

Forest Decline in Minesing Wetlands

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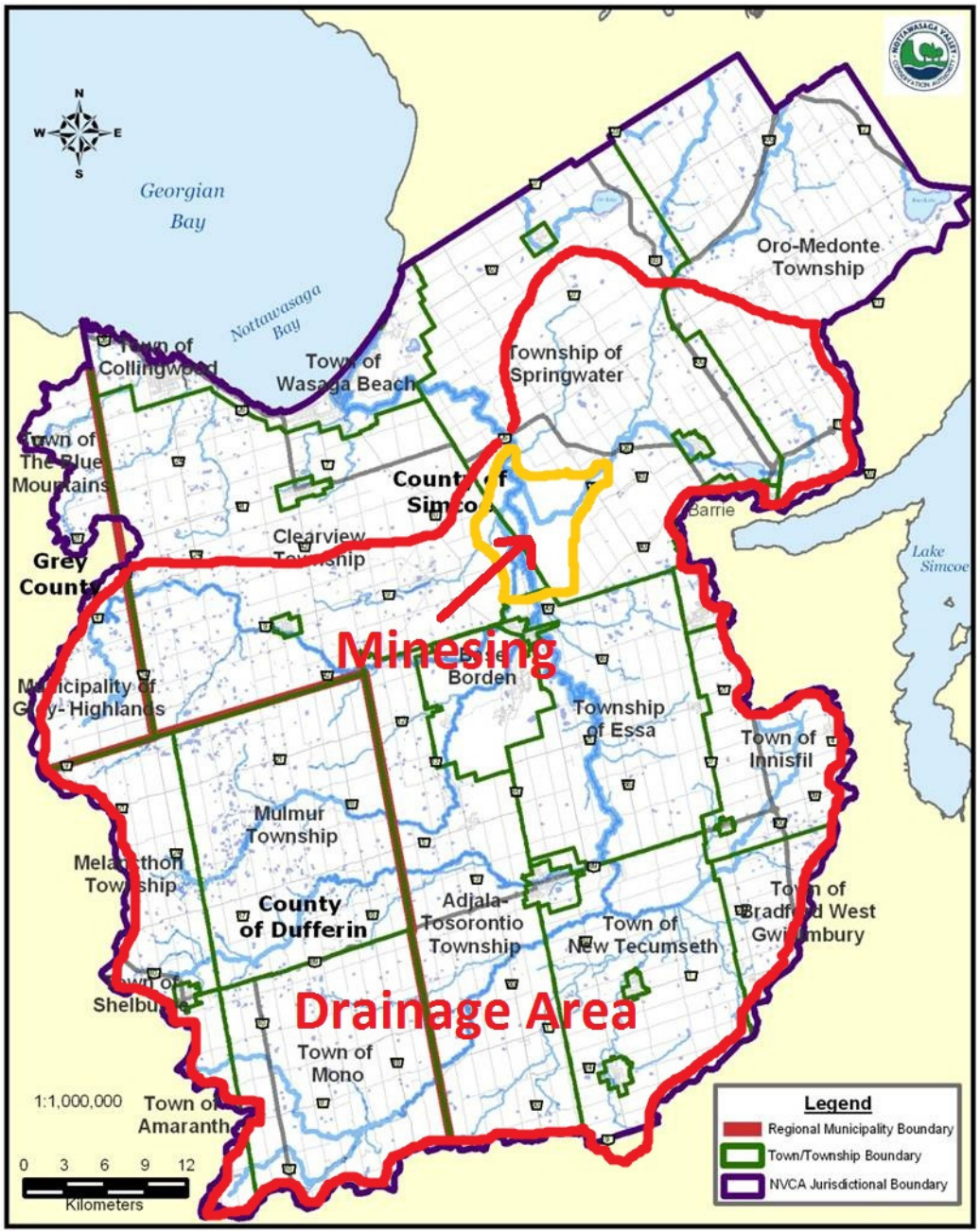
Friends of Minesing Wetlands -

An Evening of Science and Stewardship

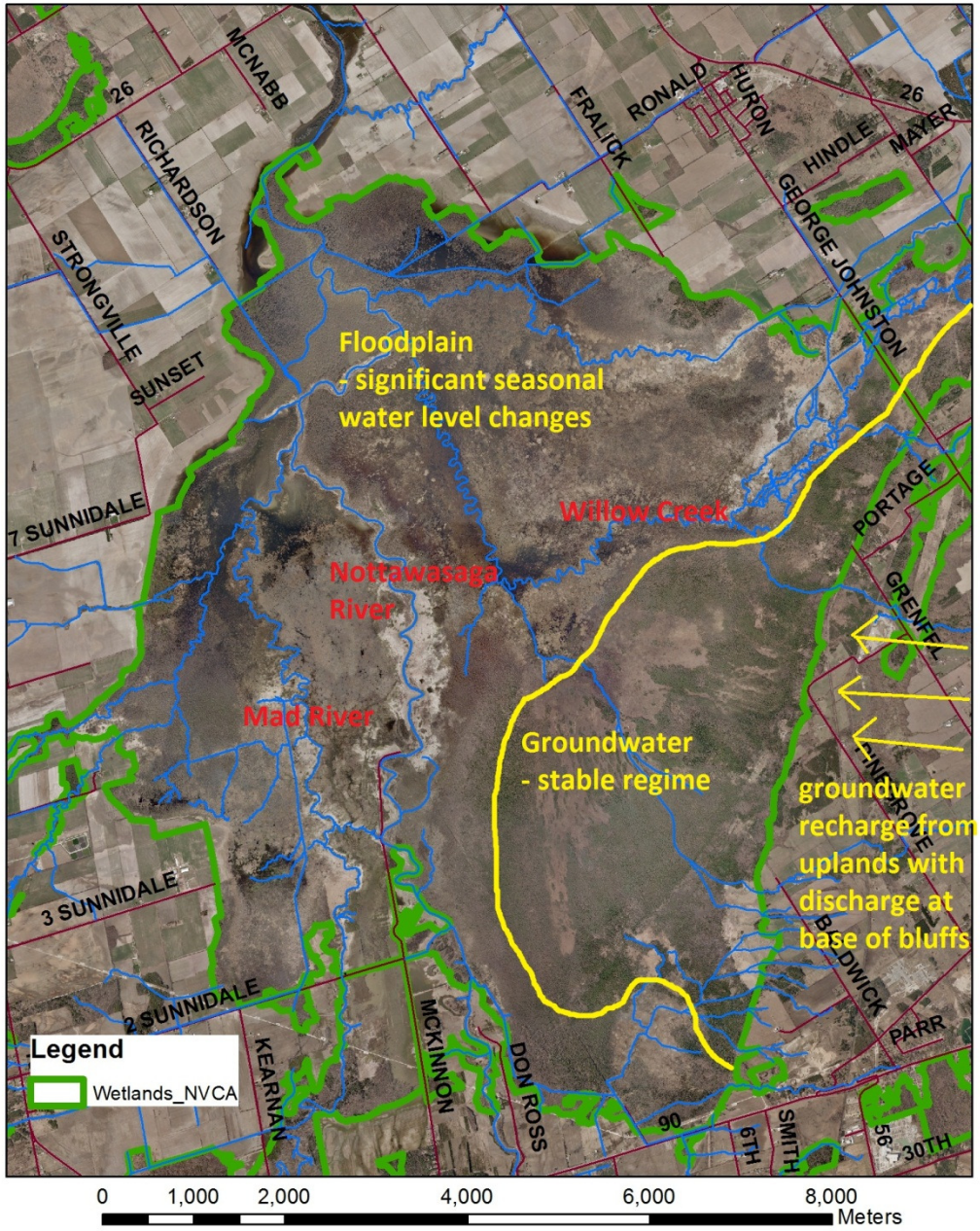
November 13, 2014



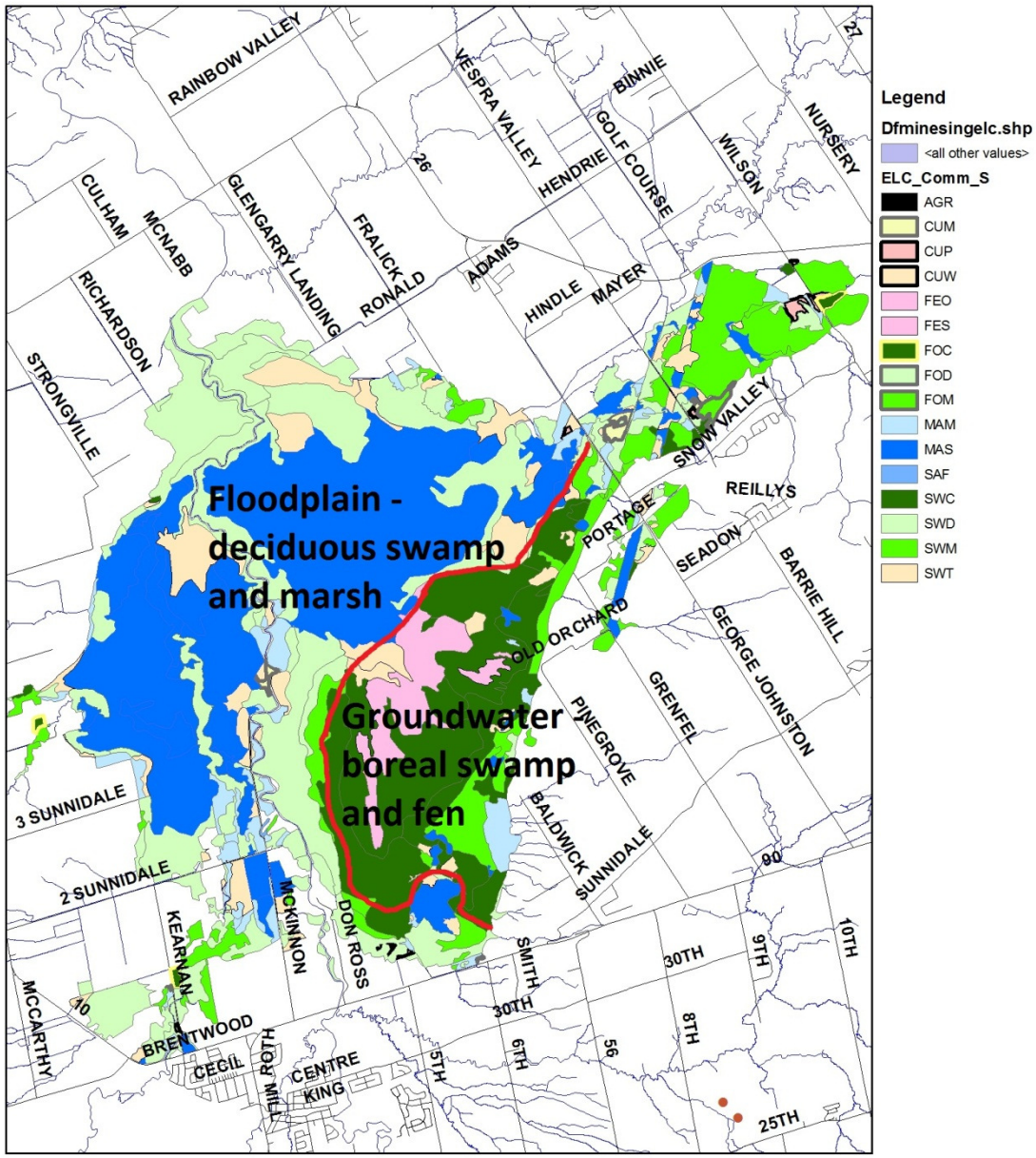
Minesing Wetlands

- Nottawasaga River watershed
- >3,000 km^2 drainage area
- Includes drainage from Niagara Escarpment, Oak Ridges Moraine and Oro Moraine
- Convergence area for 3 major river systems – Nottawasaga, Mad and Willow

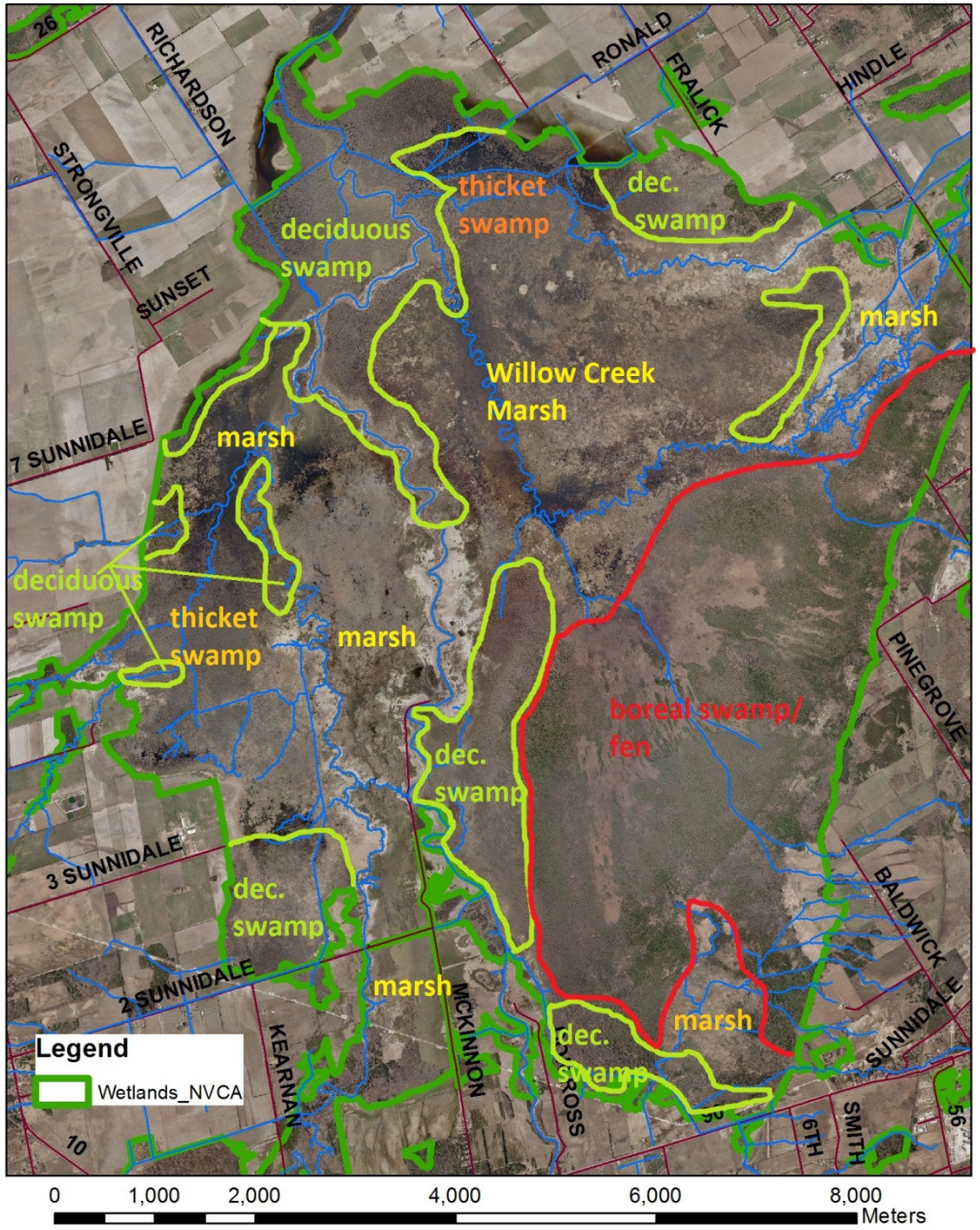
Minesing Wetlands - Floodplain vs Groundwater-Dominated Systems



Minesing Wetlands - ELC Community Series



Minesing Wetlands - Deciduous Swamp and Marsh




ROAD
CLOSED
WARNING
WATER OVER
ROAD

Willow Creek – Spring View


Willow Creek – Summer View


SPRING
SUMMER

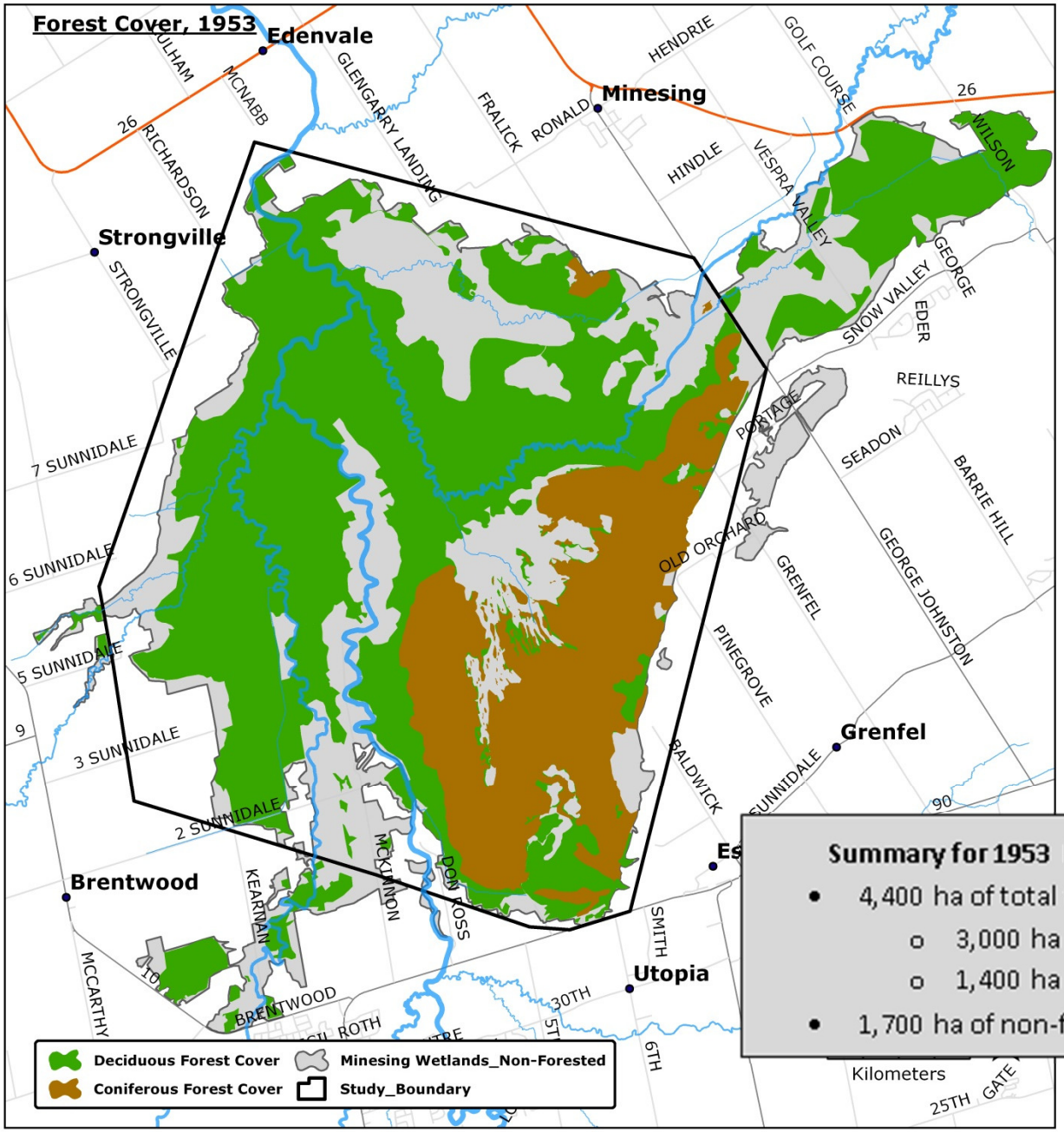
Minesing Wetlands and Forest Loss

- Some idea that forest loss is occurring
- No idea of extent of scale

Gee…we've lost a lot of forest…how did that happen? Will it keep happening? What are the implications? Can we change what's happened?

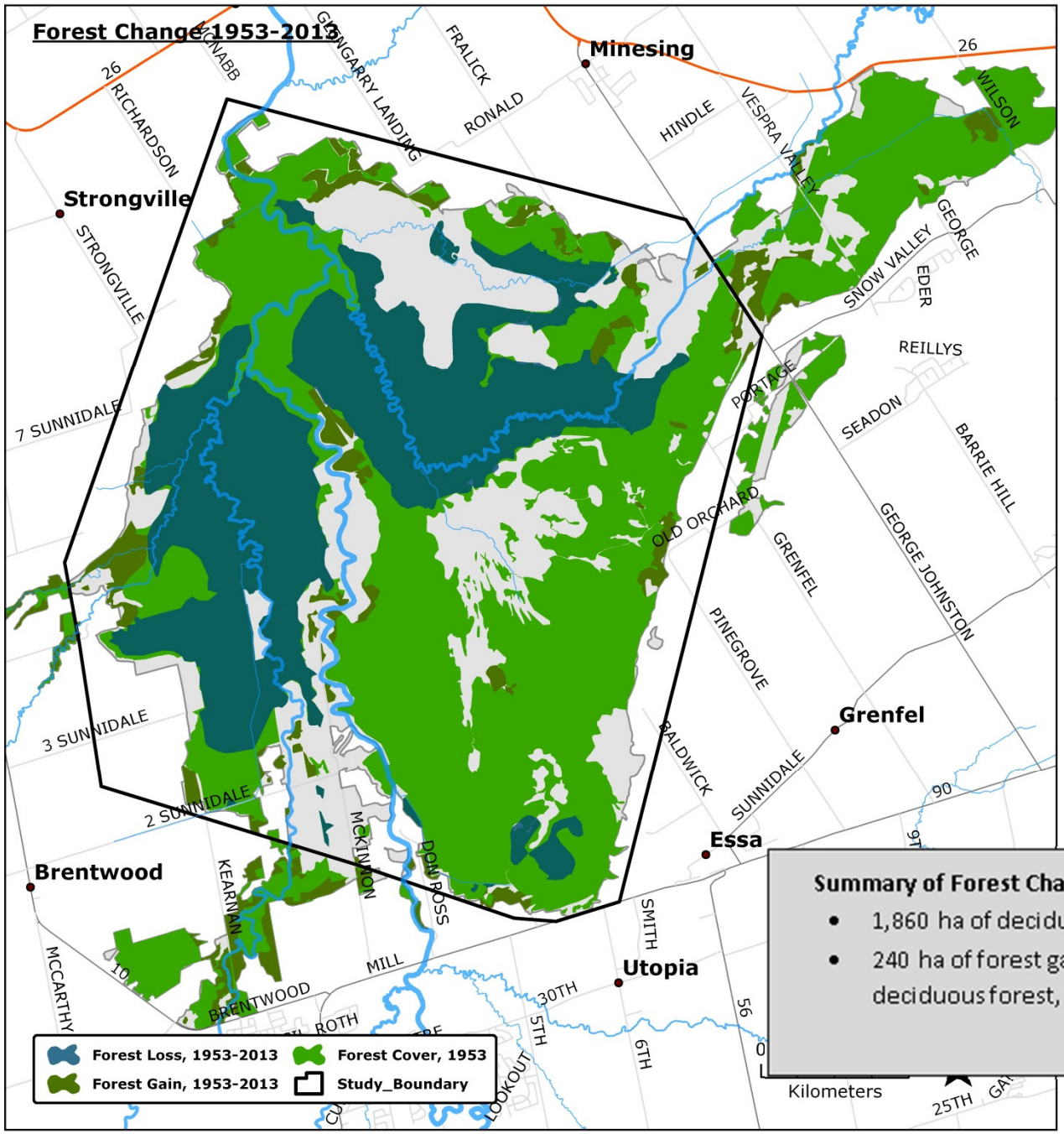
Forest Decline - Study Protocol

- Review of air photos/orthoimagery from 1953, 1971,1978, 1989, 2002 and 2012
- Minesing forest cover interpreted from air photos and digitized/mapped using GIS
- 1953 mapping used as base for comparisons (recognizing there may have been prior loss)



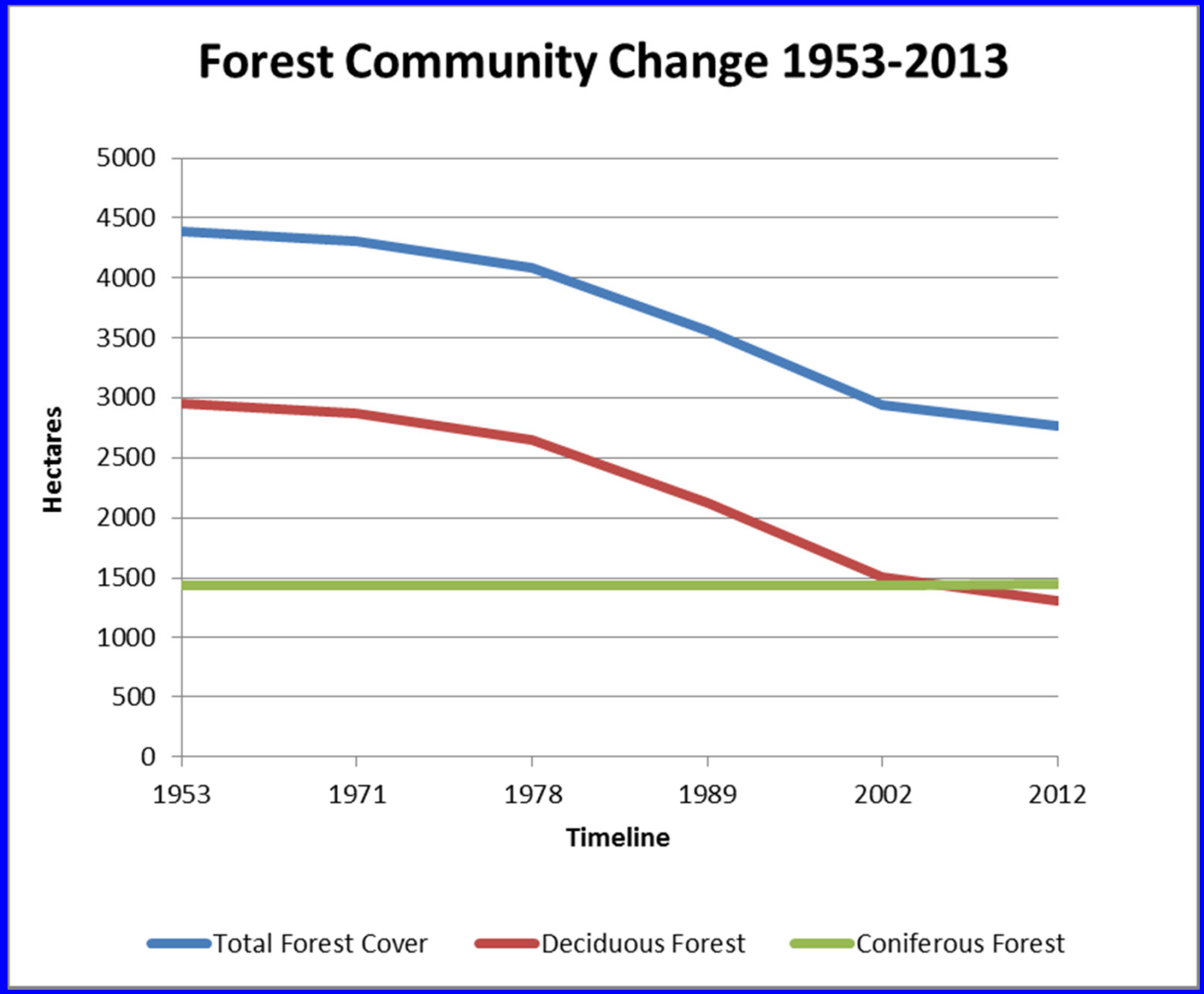
Summary for 1953 Forest Cover in the Minesing Wetlands

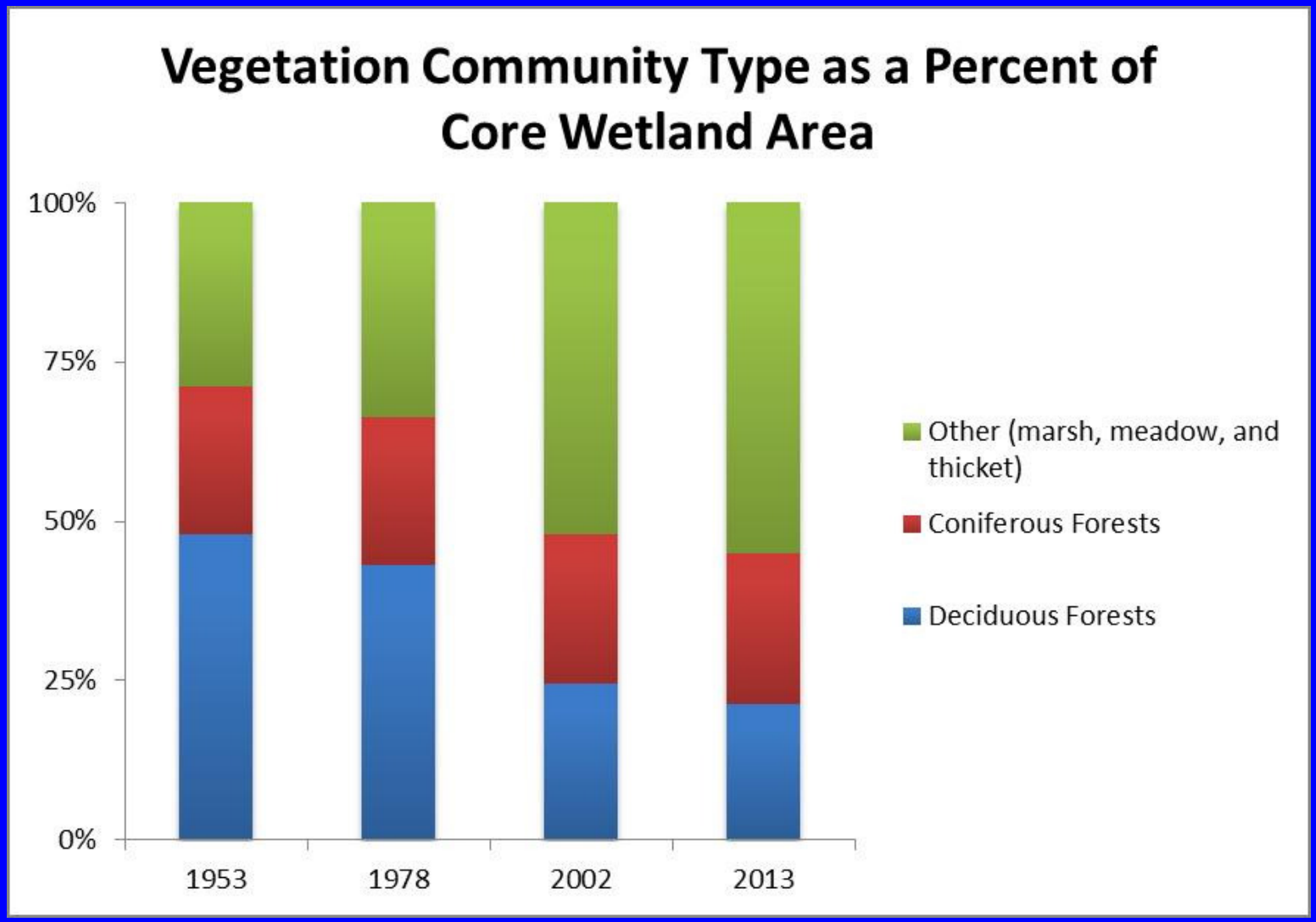
- 4,400 ha of total forest cover within the study boundary
  - 3,000 ha of deciduous forest cover
  - 1,400 ha of coniferous forest cover
- 1,700 ha of non-forest wetland or agricultural land



Summary of Forest Change in the Minesing Wetlands 1953-2012

- 1,860 ha of deciduous forest loss within the study boundary
- 240 ha of forest gain within the study boundary (220 ha deciduous forest, 20 ha coniferous forest)


Forest Community Change 1953-2013
Hectares
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1953
1971
1978
1989
2002
2012
Timeline
Total Forest Cover
Deciduous Forest
Coniferous Forest


Vegetation Community Type as a Percent of Core Wetland Area
100%
75%
50%
25%
0%
1953
1978
2002
2013
Other (marsh, meadow, and thicket)
Coniferous Forests
Deciduous Forests

McKinnon Road Old Fileds, 1953

McKinnon Road Old Fields, 2012

Forest Loss – WHY???

- More than 1,800 hectares of deciduous forest cover was lost between 1953 and 2013
- 37% decline in total forest cover and a loss of 56% of total deciduous cover

- Historic land use change in watershed
- Historic land use change next to Minesing Wetlands
- Changing hydrology (wetter) = weakening forests
- Weaker forests more susceptible to isolated events (Hurricane Hazel, Dutch Elm Disease, beaver activity)

Note: Boreal (conifer) swamp – isolated from impacts (groundwater-fed) and no loss

Historical Watershed Land Use Change

- Conversion of watershed forests and wetlands to agriculture and urban
- Changing (less stable) flow regimes and associated sediment transport
- Highly erodible sands and silts present in watershed
- Cumulative impacts heading downstream to Minesing Wetlands

The Minesing Delta

- “mini-Mississippi” where three rivers meet (cumulative impacts from all three systems)
- Natural levees along river banks where sands and silts are deposited (protect swamps from frequent flooding)
- Increased sediment loads result in rising river beds thereby increasing frequency of levee “breaks” and levee overtopping (and wetter floodplain swamps)

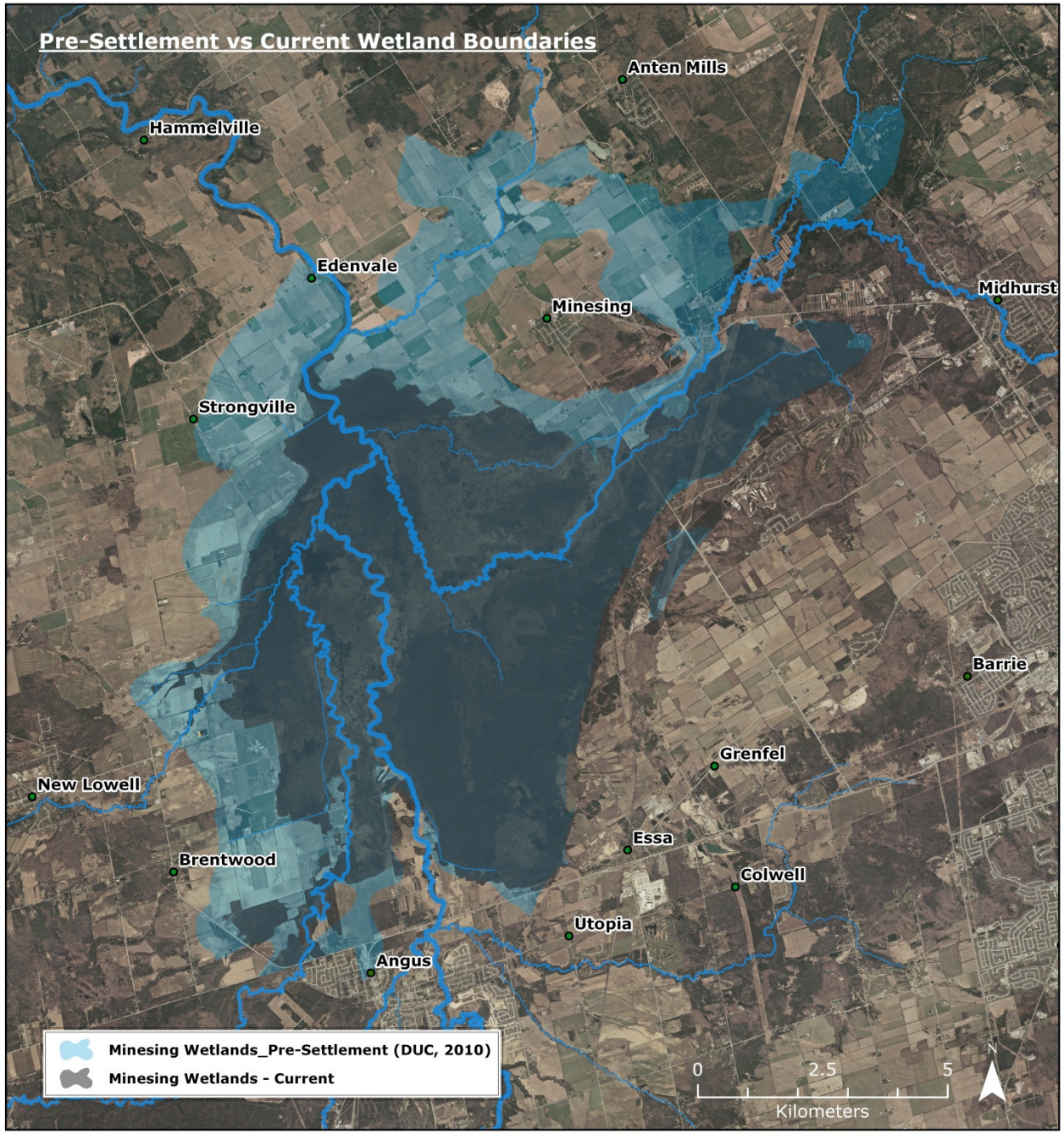

Sediment Deposition –
Willow Creek Levee 2014

Nottawasaga River Levee – note that river elevation is higher than the back levee swamp


Willow Creek
Levee (great place
to stop for lunch)

Adjacent Land Use Change

- Conversion of wetlands to farm land (circa 1890s)
- Significant artificial drainage systems from new farm land to (and into) Minesing Wetlands – particularly on lands draining toward Willow and Mad
- Reduced wetland storage and improved conveyance resulting in wetter swamp conditions
- Mad and Willow swamps (along Minesing periphery) more impacted than Nottawasaga swamps


Pre-Settlement vs Current Wetland Boundaries
Anten Mills
Hammelville
Edenvale
Minesing
Midhurst
Strongville
Barrie
Grenfel
New Lowell
Essa
Brentwood
Colwell
Utopia
Angus
Minesing Wetlands_Pre-Settlement (DUC, 2010)
Minesing Wetlands - Current
0
2.5
5
Kilometers
N

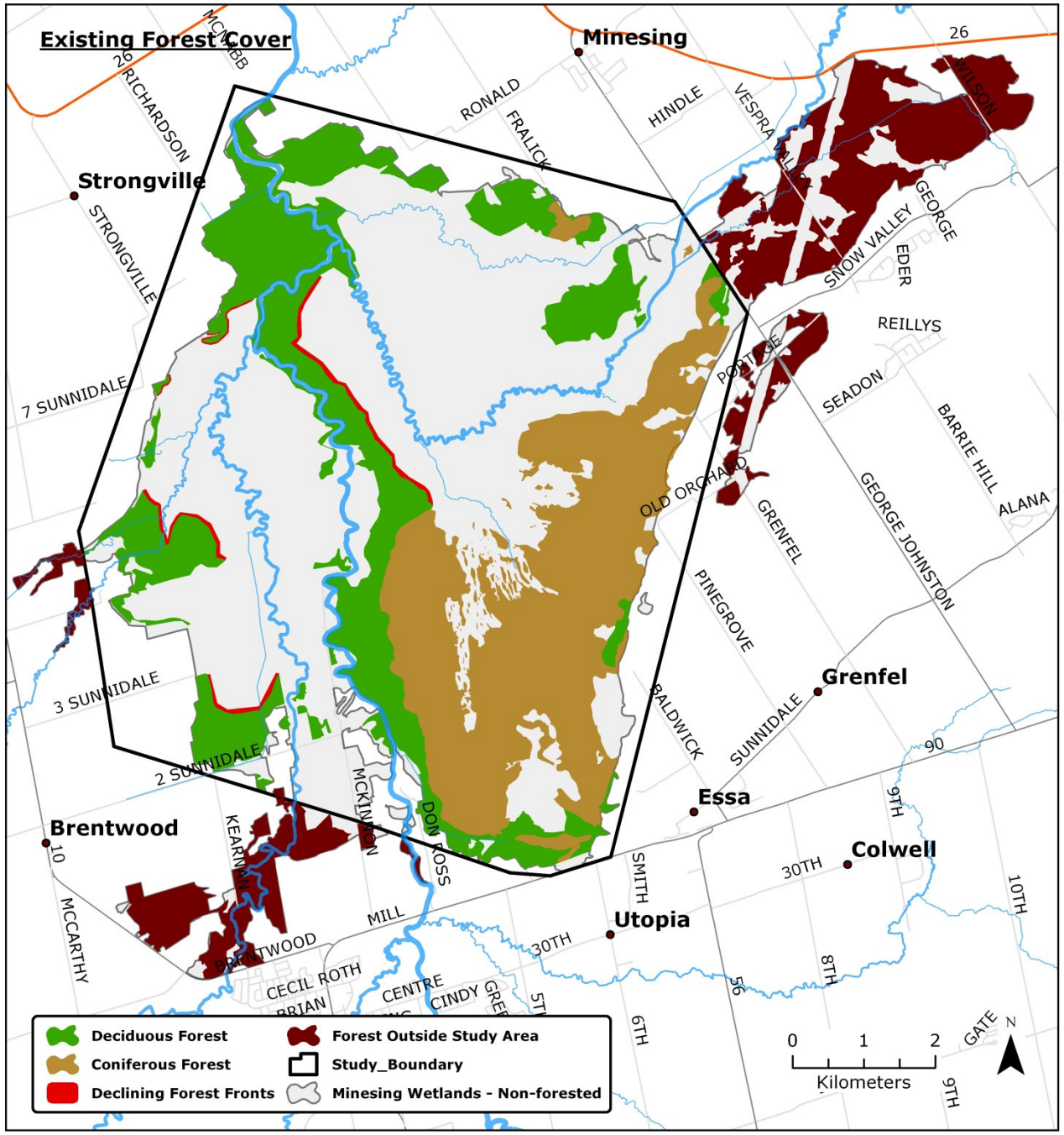
Forest
Wildlife
- Losers

Ecological Implications

Marsh
Wildlife
- Winners


Enhanced spring stopover habitat?


Tall Manna Grass (*Glyceria maxima*) –
invasive species covering hundreds of
hectares of former swamp forest

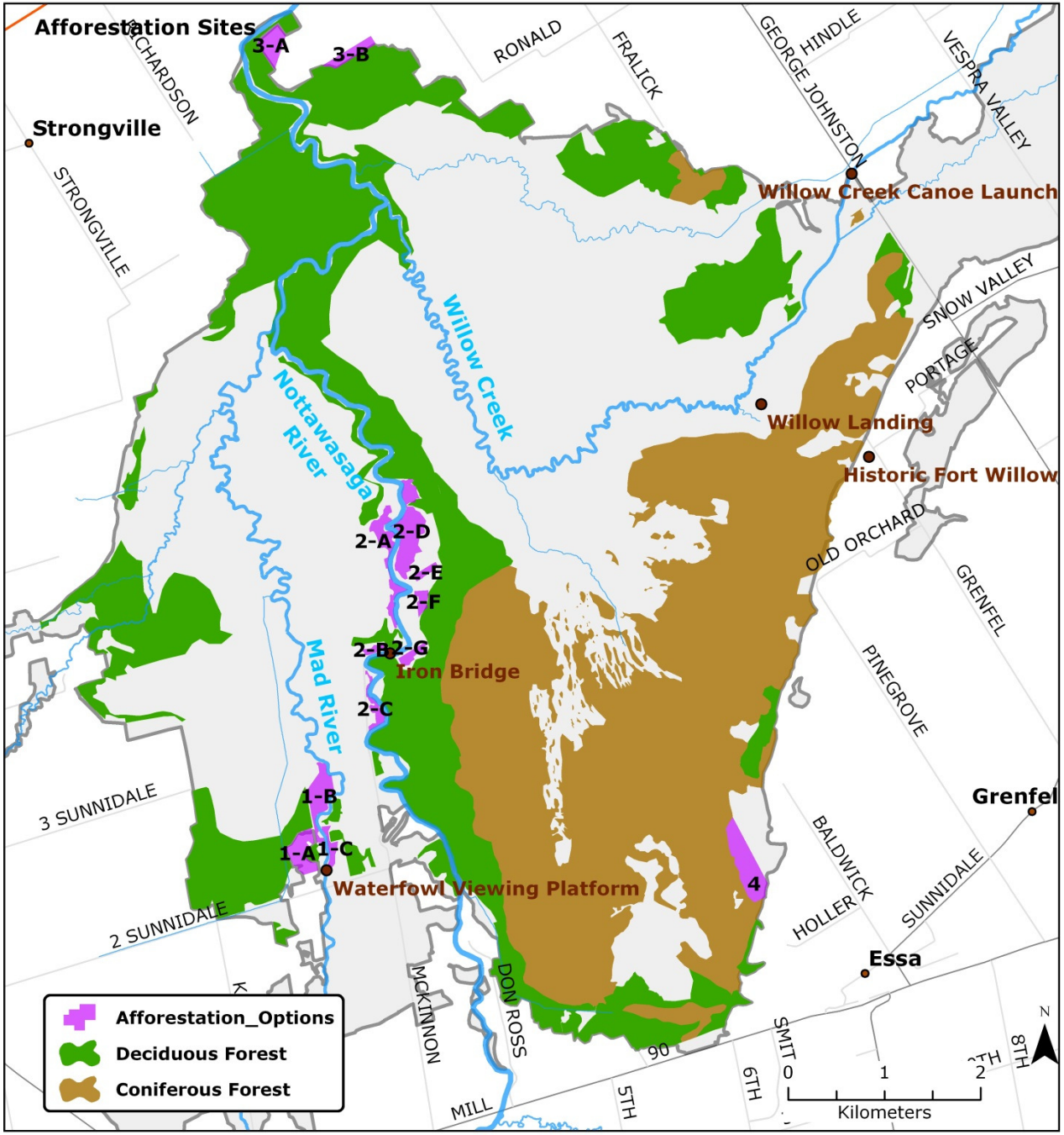


Loss Trajectory

- Significant forest loss along “fronts” will continue
- Hydrology permanently altered (unless there is massive intervention)

Future Potential Threats

- Watershed urbanization and agricultural intensification (additional change to flow and sediment regimes)
- Climate change (more intense storms could result in further hydrological change – wetter floodplains)
- Emerald Ash Borer – remaining floodplain forests often have a strong ash component



Opportunities

- **Need to maintain floodplain forests (important features and functions)**
- Innovative watershed planning and landscape stewardship to avoid mistakes of past
- Are there lands that are suitable for reforestation?
- Former farm lands along Nottawasaga and Mad Rivers (McKinnon settlement)

Minesing Reforestation

- Through this study, we have gone from "thinking about" forest loss to quantifying forest loss to identifying potential causal factors to identifying a strategy to restore floodplain forests (where possible)
- Hopefully leading to exciting opportunities to restore forest cover (report + rare species = funding opportunities to undertake work)

Challenge: To reforest dozens of hectares of floodplain forest to bolster and reconnect remaining floodplain forests in Minesing Wetlands


THANK YOU!!!