

# Vulnerability Assessment for Agriculture in the Lake Simcoe Watershed



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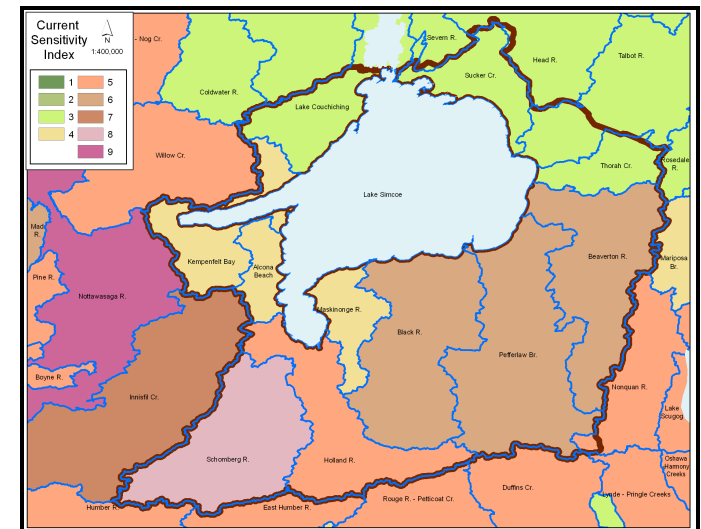
# Lake Simcoe Protection Plan

## 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

# Study Approach

- Uses available, provincial-scale data to generate **Indicators** used to assess vulnerability (or in this case, sensitivity)
  - 2006 Ag Census
  - NAHARP Data
- Uses a simple scoring system of High, Medium, Low for the indicators
- Scale - Quaternary watershed level is considered optimal for sensitivity assessment



# 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



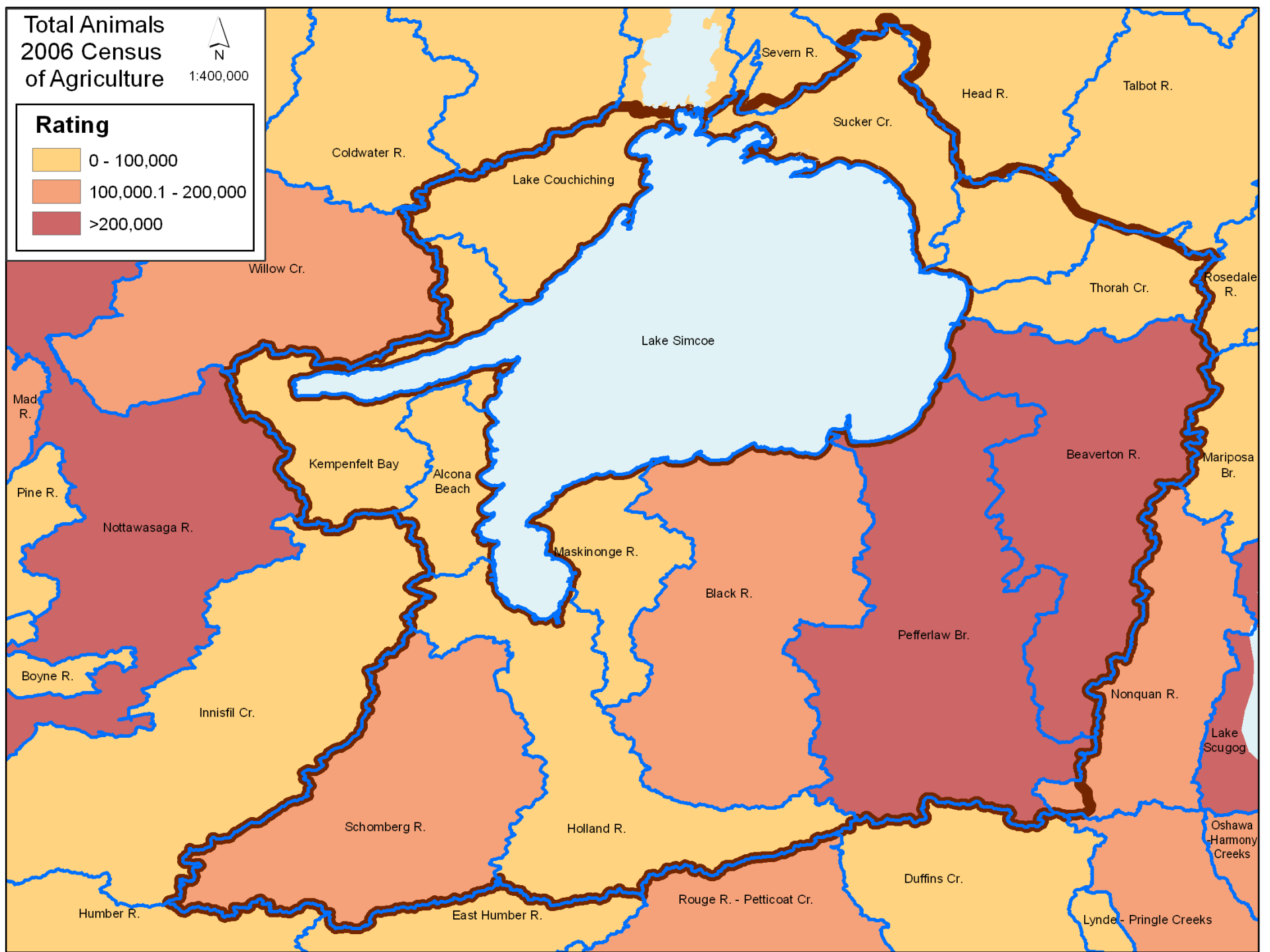
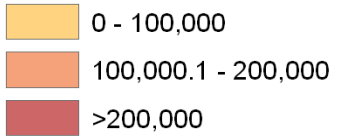
**OMAFRA Engineer Harold House**

# Total Animals 2006 Census of Agriculture

1:400,000



## Rating



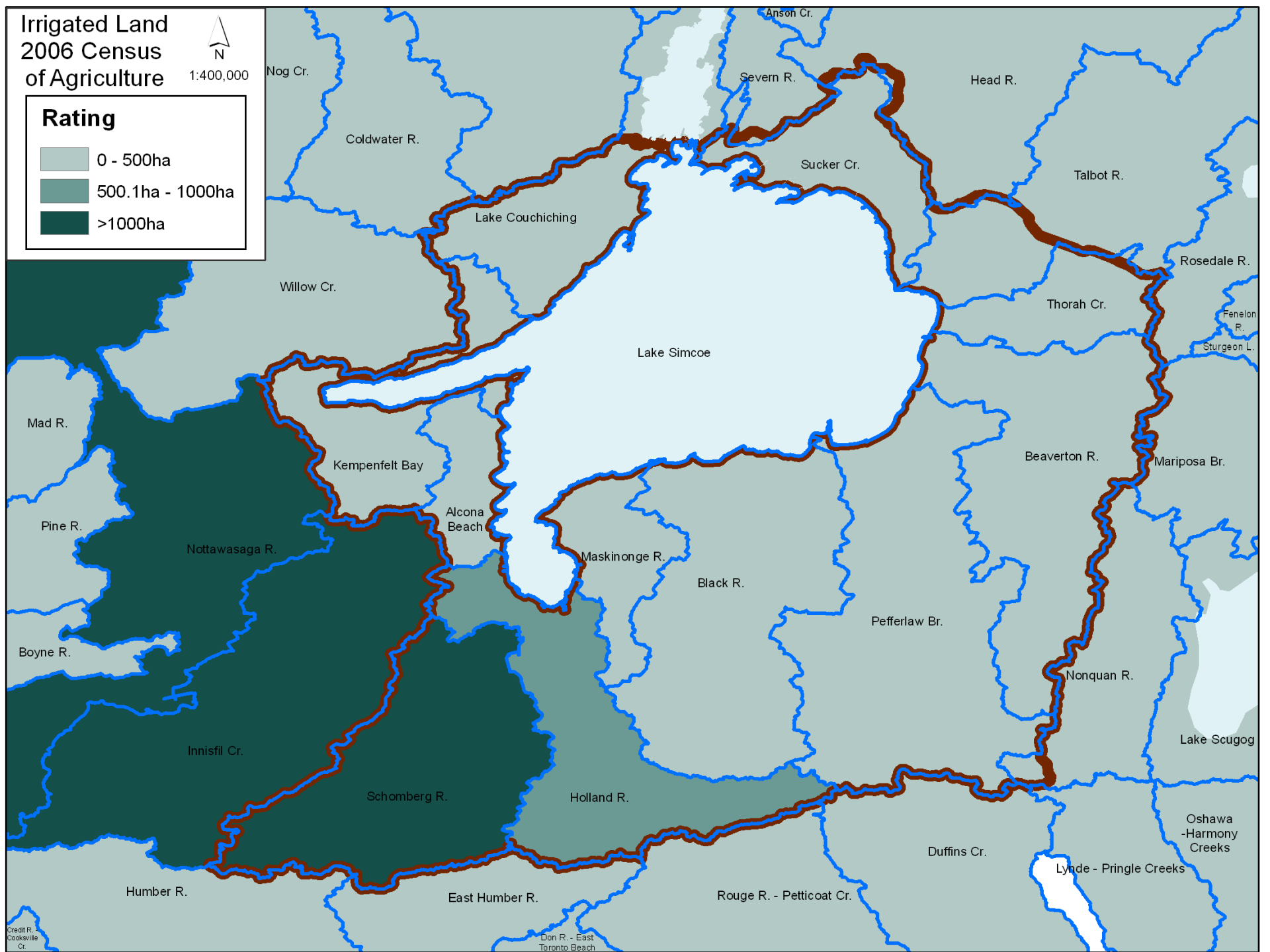
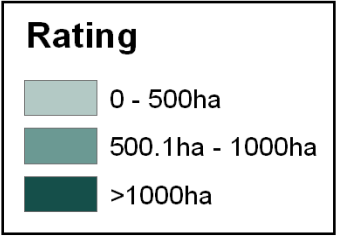
# Indicator # 2: Irrigated Hectares

- 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



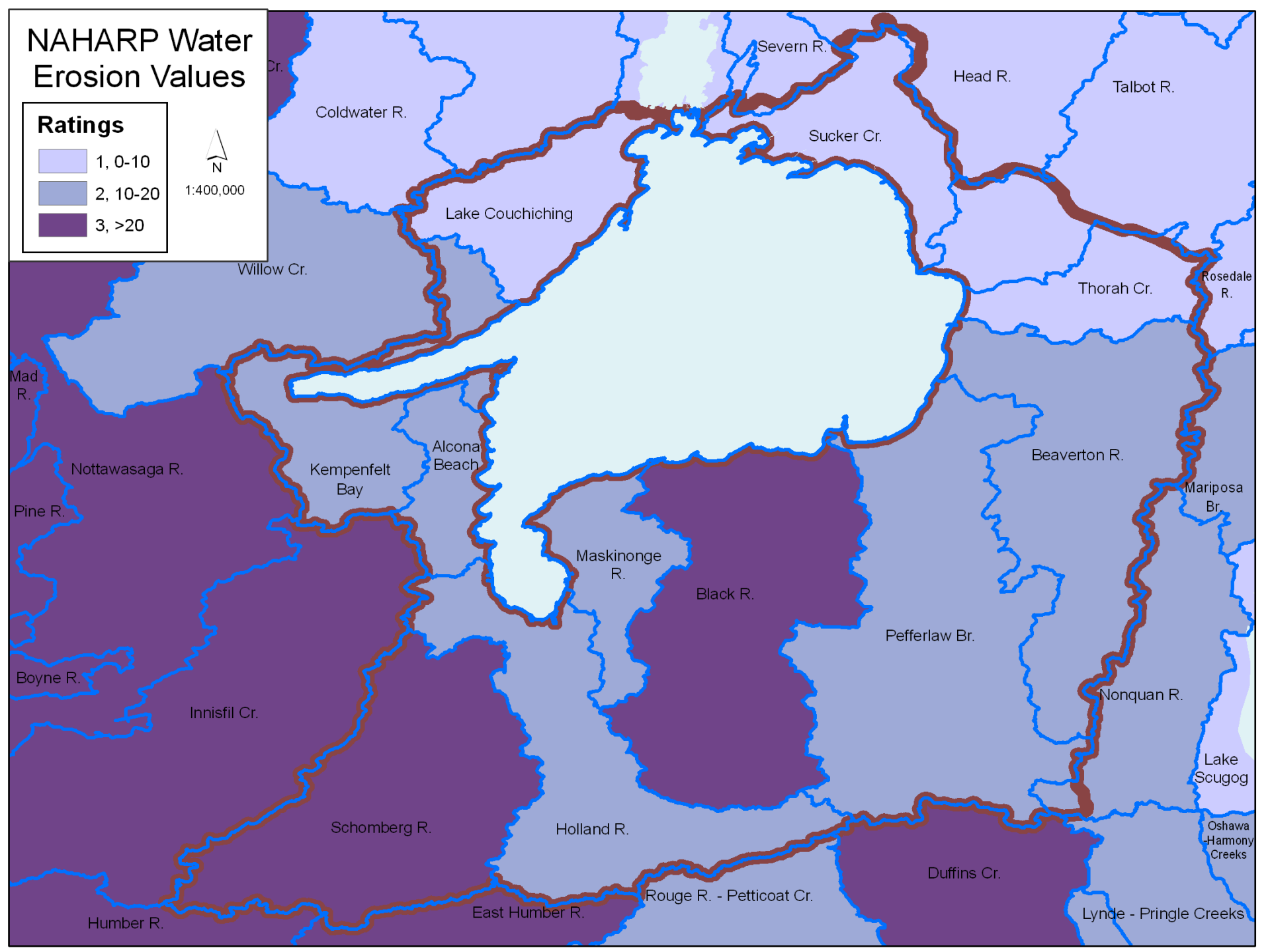
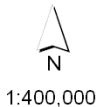
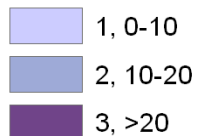
# Indicator # 3: Water Erosion Potential

- 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!

