
Toronto Beach

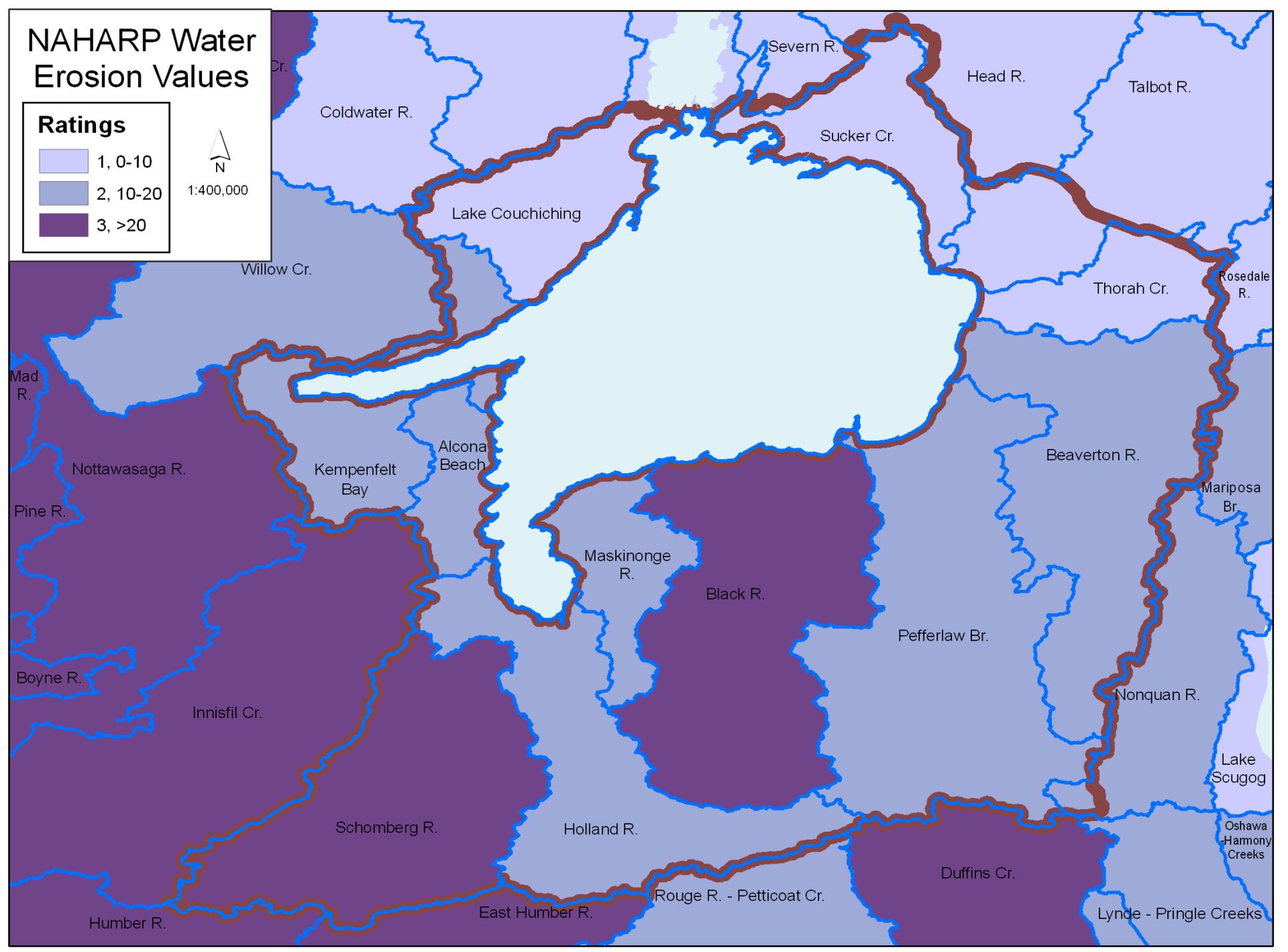
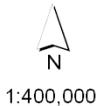
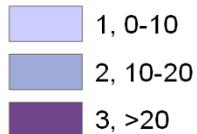
# Indicator # 3: Water Erosion Potential

- Based on potential soil erosion in tonne/ha per quaternary watershed
- Uses USLE and Soil Land Classification data to calculate
- Assumes that climate change will lead to more frequent intense rainstorms
- As rain intensity increases the potential for soil loss is greater



# NAHARP Water Erosion Values

## Ratings



- Each of the 3 maps were added together to generate an overall 'sensitivity index'
  - Results influenced by amount of agricultural activity – see differences between north and south
  - Present one way of looking at potential vulnerability
  - Provides basis for discussion



- Driven by a high number of irrigated hectares and high potential for soil erosion
- Irrigated hectares driven by crops grown in these sub-watersheds (e.g. potatoes, horticultural crops)
- High potential for soil erosion is driven by the soil type, topography change in the south
- Very simplistic; no consideration of mitigating factors or adaptive capacity (i.e. implementation of Best Management Practices)



# Data Gaps/ Limitations/ Sources of Error

- Data used may not be applicable in other areas of the province, e.g. irrigated acres
- Assumptions too simplistic
  - Same heat stress among livestock types
  - Ag water use is more than irrigation
  - Soil layers very coarse scale
- 2006 Agricultural Census data is outdated



# Recommendations 1-4

- The sensitivity scoring should remain on a quaternary level.
- The sensitivity assessment should be conducted on a provincial level with a single set of ranges for each sensitivity indicator.
- A sensitivity assessment on a provincial level should include a drought frequency indicator.
- A single set of ranges for each indicator should be vetted by an expert committee to ensure that classifications of properly represent the fluctuation in numbers across the province.

## Recommendations 5-8

- A more accurate province wide agricultural land use data set, such as the one the Agricultural Resource Inventory is attempting to capture, should be obtained.
- Assessment should be re-run with 2011 agricultural census data. Need to consider ways to deal with large fluctuations in commodities (e.g. hog industry).
- In adaptive capacity piece should be included to move this exercise from a sensitivity assessment to a vulnerability assessment.
- Develop a data set that can be used to assess the current sensitivity of pests.

Thank you!

