Pits & Quarries in Ontario

Module 3

Aggregate Extraction

& Source Water Protection

Key Messages

1. Aggregate producers are primarily water handlers, not consumers
2. Site rehabilitation creates water assets
3. The aggregate industry is a clean industry
4. The industry is highly regulated
5. Aggregate extraction is compatible with source water protection

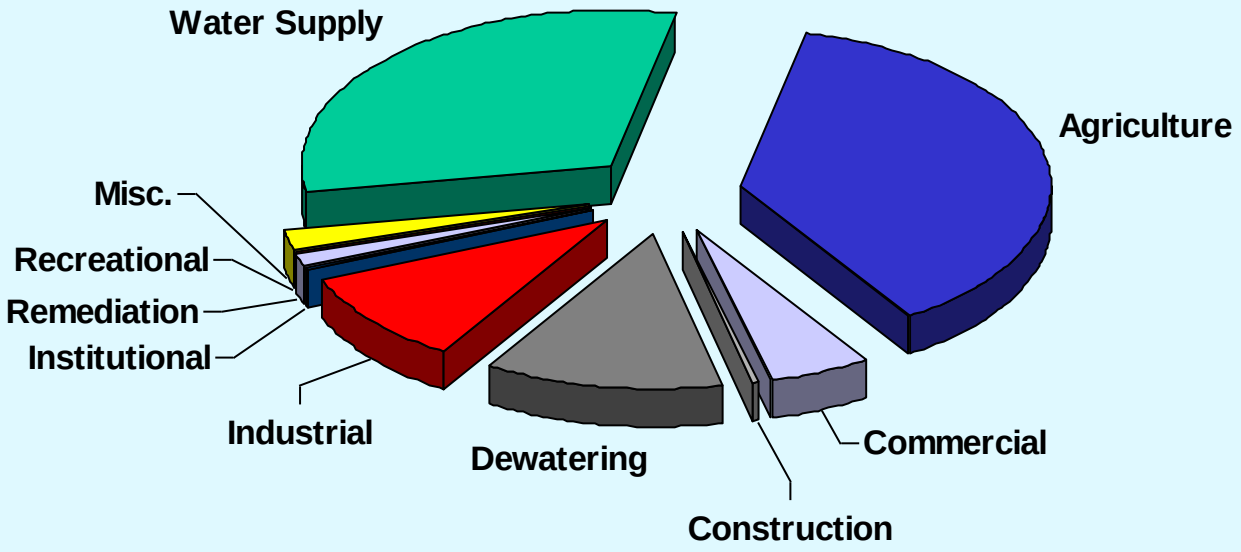
Water Handlers, Not Consumers

The majority of the water that is used during aggregate operations is recycled or returned to the watershed

Water Handlers, Not Consumers

Groundwater Taking Permits in Ontario

(2% by maximum permitted volume of water)

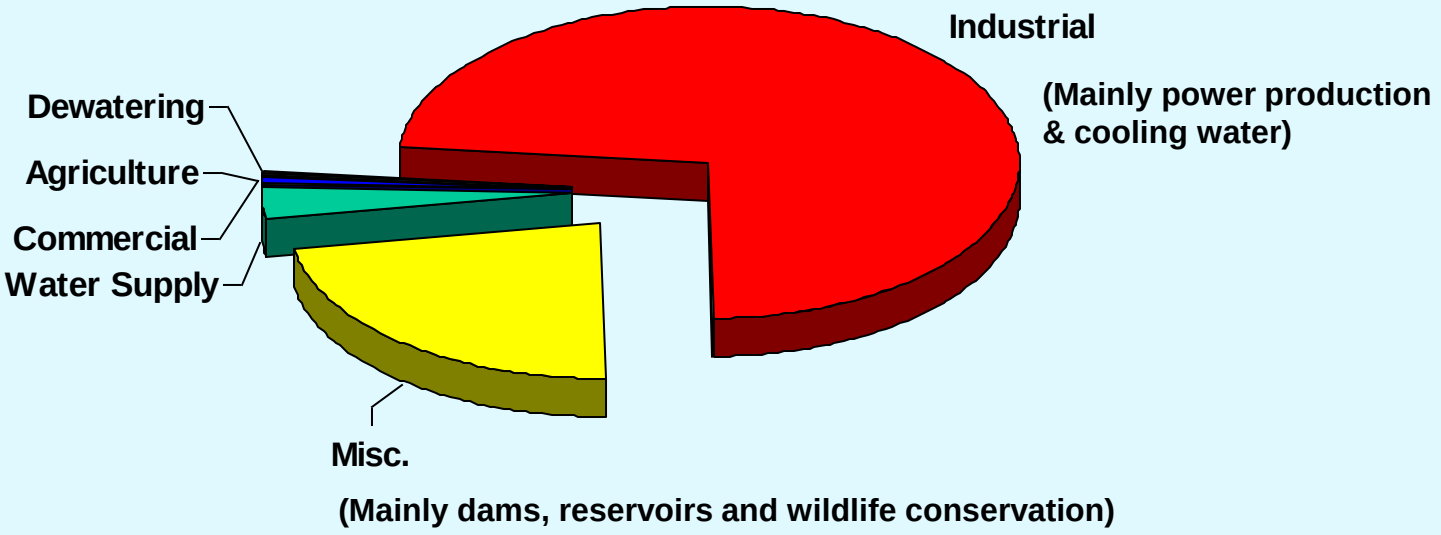


Source: Ministry of the Environment

Water Handlers, Not Consumers

Surface Water Taking Permits in Ontario

(98% by Maximum Permitted Volume)



Source: Ministry of the Environment

Water Handlers, Not Consumers

- MOE reports that Ontario aggregate producers hold permits to take water that total 770 billion litres *per* year

  however …

- There is a critically important difference between three types of “water takings”!

Water Handlers, Not Consumers

Maximum permitted amount	The maximum daily amount of water that can be pumped, according to the Permit to Take Water (PTTW).
Actual water taking (1 - 37%)	The actual amount of water pumped at the site. Usually substantially less than the maximum permitted amount listed in the PTTW because of actual operational requirements, seasonal shutdown, and demand.
Water consumption (1 - 12%)	The amount of water that actually leaves the local watershed. It is only a small fraction of the maximum permitted amount listed in the PTTW since the industry recycles extensively (e.g., aggregate washing), or simply transfers water within the local watershed (e.g., quarry dewatering).

Source: Water Consumption Study, Golder Associates Ltd., August, 2006.

Water Handlers, Not Consumers

- Overall water losses are quite small
- Products shipped to customers generally contain less than 10% water by weight; up to half is rainwater
- Most aggregate operations consume less than 12% of the rain that falls on the site

Source: Water Consumption Study, Golder Associates Ltd., August, 2006.

A Clean Industry

- Aggregate extraction and associated crushing and washing activities are primarily mechanical processes
- Very few chemicals are used or stored on aggregate sites

A Clean Industry

- Fuels and lubricants are the only chemicals used or stored at most aggregate sites, and are subject to strict provincial regulations

A Clean Industry

- Aggregate is processed mechanically by crushing, screening and washing
- No chemicals are added to the products or to the water

A Clean Industry

- Water quality testing in the late 1980s, at a wide variety of pits and quarries, found the water quality to be good*
- MISA regulations requiring ongoing effluent testing were not deemed necessary for aggregate extraction and processing

* Source: Aggregate Industry MISA Preregulation Monitoring Program Results. SENES Consultants Ltd., May 1998.

MISA
Municipal/Industrial Strategy for Abatement

A Highly Regulated Industry

Currently, more than 25 provincial and federal Acts govern environmental protection at aggregate sites

Licencing

- Producers are required to undertake extensive groundwater and surface water studies, in accordance with Provincial Standards, before the Ministry of Natural Resources will issue a licence pursuant to the *Aggregate Resources Act*

Water Taking

- The volume of water managed for quarry dewatering or aggregate washing is governed by a Permit to Take Water issued by the Ministry of the Environment

Fuels

- The *Liquid Fuels Handling Code* administered by the Technical Safety and Standards Authority places strict controls on the storage and use of fuels and lubricants
- These controls are also noted on the operational site plan and administered by MNR inspectors

Water Discharge

- Certificates of Approval are required under the *Ontario Water Resources Act* to discharge water from a pit or quarry

- Water quality ***and*** quantity must be acceptable

Water Wells

- "*Riparian Rights*" - everyone is entitled to a fair share of water
- The *Ontario Water Resources Act* protects neighbours from the depletion or contamination of well water
- MOE investigates complaints of well interference and has the authority to issue orders to compel actions to preserve water supplies

Fill

- The *Environmental Protection Act* establishes strict standards for inert fill that may be accepted in aggregate sites
- Operators of waste disposal sites require a Certificate of Approval from the Ministry of the Environment to accept any other type of backfill
- These sites are no longer treated as pits and quarries for the purposes of source water protection planning, rather they are treated as waste management operations

Compatible with Source Water Protection

Aggregate is extracted without contaminating or depleting water supplies

Source Water Protection

- Ontario's stone, sand and gravel producers support source water protection
- Both water and aggregates are essential resources, as identified in the Provincial Policy Statement, 2005
- OSSGA has actively participated in the public process leading to the development of the source water protection legislation

Source Water Protection

- Aggregates are essential to construct and maintain the province's drinking water infrastructure:
  - Pack water well screens
  - Build water treatment plants
  - Concrete water pipe
  - Backfill pipe trenches

Source Water Protection

- Aggregate extraction is not deemed a "*threat of provincial concern*" to sources of drinking water

"Augmented vulnerability" means a hole in the ground!

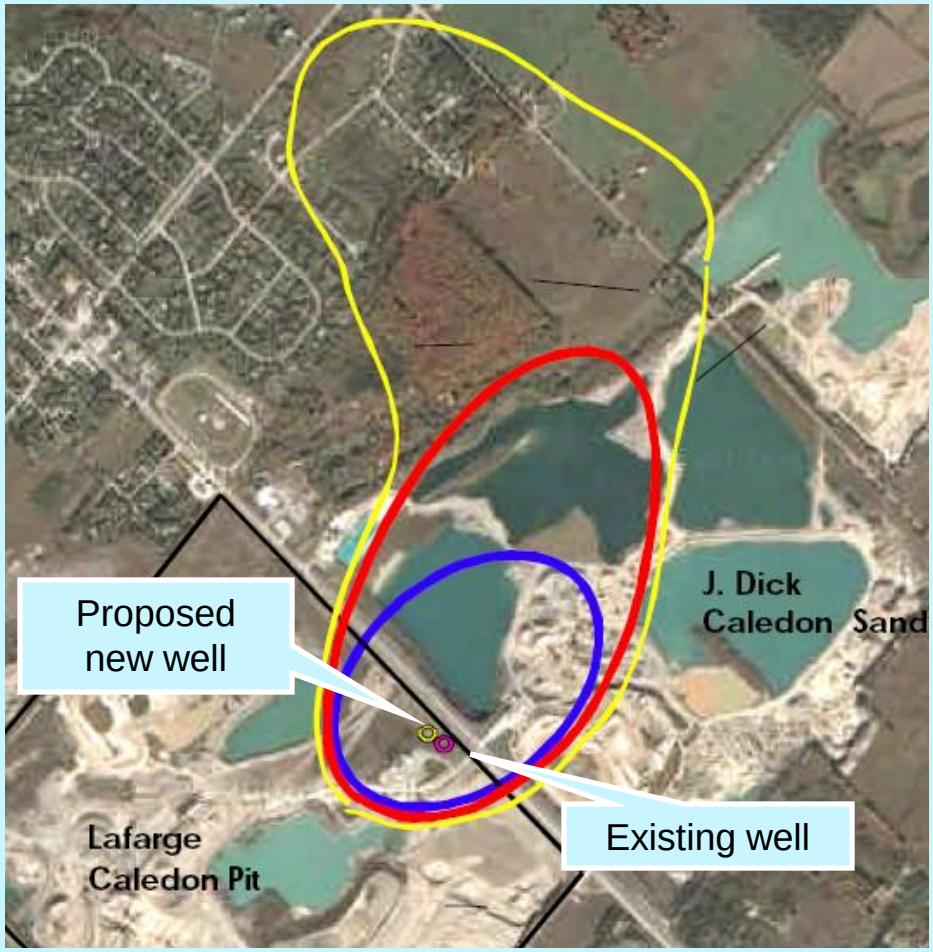
Vulnerability + **Threat** = **Risk**

Aggregate extraction is not identified as "threat of provincial concern"

Source Water Protection

- There are numerous examples of municipal water works and wells located within, or adjacent to, pits and quarries in Ontario, with no record of significant problems

Source Water Protection



Peel Region Well #3:

"*over the previous 26 years … the water quality from Well 3 has been excellent … water taking from an aquifer adjacent to an aggregate extraction site, when operated with "due diligence" … can co-exist*"

Source: Region of Peel

"*overall raw water quality of the PW#3 well field is excellent and essentially meets all Ontario Drinking Water Standards*"

Source: Geo Kamp Ltd.
(Water Supply Consultants)

Source Water Protection

- The advantages of locating a municipal well in a gravel pit include:
  - Lower drilling costs
  - Enhanced recharge
  - Softer, less mineralized water
  - Lower risk of fertilizer, pesticide or bacteriological contamination (which are not associated with aggregate extraction or processing)

Source Water Protection

- A number of other jurisdictions, which have already implemented source water protection programs, have concluded that aggregate extraction represents a low or negligible risk, including: Louisiana; New York State; Dayton, Ohio; and Kitsap County, Washington.

Source: Applied Research on Source Water Protection in the Aggregate Industry; Ministry of Natural Resources

Source Water Protection

… more than 300 sand and gravel mines operating in the State mine aggregate below the water table. In its experience, no such mining activity has ever resulted in the contamination of a drinking water supply … a comprehensive review of the scientific literature, field interviews with water supply managers, and an examination of case studies from New Hampshire, Ohio and New York, concluded that they had "found no scientific documentation containing evidence that excavating gravel above or below the water table was detrimental to an underlying aquifer".

Source: State of New York Department of Environmental Conservation, April 2005

Creating Water Assets

Pits & quarries afford excellent opportunities for water-based rehabilitation

Creating Water Assets

- Pit and quarry lakes increase water storage in the watershed, which can help regulate stream baseflow and shorten natural drought cycles
- Lakes formed in pits and quarries can be used for drinking water reservoirs

Creating Water Assets

Fonthill Kame

Creating Water Assets

Wainfleet Wetlands

Creating Water Assets

Dufferin Milton Quarry

Creating Water Assets

St. Marys Swimming Quarry

Contact

Jessica Annis
Environment & Resources Manager
Ontario Stone, Sand & Gravel Association

365 Brunel Rd., Unit 2
Mississauga, ON L4Z 1Z5
Phone: (905) 507-0711 x 2
Fax: 905-507-0717
Email: jannis@ontariossga.com
Web: www.ontariossga.com