BIOREGIONAL DESIGN FOR MULTIPLE AGGREGATE EXTRACTION SITE REHABILITATION IN THE OAK RIDGES MORAINE, ONTARIO, CANADA

HEATHER SCHIBLI

ADVISOR: DR KAREN LANDMAN

COMMITTEE MEMBER: DR LORNE BENNETT

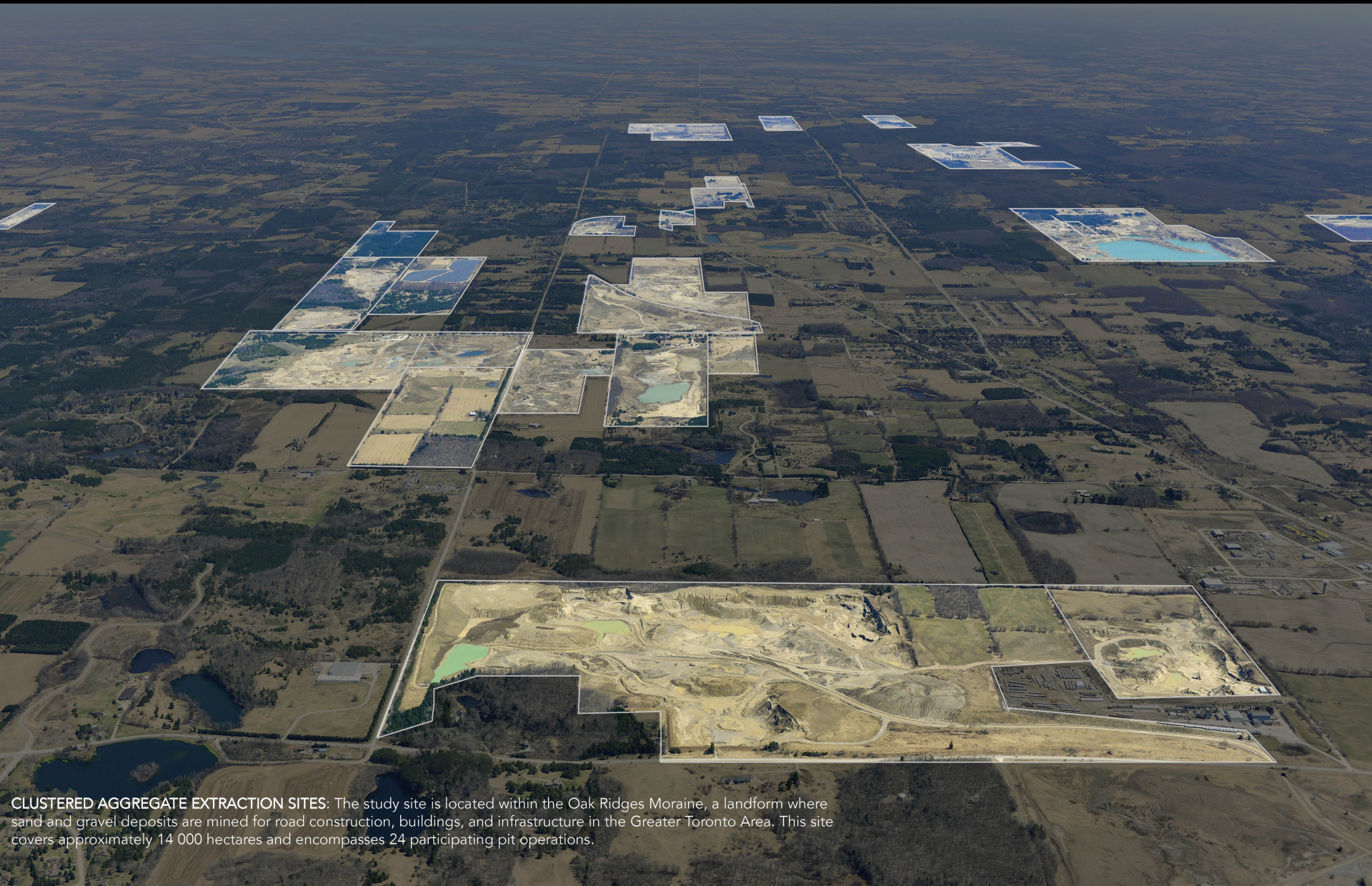
THURSDAY OCTOBER 13, 2016

THE CANADIAN RURAL REVITALIZATION FOUNDATION CONFERENCE

OSSGA LACF FAPC SSHRC UNIVERSITY of GUELPH OAC LATORNELL CONSERVATION SYMPOSIUM

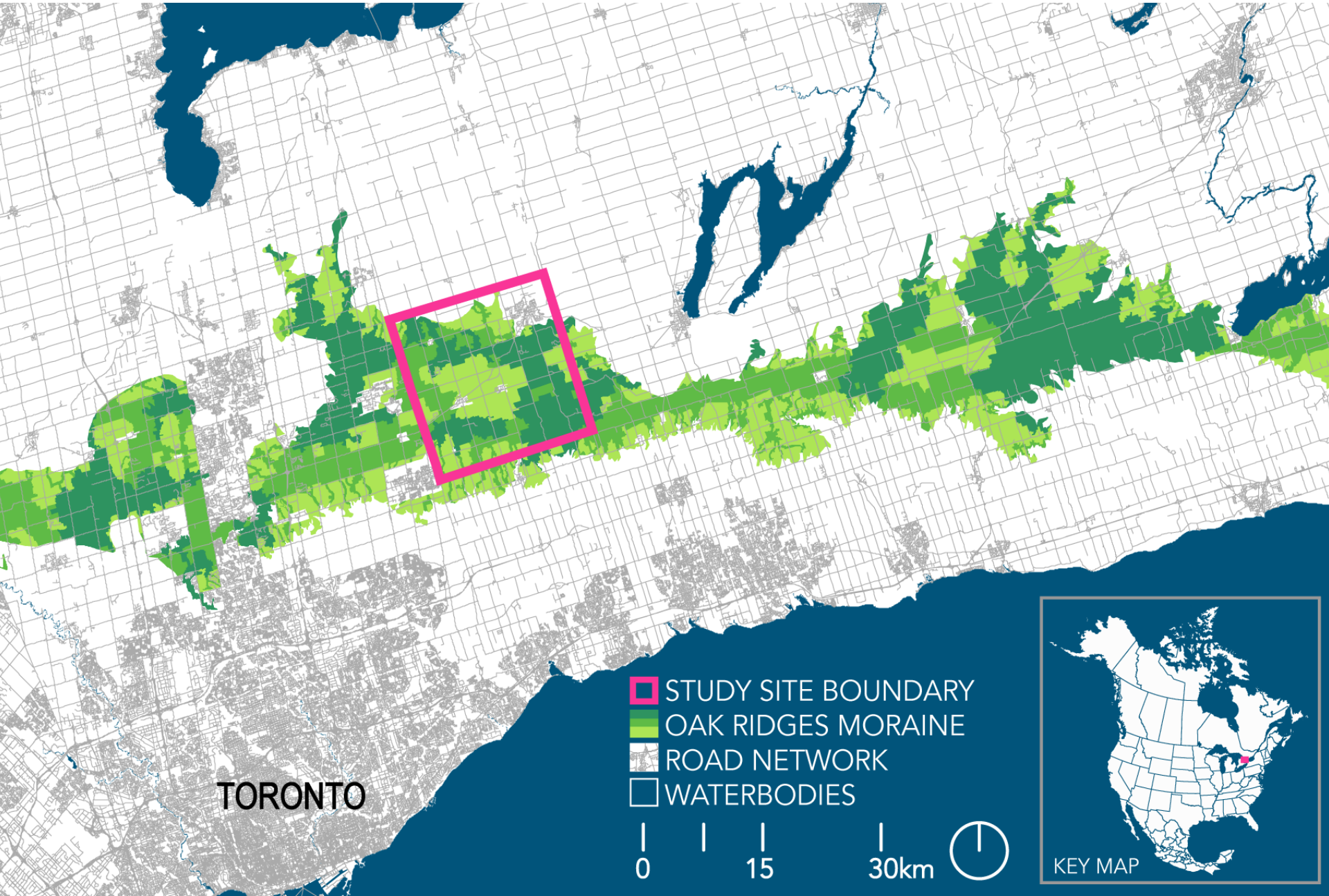
CONTENTS

BACKGROUND

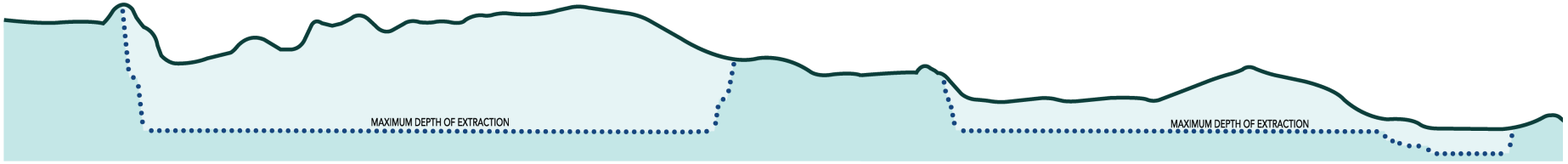


CLUSTERED AGGREGATE EXTRACTION SITES: The study site is located within the Oak Ridges Moraine, a landform where sand and gravel deposits are mined for road construction, buildings, and infrastructure in the Greater Toronto Area. This site covers approximately 14 000 hectares and encompasses 24 participating pit operations.

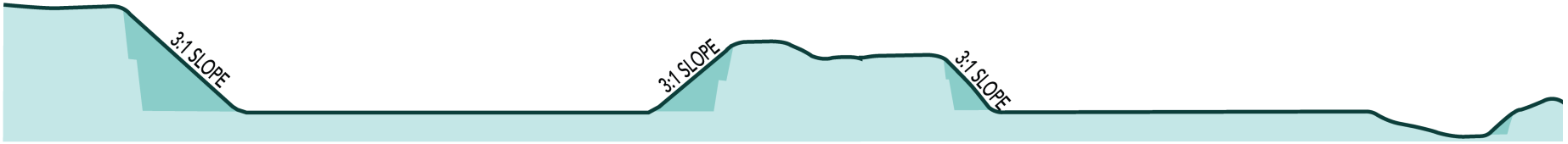
BACKGROUND


STUDY SITE BOUNDARY
OAK RIDGES MORAINE
ROAD NETWORK
WATERBODIES
0
15
30km
TORONTO
KEY MAP

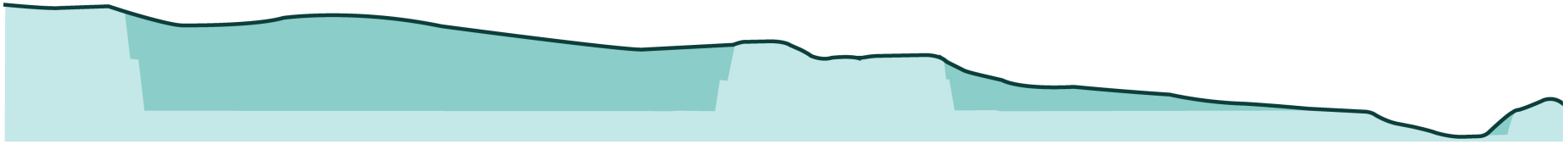
BACKGROUND



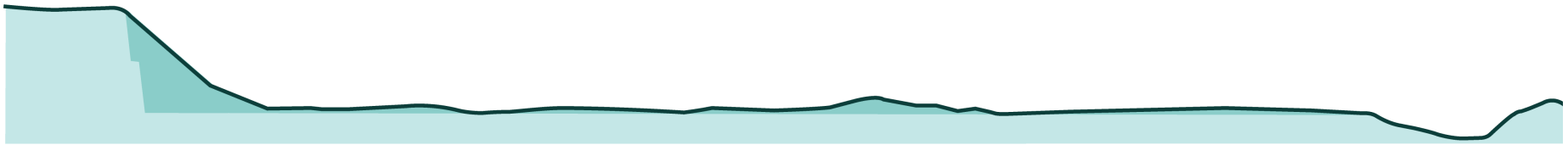
EXISTING CONDITION



APPROVED REHABILITATION PLAN



POSSIBLE REHABILITATION WITH FILL



POSSIBLE REHABILITATION WITHOUT FILL

FILL
BACKGROUND MATERIAL
EXTRACTED MATERIAL

GOALS + OBJECTIVES

1. Identify the opportunities and barriers for bioregional design of multiple aggregate-extraction site rehabilitation in the Township of Uxbridge

2. Develop a design for landscape scale rehabilitation for the Township

LITERATURE REVIEW: ACADEMIC

SUSTAINABLE LANDSCAPE PLANNING

BIOREGIONAL PLANNING

Brunkhorst 2000; Ontario Nature 2014; Thayer 2003

MULTIFUNCTIONAL LANDSCAPES

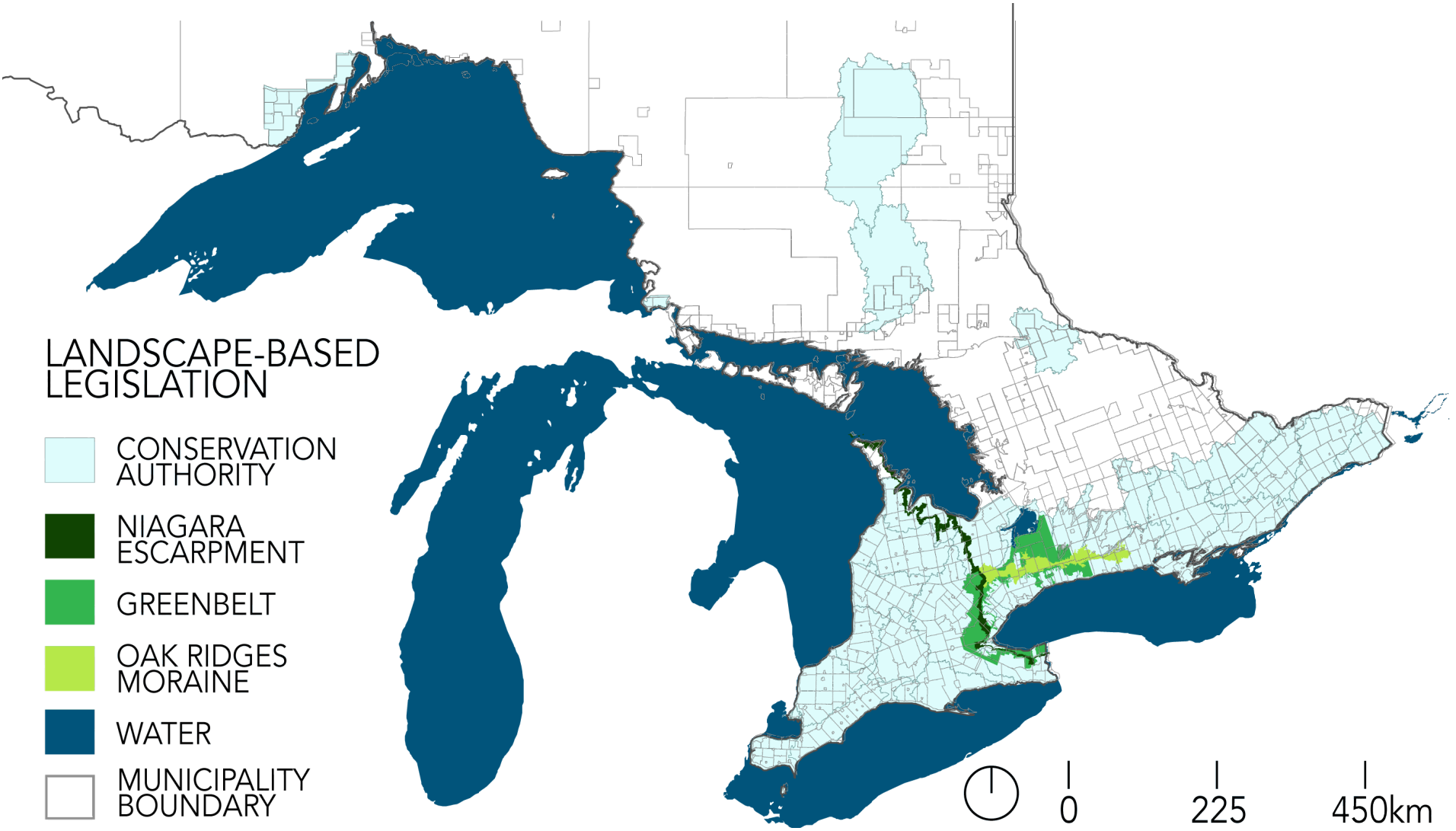
Brandt + Vejre 2004; Kato + Ahern 2009; Lagendijk + Wisserhof 1999; Musacchio 2009; Naveh 2001; Odum 1983; Selman 2012; Selman 2009

STAKEHOLDER ENGAGEMENT

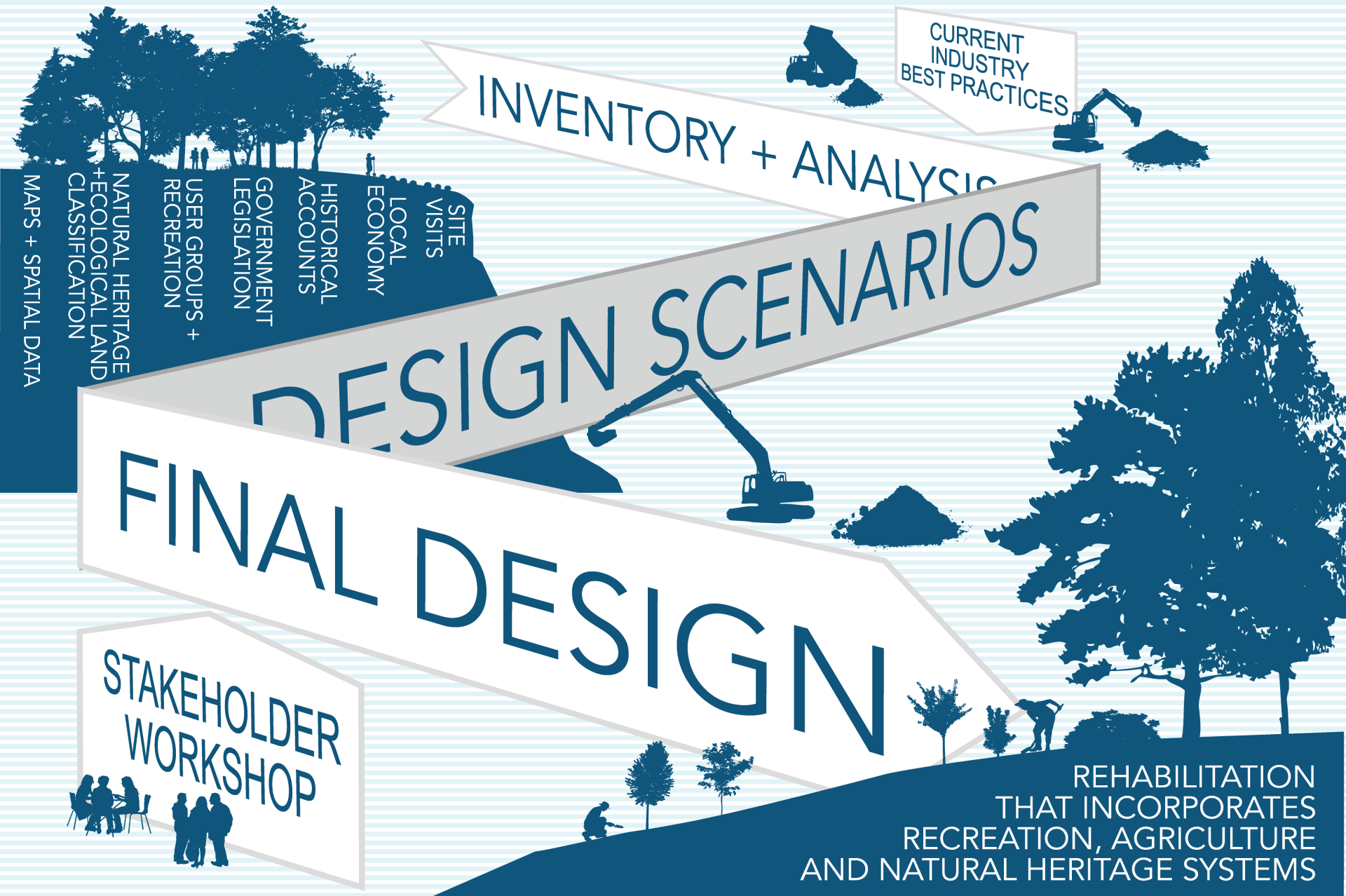
FUTURE + ALTERNATE SCENARIO STUDIES

Nassauer 2012; Reed 2008; Swart et al. 2004; Thompson et al. 2012

LITERATURE REVIEW: GREY LITERATURE



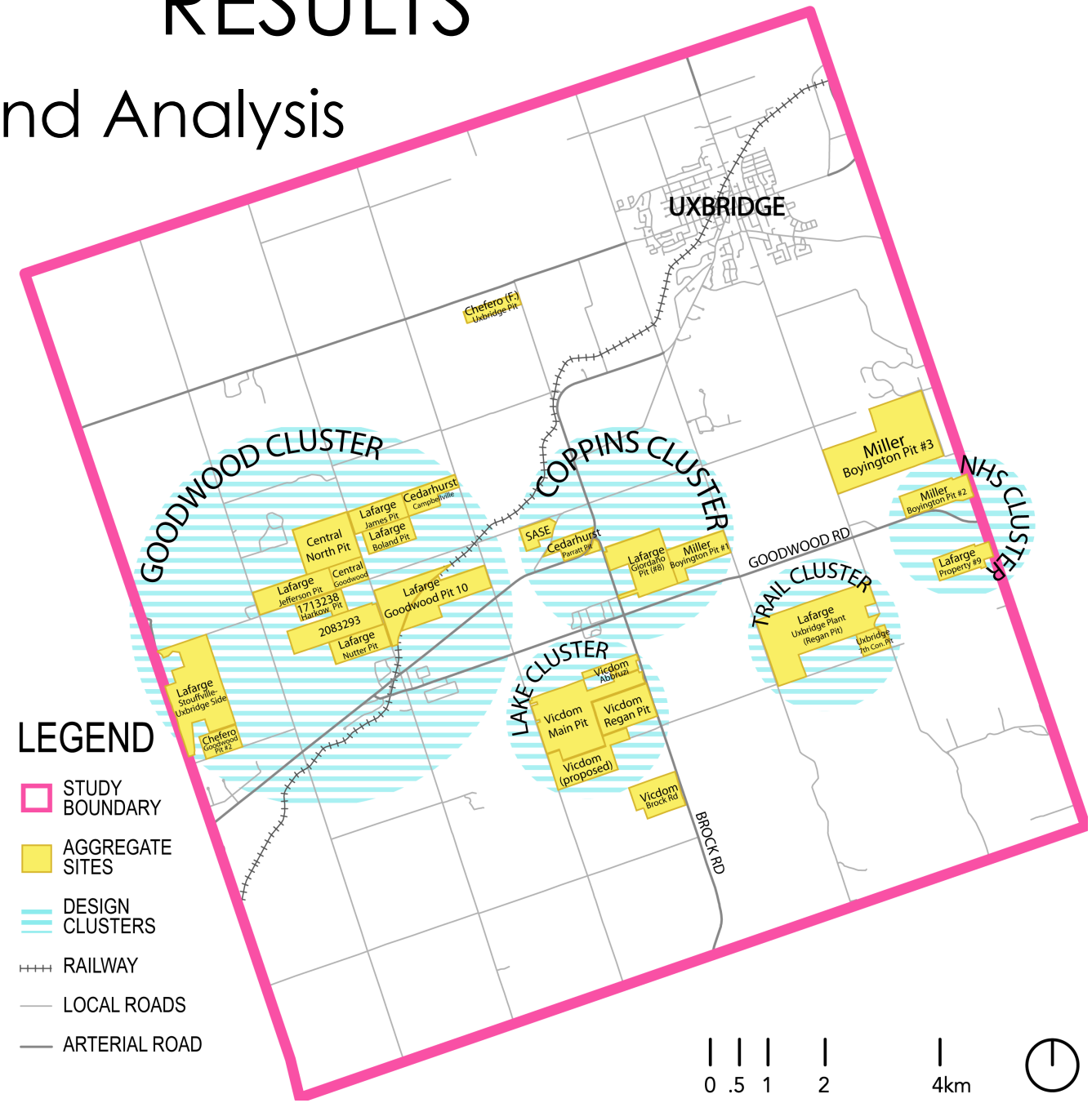
METHODS


INVENTORY + ANALYSIS
CURRENT INDUSTRY BEST PRACTICES
SITE VISITS
LOCAL ECONOMY
HISTORICAL ACCOUNTS
GOVERNMENT LEGISLATION
USER GROUPS + RECREATION
NATURAL HERITAGE +ECOLOGICAL LAND CLASSIFICATION
MAPS + SPATIAL DATA
DESIGN SCENARIOS
FINAL DESIGN
STAKEHOLDER WORKSHOP
REHABILITATION THAT INCORPORATES RECREATION, AGRICULTURE AND NATURAL HERITAGE SYSTEMS

RESULTS

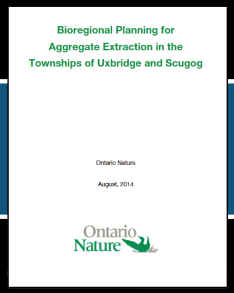
1. Inventory and Analysis

- Agricultural Capacity
- Natural Heritage
- Ecological Land Classification
- Local Economies
- Recreation + Trail Systems
- Soil Texture + Drainage
- Tributaries + Conservation Authorities
- Legislation
- Local History
- Landscape Pattern + Context
- Input from previous workshops

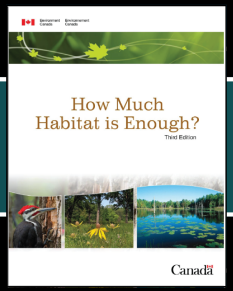


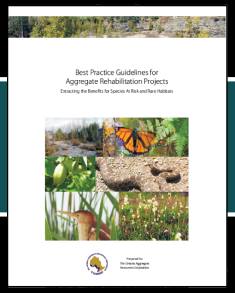
RESULTS

2. Best practices from the grey literature



1. ONTARIO NATURE BIOREGIONAL PLAN

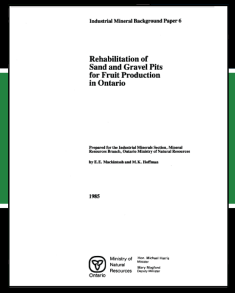


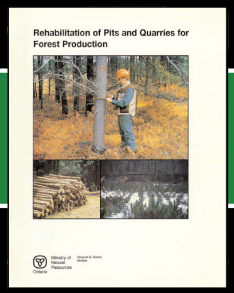


2. ENVIRONMENT CANADA
3. TOARC

4. SAROS PAPER #6
5. CORNERSTONE STANDARDS

6.
7.
8.
MNR PIT & QUARRY REHABILITATION PAPERS

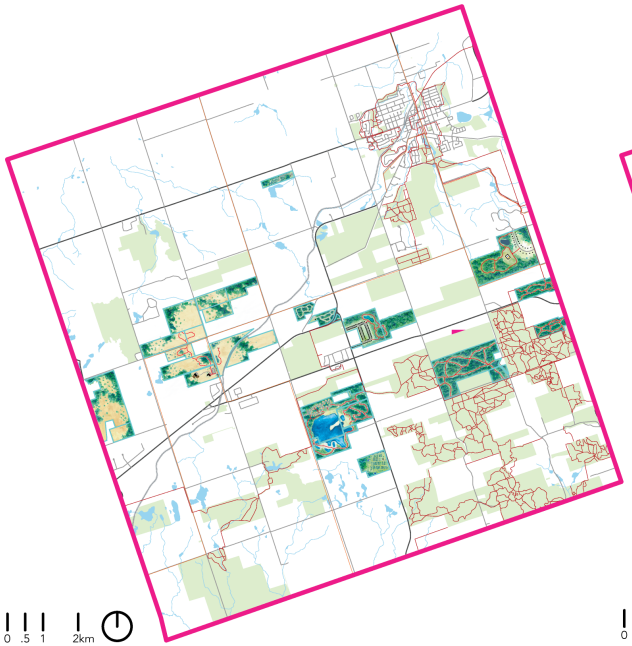




RESULTS

3. Develop three possible future scenarios

SCENARIO A
RECREATION



SCENARIO B
NATURAL HERITAGE

SCENARIO C
AGRICULTURE

RESULTS

4. Engage stakeholders in a collaborative evaluation of the scenarios

RESULTS

5. Integrate stakeholder input for a revised future scenario

RESULTS

5. Integrate stakeholder input for a revised future scenario

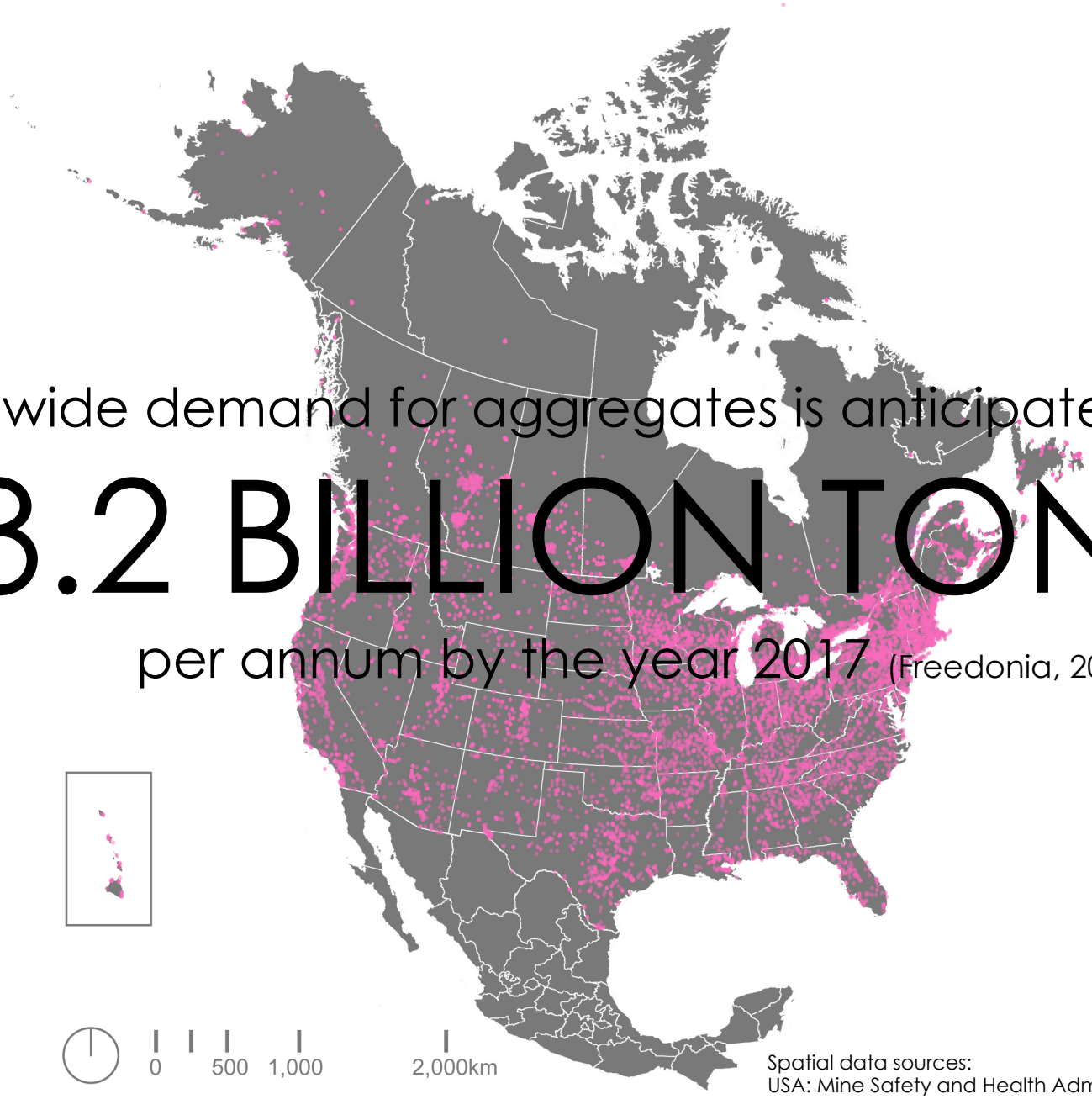
RESULTS + ANALYSIS

5. Integrate stakeholder input for a revised future scenario

RESULTS + ANALYSIS

5. Integrate stakeholder input for a revised future scenario

AMERICAN + CANADIAN AGGREGATE EXTRACTION SITES



Worldwide demand for aggregates is anticipated to exceed

53.2 BILLION TONNES

per annum by the year 2017 (Freedonia, 2014)

Spatial data sources:
USA: Mine Safety and Health Administration, US Department of Labor
Canada: Global Forest Watch Canada

THANK YOU

The full report is available at:
issuu.com/heatherschibli

hschibli@dougan.ca