Aggregate Extraction in Ontario: A Strategy for the Future

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Aggregate Extraction in Ontario: A Strategy for the Future

by Matt Binstock and Maureen Carter-Whitney
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CIELAP informs legislative, policy and regulatory outcomes for Sustainability at the national and provincial/territorial levels of government in Canada.

About the Authors

Matt Binstock is a Policy Researcher at CIELAP. Matt holds a Bachelors Degree in Environmental and Resource Studies from Trent University and a Masters Degree in Environmental Studies from York University.

Maureen Carter-Whitney (LL.B., LL.M.), Research Director at CIELAP, is an environmental lawyer with a background in legal research and environmental public policy analysis, and a strong interest in sustainable land use planning and in public engagement in environmental decision-making. She also teaches environmental law and is the author of LexisNexis’ looseleaf publication, Environmental Regulation in Canada.

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Executive Summary

Aggregate extraction continues to be one of the most controversial land use issues in Ontario. Demand for aggregate resources in fast growing municipalities in the province, combined with a policy and legislative framework promoting extraction of aggregates close to the markets where they will be consumed, has resulted in substantial resistance to new aggregate extraction operations when they are proposed.

In 1992, the Ministry of Natural Resources (MNR) developed a State of the Resource Report on aggregate reserves, consumption trends, conservation and recycling, with a primary focus on Southern Ontario. The report informed the development of policies and programs, and provided guidance to municipal planning processes. The Environmental Commissioner of Ontario (ECO) has repeatedly called for MNR to update its State of the Resource Report and the ECO’s 2006/07 Annual Report specifically recommended that MNR also develop an aggregates conservation strategy. In 2007, MNR stated in response that, while it was committed to developing a strategy, it needed first to update its 1992 State of the Aggregate Resource in Ontario Study (SAROS).

A new SAROS was completed in 2009. It updated information in the 1992 report, included research on new subject matters and expanded the geographic scope to include all regions of Ontario. The subject matter was divided into six components and contracted out to independent consultants, who produced a series of papers; many of the findings from these papers were ultimately consolidated into a final report authored by the Ministry of Natural Resources. It is anticipated that, with the completion of the SAROS reports, MNR now has the background information it needs to soon develop a broader strategy to conserve aggregates, improve environmental safeguards and oversight and reform transportation methods, while recognizing the numerous economic benefits that the resource provides to the province.

This report is intended to provide commentary on the 2009 SAROS and additional research that will inform the development of an improved Ontario aggregates strategy. It is hoped that this research will assist various stakeholders to work together to create a strategy for aggregates in Ontario that reflects environmental and social values, as well as economic interests.

Authors of the SAROS reports suggest that high quality aggregates located in close proximity to the Greater Toronto Area (GTA) are growing scarce and shortages may be experienced within 10 to 20 years if new licences are not approved in close-to-market areas. If this scenario is realized, reliance on aggregate reserves located further from high demand areas will surely increase. At the same time, long term alternatives to the current close-to-market approach, such as transportation of aggregates by rail or barge from northern Ontario, are described in the SAROS as having serious social, environmental and economic implications.

Some sections of the SAROS reports do suggest that improved demand management for aggregates may be possible through changes in urban design and greater recycling, but both of these options are currently hindered by a lack of data. The net impact of trends in urban planning and design, such as the smart growth principles prescribed under the province’s Growth Plan for the Greater Golden Horseshoe Region, on the demand for virgin aggregates is not fully
known. Basic data on the types, quantities and locations of materials that could be used as substitutes for virgin aggregate are also currently lacking.

At the same time, a constraints analysis undertaken for the SAROS reports indicates that large amounts of aggregate could still be extracted from the bedrock of Southern Ontario, but that 93% of these deposits that are currently unlicenced overlap with environmental or agricultural features. A likely outcome of these SAROS findings will be increased pressure to open additional areas in the Greenbelt, Oak Ridges Moraine and Niagara Escarpment Plans, where much of the aggregate that supplies the GTA is currently extracted. These three land use plans will be undergoing a 10-year consolidated review in 2015 and aggregates will likely be a central focus of this process.

In particular, the Oak Ridges Moraine Conservation Plan (ORMCP) anticipates that heightened demand for close-to-market aggregates may mean that new aggregate extraction is permitted in its Natural Core Areas, where it is currently restricted in order to protect key natural heritage features. Numerous licenced aggregate pits exist across the Oak Ridges Moraine, many in close proximity to Natural Core Areas, which could potentially be candidates for expansion if current restrictions were eased. Also, communities just beyond these protected areas such as Simcoe will likely continue to see an increase in demand for aggregates to supply GTA markets. Overall, the SAROS study suggests that if the status quo for managing aggregates in the province is maintained, future supplies of aggregate for the GTA market will come from sites located within or just beyond regional conservation plan areas.

The social and economic benefits provided by Ontario’s aggregates in various applications are well understood and are discussed in depth in the SAROS reports. The importance of aggregate resources to the province is also reflected in a planning policy framework supporting close-to-market extraction of aggregates, which has been in place in one form or another since the 1970s. Regarding the current provincial approach to aggregate resource management, some of the stakeholders interviewed for CIELAP’s research believe that there is a tipping point at which the need to preserve remaining natural heritage features should outweigh the benefits of close-to-market aggregates management. Several respondents also pointed to a need for better accounting of social and environmental costs related to aggregate extraction. The province’s current fee of 11.5 cents per tonne of aggregate extracted, does not address all of these costs and in some cases only covers the cost of road maintenance for municipalities hosting aggregate operations. Also, this relatively low fee means that the use of recycled material is not an attractive alternative from a financial perspective.

Better accounting of the full cost of aggregate extraction, including social and environmental impacts is required. Once this has been achieved, the provincial government needs to ensure that such costs are reflected in the total price paid for aggregates.

An aggregates strategy for Ontario must address these seemingly conflicting interests with a comprehensive approach that manages current demand, but also takes a long-term view that contemplates the potential for the future use of rail or marine transportation from areas where there may be less land use conflict. For example, in the United States and the UK, transportation
of aggregates by rail has seen modest growth in recent years, suggesting that this is both feasible and, in some contexts, an appropriate solution.

Inter-ministerial cooperation is needed to:

- enable transportation reform to allow for the growth of rail infrastructure over the long term and reduce dependence on continual, large-scale highway expansion projects;
- develop sufficient government staff capacity to apply and enforce the Aggregate Resources Act (ARA) in all areas with significant resources throughout the province;
- establish both incentives for greater recycling, rehabilitation and information sharing among stakeholders and disincentives targeting waste and bad practices that perpetuate a negative public perception; and
- reform the current framework for rehabilitation of worked out pits and quarries by establishing both incentives and requirements to improve the quality and quantity of rehabilitation throughout the province.

The UK provides one of the strongest examples of what can be achieved in terms of sustainable aggregate resource management, as was acknowledged in several areas of the SAROS report and by MNR. However, a levy charged on virgin aggregates in the UK is currently 2.00 GBP (approximately $3.22 CDN) per tonne of aggregate extracted. Ontario’s current fee of 11.5 cents per tonne would likely not be sufficient to support the development of similar initiatives. A long-term aggregates strategy must begin to examine other, more comprehensive ways to define the value and appropriate price of the resource. Increased aggregate royalties could also improve staff capacity in MNR to allow for greater compliance with and enforcement of the ARA, and to develop programs that promote knowledge sharing between government, industry and interested stakeholders. Other jurisdictions, such as Sweden and the Netherlands, have faced similar land use conflicts and environmental challenges within their own aggregate industries and their responses include the establishment of taxes on virgin aggregate; taxes or bans on the landfilling of wastes that are suitable for use as aggregate; and financial incentives to make greater use of recycled materials in construction.

The SAROS report should be viewed as an important step toward a long term aggregates strategy. It should be the catalyst for a broad, open debate on which elements will be needed in a new strategy that will be most beneficial for Ontario from economic, social and environmental perspectives. The report should also lead to ongoing research on the environmental impacts and costs of extraction, jurisdictional review and improved data sharing and analysis.

**Summary of Recommendations**

**Section 4 – Environmental, Social and Human Health Impacts of Aggregate Extraction in Ontario**

**Continue to study environmental impacts of aggregate extraction.** The Ontario government should identify an efficient means of undertaking a comprehensive study of the environmental, social and cultural heritage impacts of aggregate extraction in an Ontario-specific context that
includes cumulative impacts, and provides a broader understanding of land use change issues such as the loss of agricultural land. This study should be led an independent body, but with extensive input by MNR and the Ministry of the Environment (MOE), as they have direct access to critical field data for determining trends. The study should also include input from other stakeholders such as environmental non-profit organizations, municipalities and the public. In addition, MNR should make a database of field audit information collected by aggregate inspectors available to the public in order to allow third parties to track trends in environmental impacts and identify potential problem areas that need greater attention.

Section 6.1 – Balancing the need for Mineral Aggregate with other Land Use Interests in a High Growth Region

Increase producer requirements for monitoring and reporting. MNR should use additional provincial funding to increase enforcement of the ARA. At the same time producer requirements, especially for larger, more complex operations should be increased by requiring more detailed monitoring under the Compliance Assessment Report system, as well as more frequent site visits from MNR inspectors. MNR should issue fines against aggregate producers who submit incomplete or inaccurate Compliance Assessment Reports.

Introduce sunset clauses on aggregate licences. MNR should introduce a sunset clause on aggregate licences. While sunset clauses could be phased in gradually for the entire province, at minimum the use of sunset clauses for aggregate operations in the Oak Ridges Moraine, Greenbelt and Niagara Escarpment areas should be considered during the 2015 consolidated review of the three regional plans.

Section 6.2 – Supply and Demand for Aggregates

Determine the impact of urban development on the demand for aggregates. As a first step towards creating an aggregates conservation strategy, MNR in collaboration with the Ministry of Transportation (MTO) and the Ministry of Municipal Affairs and Housing (MMAH) should undertake further research on the impact of different urban development approaches on the demand for virgin aggregates. Once urban design approaches that can reduce the need for virgin aggregate over the long term have been identified, these should be incorporated as requirements where feasible in an aggregates conservation strategy. For example, provincial infrastructure funding could be made conditional on the use of materials and/or designs that minimize the need for virgin aggregate.

Section 6.3 – Underutilization of Recycled Aggregate

The provincial government should promote and where possible, require the use of recycled aggregate to the fullest extent possible without compromising safety or durability of infrastructure by doing the following:

a) Follow the SAROS recommendation to create an inventory of recycling activity and available materials. MNR should pursue all recommendations provided in SAROS Paper 4: Reuse and Recycling to improve the rate of aggregate recycling in the province.
b) **Establish provincial targets for recycling aggregate.** As a component of the province’s proposed Aggregates Conservation Strategy, adopt a recycling target of 10 to 15% substitution of virgin aggregate for recycled/secondary material. Recycling targets should also be increased incrementally over time as knowledge on the availability of suitable materials and recycling practices improve.

c) **Remove municipal barriers to recycling aggregate.** MMAH, in collaboration with the Ministry of Infrastructure and MNR, should use provincial legislation to address municipal official planning barriers to the use of recycled aggregate. For example, municipalities designated as urban growth centres under the *Places to Grow Act, 2005* should be required to accommodate recycling facilities and encourage the use of recycled aggregate in infrastructure, as appropriate.

d) **Introduce a landfill tax to reduce unnecessary landfilling of usable material.** As a component of a long-term aggregates strategy, the Ontario government should combine an aggregates royalty increase for virgin aggregate with a provincial landfill tax that will reduce the disposal of waste products that have the potential to act as a substitute for virgin aggregate.

**Section 6.4 – Site Plan Amendments**

**Make major changes to aggregate operations conditional on use of best practices.** MNR should revise the current procedure for major site plan amendments to encourage producers to implement best practices. Approval of requests, such as for tonnage increases, increases in the depth of extraction, removal of setbacks or addition of new equipment to a site should be conditional on evidence of successful progressive rehabilitation to date and/or a tightened timeframe for resource depletion and final rehabilitation.

**Section 6.5 - Rehabilitation**

MNR should commit to implementing all key recommendations already identified through their EBR review of rehabilitation in 2006 and in *SAROS Paper 6: Rehabilitation.*

MNR should strongly consider reintroducing the security deposit model for rehabilitation of worked out pits and quarries. As recommended in *SAROS Paper 6: Rehabilitation,* MNR should consider reintroducing the security deposit model for aggregate licences to increase the financial incentive to rehabilitate worked out sites.

**Section 6.6 – Compliance Monitoring**

**Increase the number of aggregates field inspectors.** The Ontario government should make funding available to restore the number of aggregate field inspectors to a level that will enable more frequent and thorough monitoring of a greater number of pits and quarries in the province.
Section 6.7 – Pricing and Accounting for the Cost of Aggregates

Gradually increase the current aggregate royalty rate and licence fees to fund reforms. MNR should increase the current per tonne licence fees and royalties charged on the extraction of aggregates. As a starting point, the rate should be increased to a level sufficient to continue to fund additional staff capacity within MNR. Additional revenue from future increases should be used to further recycling efforts, extend the geographic areas covered by the ARA, improve rehabilitation efforts and support further research into how the industry can improve practices. The royalty rate and fee increases should be phased in incrementally over time.

Section 7 – Long-Term Considerations for Aggregates Management in Ontario

Continue to investigate long term alternatives to close-to-market aggregate extraction supported by truck transportation. MNR, in collaboration with MTO, should continue to lead research into using rail transportation from as a long-term option for the movement of aggregates to high demand areas. This research should include an analysis of various transportation alternatives that will take into account a broad range of costs and benefits including social and economic benefits and environmental factors. This research should inform the eventual development of a provincial rail strategy.

Improve knowledge of how different types of aggregate are used and how they move from the extraction site to the job site. MNR, in collaboration with the Ontario Aggregate Resources Corporation (TOARC) and the Ontario Sand, Stone and Gravel Association (OSSGA), should make information on annual tonnage and transportation routes of existing operations available to municipalities and to third party bodies.
### 1. Introduction and Background

Ontario’s *Aggregate Resources Act*\(^1\) defines “aggregates” as gravel, sand, clay, earth, shale, stone, limestone, dolostone, sandstone, marble, granite and rock. Aggregates are used primarily for the construction and maintenance of numerous types of infrastructure, including highways, bridges and sewer mains. Aggregates are also used in the manufacturing of products such as pharmaceuticals and cosmetics.

The extraction of aggregate resources in Ontario often becomes controversial for the damage it causes to natural landscapes and the impacts it causes in local communities. Pits and quarries remove natural vegetation, top soil and subsoil, leading to loss of animal wildlife, biodiversity and aquatic systems. Aggregate extraction can have negative effects on water quality and quantity, natural heritage features, and endangered species and can adversely impact nearby residents and those who enjoy recreation and tourism (notably eco-tourism). Adjacent communities and adjacent ecosystems are affected by noise, dust and vibration.

Ontario is at a crossroads on the issue of aggregate extraction. In 2009, Ontario’s Ministry of Natural Resources (MNR) completed an update of the 1992 State of the Aggregate Resource in Ontario Study (SAROS), which it has stated will inform the development of a broader provincial aggregates strategy.\(^2\) Over the years, MNR has also indicated that it is committed to the development of an aggregates conservation strategy in collaboration with other provincial ministries. While a broader provincial aggregates strategy would address issues such as ensuring long term aggregate supplies and transportation of aggregates to high demand areas, an aggregates conservation strategy would also address the need to reduce consumption of aggregates through demand management and increased use of recycled material.\(^3\) The development of these strategies presents a rare and significant opportunity for conservation organizations and other stakeholders who seek a greater balance between aggregate extraction activities and environmental protection to inform the development of a long-term strategy for aggregate resources in Ontario.

Over the last three decades, production of aggregate in Ontario has fluctuated between approximately 100 million and 200 million tonnes annually.\(^4\) Industry estimates that, over the next 25 years, the GTA will require approximately 1.5 billion tonnes of aggregate as urban infrastructure is renewed and built.\(^5\) If more protective policies are not put into place, much of this aggregate will come from some of the most ecologically sensitive land in and around the

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1. R.S.O. 1990, c, A.8
3. Personal Communication, Ontario Ministry of Natural Resources, July 2010
Ontario Greenbelt. Many of the massive gravel pits and quarries proposed for Ontario could cause severe environmental degradation to the Niagara Escarpment, a UNESCO World Biosphere Reserve within the Greenbelt, Areas of Natural and Scientific Interest (ANSIs) and remaining areas in Ontario’s unique but increasingly depleted Carolinian zone.

Outdated policies and compliance requirements make it challenging for the Ontario government to ensure sustainable aggregate operations. There are numerous problems with how current legislation is enforced, including inadequate monitoring of environmental impacts, and a lack of effective mechanisms for inspection, enforcement and rehabilitation of aggregate operations. Current provincial land use planning legislation and policies give priority to aggregate extraction over other land uses, sometimes leading to negative impacts on the health, safety, quality of life and well-being of citizens, natural landscapes, and the environment.

In 1992, MNR developed a State of the Resource Report on aggregate reserves, consumption trends, conservation and recycling. The report informed the development of policies and programs and provided guidance to municipal planning processes. The Environmental Commissioner of Ontario (ECO) has repeatedly called for MNR to update its State of the Resource Report and the ECO’s 2006/07 Annual Report specifically recommended that MNR develop an aggregates conservation strategy. In 2007, MNR stated in response that, while it was committed to developing a strategy, it needed first to update its 1992 State of the Resource Report. This updated study was completed in 2009. It is anticipated that, with the completion of the update, MNR will have the background information it needs to soon develop a broader strategy to conserve aggregates and better protect the environment.

In the analysis that follows, CIELAP provides research that will inform the ultimate development of an improved Ontario aggregates strategy. It is hoped that this research will assist various stakeholders to work together to create a strategy for aggregates in Ontario that reflects environmental and social values as well as economic interests.

This report explores:

- the impacts of current regulations and policies on aggregate extraction in Ontario;
- the actual experience with new and expanded aggregate operations in recent years, particularly in Southern Ontario since the time that Oak Ridges Moraine Conservation Plan, Greenbelt Plan and other land use plans have come into force; and
- how best to balance competing objectives that include land conservation, protecting natural heritage, maintaining water resources, supporting healthy communities and obtaining aggregate resources.

CIELAP has sought to provide a balanced analysis and represent the perspectives of a broad range of stakeholders with an interest in aggregates policy in Ontario. To achieve this goal, we interviewed a range of stakeholders with an interest in aggregates policy including: citizen’s

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groups and non-profit organizations; academics; municipal planners; industry representatives\textsuperscript{7}; and provincial government staff. In total, 12 informal, semi-structured interviews were conducted for the purposes of this project.

CIELAP’s research also drew on publicly available data sources such as records of site plan amendments for aggregate operations on the Environmental Registry Database, records of active aggregate licences in MNR’s Aggregate Licensing and Permitting System (ALPS) and previous analyses of aggregates issues featured in Annual Reports to the Legislature by the Environmental Commissioner of Ontario. CIELAP also reviewed aggregates policies and practices in other jurisdictions to inform recommendations for Ontario.

\textsuperscript{7} CIELAP interviewed: staff at the regional municipalities of Simcoe, Peel, Clarington, Halton and North Dumfries provincial staff at MNR, the Ministry of Transportation and the Ministry of Municipal Affairs and Housing; industry representatives with the Ontario Sand Stone and Gravel Association; representatives of Gravel Watch Ontario and the Toronto Environmental Alliance; and a York University professor who has published articles on pits and quarries in Ontario. A majority of interviews were conducted in person or by telephone, with the exception of two interviews which were conducted by email correspondence.
2. The 2009 State of the Aggregate Resource in Ontario Study

MNR’s initial 1992 State of the Resource Report was updated in 2009. The scope of this study was expanded beyond that of the 1992 study to include consideration of a broader geographic region of Ontario and addressed various components of aggregate resource management in more detail. The study was undertaken by a group of consultants with extensive background in and involvement with Ontario’s aggregate industry. The goals of the SAROS update included:

- updating information about the supply and demand for aggregates in the province;
- determining the amount of aggregate remaining in existing reserves;
- identifying possible constraints on the long term aggregate supply;
- developing a methodology for creating an inventory of material with potential to be recycled;
- providing an overview of the social, economic and environmental value of aggregates to residents of Ontario;
- investigating alternative methods of aggregate delivery using different modes of transportation; and
- providing up to date information on the status of rehabilitation of pits and quarries.

Research and recommendations related to the above goals were presented in 6 background papers; SAROS Paper 1: Aggregate Consumption and Demand; SAROS Paper 2: Future Aggregate Availability and Alternatives Analysis; SAROS Paper 3: The Value of Aggregates; SAROS Paper 4: Reuse and Recycling; SAROS Paper 5: Aggregate Reserves in Existing Operations; and SAROS Paper 6: Rehabilitation.

The SAROS update was also informed by two panels: an Advisory Panel composed of representatives from citizens’ organizations, academia, the aggregate industry, municipalities, conservation authorities and provincial government; and a Technical Expert Panel with similar stakeholder representation.\(^8\) The study concluded with the publication of a Consolidated Report authored by MNR that identified key findings of the project consultants as well as a list of recommendations produced by the SAROS Advisory Panel. The Advisory Panel identified the following as perspectives that must be recognized as a first step towards improved aggregate resource management:

- The SAROS initiative is the first step of an ongoing effort to increase knowledge and understanding of aggregates in the province;
- The province needs to take a proactive, strategic approach to aggregates management and this approach must reflect collaborative planning on a landscape level; and

The province should adopt a model of integrated aggregates management that allows for both an economically competitive and environmentally sustainable aggregates industry—there is an opportunity to study other jurisdictions with the intent of identifying best practices that could be applied in Ontario.\(^9\)

In addition the Advisory Panel provided a list of specific recommendations, which included the following:

- the development of a long term strategic aggregate road map;
- the improvement and protection of access to critical aggregate resources for future use;
- identification of strategies to reduce, reuse and recycle aggregates in partnership with municipalities;
- development of an aggregates conservation strategy;
- increased promotion of rehabilitation by the provincial government; and
- rationalization of the existing approvals process to remove duplication and overlap.\(^10\)

Shortly after the completion of the SAROS report, Gravel Watch Ontario—a group of citizens’ organizations with an interest in the promotion of a sustainable aggregates industry—published a series of reports that highlighted concerns with the various aspects of the SAROS study. Gravel Watch raised questions regarding: the scope of analysis applied to the alternatives and transportation analysis in \textit{SAROS Paper 2: Future Aggregate Availability and Alternatives Analysis}; the extent to which economic, social and environmental costs and benefits of aggregate were accounted for in \textit{SAROS Paper 3: The Value of Aggregates}; the conclusions drawn regarding the amount of aggregate remaining in the province’s existing licenced reserves in \textit{SAROS Paper 5: Aggregate Reserves in Existing Operations}; and the general transparency of the SAROS process.\(^11\)\(^12\)\(^13\)

In addition, a number of information gaps were identified by MNR upon conclusion of the SAROS exercise, including the volume of reserves remaining in existing aggregate sites, the volume of recyclable aggregates not being utilized, qualitative data to assess rehabilitation performance; and easily accessible information about rehabilitation presented in a consistent format.\(^14\)


\(^10\) Ibid.


\(^14\) Personal Communication, Ontario Ministry of Natural Resources, July 2010.
3. Understanding the Controversy: Aggregate Extraction and Land Use Conflicts

While extraction practices and rehabilitation have improved significantly since the early days of Ontario’s aggregate industry, some degree of negative impact is unavoidable. The nature of the aggregate extraction process makes operating a pit or quarry in populated areas without impacting local communities, or causing some level of land use conflict highly difficult. There is evidence to support this internationally as quarries are almost unanimously met with public resistance in most jurisdictions where they occur. Land use conflict in Ontario is particularly severe in the GTA rural fringe where significant aggregate resources exist close to a large population and market.

While aggregate extraction is an ongoing source of aggravation for local communities and a serious concern among some environmentalists, the broad importance of aggregates to our built environment and economy cannot be overlooked. The challenges associated with the aggregates industry have remained largely the same since the 1970s. Aggregates are considered an essential good with a low per tonne cost, which imposes a significant impact on landscapes. The need to minimize transportation costs has in most cases meant that aggregate extraction sites and related facilities are often located near population centres. This has been described by some researchers as the paradox of the aggregate industry: a steady and predictable demand for aggregates combined with local populations who would prefer mining operations to be located in more remote areas.\(^\text{15}\)

The Environmental Commissioner of Ontario (ECO) has noted that the geologic formations from which aggregates can be extracted are clustered naturally, and current provincial policy requiring that aggregates be extracted close to markets exacerbates the clustering effect seen in pit and quarry development in Southern Ontario.\(^\text{16}\)

According to MNR, there are 3729 aggregate licences on private lands and 2329 aggregate permits on crown lands in the province.\(^\text{17}\) MNR indicates that approximately 85% of Ontario’s aggregate production takes place in the southern part of the province where there has been extensive migration to urban areas, and population levels and densities are high.\(^\text{18}\) It is likely that this trend will continue into the future, suggesting that conflicts over the siting of aggregate operations will increase in decades to come. Ontario is projected to have a provincial population of between 15 and 20 million by 2036.\(^\text{19}\) Most of this growth will take place in Southern and

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\(^{17}\) Personal Communication, Ontario Ministry of Natural Resources, July 2010.


Central Ontario. For example, the most recent population projections issued by the Ministry of Finance indicate that between 2009 and 2036, the population of the GTA will increase from 6.1 million to 9.1 million. More modest growth is predicted for the Southwestern, Central and Eastern regions of the province, while minimal growth, or in some cases a net out-migration, is projected across most of northern Ontario.

Aggregate reserves are already partially constrained by the Niagara Escarpment Plan (NEP), Oak Ridges Moraine Conservation Plan (ORMCP), and most recently, the Greenbelt Plan. As a result, areas that have been an important source of aggregate just beyond what might be currently defined as ‘close-to-market’, including Simcoe County, Grey County, the Carden Plain and locations in south-eastern Ontario such as Clarington and Alnwick-Haldimand, may be subject to heightened demand in years to come.

Many jurisdictions throughout the world face similar issues to Ontario in terms of growing urbanization and increasingly constrained resources and some are considering the option of transporting aggregate over longer distances. In fact, urbanization, rural migration, more stringent zoning and environmental regulation are challenges for close-to-market extraction in virtually every jurisdiction examined for this report.

All of the trends discussed above are exacerbated by the concern that close-to-market supplies are running out. Research conducted by the National Research Council of Canada in the late 1970s predicted shortages of high quality aggregates, such as those capable of meeting the province’s specifications for highway construction or other infrastructure applications, throughout Canada around larger urban areas during the next 25 years. However, the recent SAROS study suggests that in Ontario, fears of a shortage of aggregates close to urban areas expressed in the late 1970s were not realized. "SAROS Paper 1: Aggregate Consumption and Demand" indicates that rising consumption of aggregates in the province, which reached an all-time high in 1989, has consistently been met through Ontario based supplies.

Those researching the aggregate industry have long suggested sequential land use, where mineral aggregates are extracted before other potentially conflicting land uses such as residential development are permitted, as a means of avoiding shortages of the resource. While a sequential approach to land use may be more difficult to implement, there may be some potential to adopt this approach in certain regions of Ontario, as opposed to smaller, more densely

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21 Ibid.


populated jurisdictions in other parts of the world that are turning to imports of aggregates. However, the opportunities for this to take place in Southern and some areas of Central Ontario are becoming increasingly scarce. The need for a long term aggregates management strategy for Ontario is becoming clear.
4. Environmental, Social and Human Health Impacts of Aggregate Extraction in Ontario

The extraction of aggregate resources can cause significant environmental damage and has the potential to negatively impact human health and quality of life, especially if producers do not follow mitigation measures. In Ontario, aggregate extraction operations are defined as either pits or quarries. The distinction between pits and quarries is made based on the type of materials extracted. Unconsolidated materials such as sand and gravel are extracted from pits, while consolidated materials such as limestone and granite are extracted from quarries. Pits are in some cases smaller scale operations with less significant impacts, but vary widely in size across the province.

Example of a pit in the municipality of St. Mary’s, Ontario. Photo courtesy of Tony Dowling.

Quarries are often more substantial operations and may have more significant environmental and social impacts. If aggregate extraction will be occurring at a depth that extends below the water table, the pit or quarry must also be dewatered by pumping the inflow of groundwater out of the excavated area.

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Aggregate reserves in quarries must be blasted out using explosives which are put into place by drilling into the quarry face. After aggregate deposits are broken up by explosive blasts, they are transported by truck to crushing equipment, where they are further refined and sorted into categories for either immediate use or to be further refined and processed for use in materials such as asphalt.  

Example of a quarry located in the municipality of Tatlock, Ontario.

A comprehensive study of the long-term environmental impacts of pits and quarries in Ontario has never been conducted. Generally, the potential impacts of pits and quarries are contemplated in detail during the licence approval process, where the project proponent must provide a wide range of technical studies detailing potential impacts on groundwater, dust, noise levels and impact on natural and cultural heritage features, as well as how these impacts will be monitored and mitigated or prevented over the lifespan of the operation.

Additional consideration of environmental impacts often takes place at the Ontario Municipal Board (OMB), an independent review tribunal which resolves land use planning disputes in the province. In the case of an OMB hearing, the potential impacts of a pit or quarry may be assessed in greater detail by one or more expert witnesses prior to the operation being approved or rejected, but competing assessments of potential environmental impacts are normally only

possible when the opponents to the pit or quarry have sufficient funds to hire their own independent consultants. In these cases, the OMB weighs the relative merits of technical analyses provided by the proponents and opponents, before coming to a final decision on a project approval.

The following sections attempt to summarize environmental impacts of aggregate extraction identified in the literature and highlight some of the potential environmental impacts that have been identified as being specific to Ontario.

4.1 Impacts on the Landscape

Because there are limited opportunities for aggregate extraction close to the markets where they will be used, there is often a conflict between the preservation of environmentally significant landscapes and maintaining a steady and affordable supply of aggregates for construction materials. As noted above, the aggregates extraction process requires that vegetation and topsoil be removed from the site, resulting in the loss of natural habitats and soil productivity.  

Aerial view of a quarry in the regional municipality of Clarington, Ontario. Photo courtesy of the Center for Community Mapping (COMAP).

4.2 Loss of Agricultural Land

The 2009 SAROS documented the loss of agricultural land in some areas of Ontario as a result of aggregate extraction operations. In SAROS Paper 3: The Value of Aggregates, an analysis of

31 of the most recently approved aggregate licences determined that close to 100% of the licenced land upon which aggregates were extracted was classed as either agricultural or woodland. 50% of agricultural lands within the sample were comprised of class 4-7 soils, and 47.6% of class 1-3 soils (a majority of this being Class 2 soils). Areas comprised of Class 1-3 soils, as defined by the Canada Land Inventory for Agriculture, are considered to be prime agricultural lands under Ontario’s Provincial Policy Statement, and of the highest capability to support agriculture. Class 4-7 soils generally have more limitations in their ability to support agriculture. Using maps and data describing the pre-extraction features of the licenced sites and the future rehabilitation plans provided by MNR, the authors of SAROS Paper 3: The Value of Aggregates projected what the net land use changes would be across the 31 licences in the sample over time. It was determined that 62% of the agricultural lands removed in the sample would be returned to agricultural use through rehabilitation, while the remainder would be left to naturally regenerate. The study could not provide information on whether the agricultural lands created through rehabilitation would be the same Canada Land Inventory class as those removed.

In addition to the temporary or permanent loss of agricultural land as a result of aggregate extraction, agricultural land is also being lost in Ontario due to urbanization and agricultural industry trends. The greatest loss of agricultural land has occurred in the GTA. For example, between 1976 and 1997 the GTA lost over 3000 hectares of land per year as a result of urbanization.

### 4.3 Impacts on Water Quantity

Pits and quarries can have significant negative impacts on water quantity both on-site and in adjacent areas. Removal of vegetation and topsoil at the beginning of the extraction process can result in the loss of natural stream flow patterns. Aggregate deposits in their natural state also act as reservoirs, making the loss of water storage function a direct and largely unavoidable consequence of the aggregate extraction process. In Sweden, the loss of natural gravel deposits

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33 Ibid, 106.
critical to maintaining drinking water sources for some municipalities served as the initial motivation for developing policies to curb the use of gravel as construction aggregate.  

In the case of aggregate operations that extend below the water table, a number of negative hydrological impacts may occur. During the process of dredging an aggregate pit, gravel that is removed may be replaced with groundwater and precipitation, and evaporation from on-site ponds can occur at a faster rate than would occur from the natural land surface. Leveling out of the groundwater table in the pit pond can also cause alteration of groundwater flow patterns in surrounding areas. Lowering of the water table during aggregate extraction may drain surrounding wetlands that are fed by groundwater discharge.  

Aggregate extraction in Ontario displaces large quantities of water both through the process of quarry dewatering and washing of extracted materials. Permits to Take Water are required for quarry dewatering as well as for the washing of aggregates. The daily average water takings for the purposes of quarry dewatering in Ontario have been estimated at up to 10 million litres per day, while the average daily water takings for washing of aggregate materials have been estimated to be up to 8.8 million litres per day. While much of this water can be returned to the source, there are still uncertainties surrounding the broader impacts of water taking in this manner.

A case study carried out on 8 quarries across the state of Minnesota in 2005 noted that while impacts on water resources do not occur in every case, declines in aquifer levels resulting from quarry dewatering and alterations of the hydraulic gradient can be a common occurrence. Similar research has been carried out on a quarry in Ohio, which found that dewatering of

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Quarries had caused the drawdown of nearby wells. Whether or not dewatering has a significant environmental impact depends to some extent on the proximity of the site to man-made features such as wells, or natural features such as wetlands. Such features can be negatively impacted if they are within the area influenced by dewatering. Less obvious, small scale impacts of aggregate extraction on water resources may also occur as a result of creating temporary stockpiles of soil and overburden on-site, which can alter local drainage patterns.

4.4 Impacts on Water Quality

Aggregate extraction may have an adverse impact on water quality due to on site contamination from fuel storage or asphalt plants. While few impacts of aggregate operations on drinking water supplies have been documented, concern may arise when former aggregate pits are used for landflling or residential development. Recently, local citizens and municipal governments have raised such concerns over the use of a former gravel pit in the Oak Ridges Moraine to store displaced soil from development projects in the GTA.

A literature review carried out on behalf of MNR in 2006 found that there have been very few documented instances of aggregate extraction having negative impacts on water resources in terms of either quality or quantity. More research specific to Ontario is required to verify these findings in a local context.

4.5 Social and Human Health Impacts

Aggregate operations have the potential to negatively impact human health and quality of life due to the amounts of noise, dust and vibration associated with quarrying activities and transportation of aggregates from the site. Particulate matter released during extraction and processing may also be a human health hazard if it is not properly controlled.

Crystalline silica, a byproduct of natural aggregate, may cause temporary respiratory irritation or more serious long-term effects. There is some preliminary evidence to suggest that exposure to

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43 Ibid.


http://www.sustainableaggregates.com/docs/revs/t1c_dnv.pdf

crystalline silica can lead to an increased risk of lung cancer, though more robust data are required to determine whether there is a direct link.\textsuperscript{50, 51}

In April 2010, the Ontario Minister of Municipal Affairs and Housing issued a Minister’s Zoning Order under the Planning Act\textsuperscript{52} to block a proposal submitted by St. Mary’s Cement Inc. to develop an aggregate quarry in the Town of Flamborough (now part of the city of Hamilton).\textsuperscript{53} In this case, Hamilton’s Chief Medical Officer expressed concern over the potential impacts on groundwater quality and quantity that could affect nearby groundwater users.\textsuperscript{54} While the Minister’s Zoning Order has been appealed to the OMB and the Flamborough quarry may still be approved, the case illustrates that large complex quarry proposals can often raise substantial concerns regarding impacts on water resources.

There is some evidence to suggest that properties located next to aggregate extraction sites suffer from lower property values, although proving this conclusively is challenging due to the wide range of factors that may potentially reduce property values.

### 4.6 Cumulative Impacts

While pits and quarries may have relatively benign environmental impacts in comparison to other mining activities that produce toxic by-products, the secondary impacts and cumulative impacts of a number of small aggregate operations located close together may have a significant net effect. There are still knowledge gaps on the cumulative impact of multiple aggregate extraction operations located in close proximity to one another. The cumulative impacts of multiple aggregate operations extracting below the water table is currently being studied by the Ontario Sand Stone and Gravel Association, as well as the Ministry of the Environment (MOE) and MNR.\textsuperscript{55}

The Ontario Sand, Stone and Gravel Association and the Government of Ontario are also currently conducting additional research on cumulative impacts on the Carden Plain and Mill Creek Watershed. The results are expected to be made public upon completion.\textsuperscript{56}


\textsuperscript{51} Ulm et. al., “Silica, Silicosis and Lung Cancer: Results From a Cohort Study in the Stone and Quarry Industry,” \textit{International Archives of Occupational and Environmental Health}. 77 no. 5 (2004), 313-318.

\textsuperscript{52} R.S.O. 1990, c. P.13.

\textsuperscript{53} O. Reg. 138/10. See also Ontario Ministry of Municipal Affairs and Housing, “Province Lists, Stops Proposed Quarry in Hamilton.” (April 13\textsuperscript{th}, 2010).

\textsuperscript{54} City of Hamilton Public Health Services, Email message, St. Marys Cement Inc. (Canada), Application for a Category 2 Class A Quarry License under the Aggregate Resources Act (ARA), Concession 11, Parts of Lots 1, 2, and 3 in the Former Township of East Flamborough, in the City of Hamilton, (May 20\textsuperscript{th}, 2009).

\textsuperscript{55} Personal communication Ontario Sand Stone and Gravel Association, March 2010

\textsuperscript{56} Ibid.
4.7 Evaluating Environmental Impacts

The environmental impacts of aggregate extraction in Ontario have been highly debated. Industry stakeholders generally describe aggregate extraction as a clean industry, with little to no impact on water resources. 

Representatives of the aggregates industry also contend that disturbance of land is only temporary and that, in many cases, operations conclude with a landscape of higher quality than the one that existed initially. In contrast, critics point to a range of ongoing problems associated with aggregate extraction, including massive land disturbances, dewatering and noise and air quality issues. Overall, it is a challenge to effectively evaluate the environmental impacts of aggregate extraction operations.

SAROS Paper 3: The Value of Aggregates, outlines some of the environmental impacts associated with aggregate extraction, both in terms of the extraction process and the end uses of aggregates. These include the following:

- Potential health issues related to poorly maintained stormwater ponds established on aggregate extraction sites;
- Construction of new roads, highways, bridges and dams enabled by inexpensive aggregates that can cause damage to the surrounding environment;
- Decreased ecological connectivity resulting from road construction, as well as the creation of edge environments along roads that can promote increased growth of invasive or non-native species;
- Decreased biodiversity and loss of habitat associated with the construction of dams and airports; and
- Substantial loss of agricultural land to develop new extraction operations.

SAROS Paper 3: The Value of Aggregates also attempted to determine public perceptions of the environmental and social costs and benefits of the aggregate industry through a telephone survey and content analysis of a sample of Ontario Municipal Board hearing decisions related to aggregates projects.

Residents living in close proximity to aggregate extraction operations were most likely to identify noise, dust and vibration as impacts, while those dispersed throughout the province were more likely to identify broader environmental impacts on the landscape as key costs of aggregate extraction. Respondents who identified these broader environmental impacts represented a

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58 Ontario’s Natural Heritage Reference Manual (2010) Defines edge environments as “the area where different habitats (or habitat conditions)” meet. Edge environments can be created by human activities such as clearcutting of forests, road construction or creation of farmland. Edge environments can be more favorable to non-native and invasive species, as they can outcompete native species that have more specialized habitat requirements. In Southern Ontario, the fragmentation of woodlands has resulted in the creation of large amounts of edge habitat.

statistically significant majority in the survey results. Perceptions of the costs and benefits of aggregate extraction varied by region. For example, respondents in central-west Ontario were more likely to associate aggregate extraction with social costs and nuisance, while respondents living in northern Ontario were most likely to identify development and infrastructure projects as a key benefit of aggregate extraction.60

SAROS Paper 3: The Value of Aggregates and SAROS Paper 6: Rehabilitation attempted to assess the environmental impacts of aggregate extraction by reviewing samples of both recently granted and surrendered aggregate licences. While the use of small sample sizes in comparison to the overall number of pits and quarries in the province was likely due to time and budget constraints of the SAROS study, further research would be beneficial in drawing conclusions on the environmental performance of the industry as a whole.

Conclusions made in SAROS Paper 3: The Value of Aggregates about environmental impacts and the preservation of natural features on aggregate sites were based on a small sample of the 31 most recent aggregate licences granted in Ontario. While the study indicated that there might have been some improvement in preserving environmental features on aggregate sites in very recent years, it may also understate the impact of aggregate operations that have not been recently approved, of which there are many in the province.

Generally speaking, proponents applying for an aggregate licence largely examine the potential for site-specific environmental impacts that could be associated with an extraction operation through technical studies undertaken by consultants for the aggregate producer. Additional studies authored by consultants for project proponents or opponents may be produced if a proposed project is subject to an appeal before the OMB.

In many cases there is limited monitoring of whether or not the anticipated impacts actually occur beyond the self-reporting conducted by the aggregate industry through the submission of Compliance Assessment Reports61, alongside field inspections carried out by MNR to verify this information. In some cases, up to five years may pass before a site can be inspected by MNR and information submitted in Compliance Assessment Reports is verified.62

60  Ibid, 81.
61  Compliance Assessment Reports are forms submitted to MNR and municipalities by aggregate licence and permit holders in the province as a requirement under the ARA. The Compliance Assessment Report system was introduced with the passing of the Aggregate and Petroleum Resources Statute Law Amendment Act of 1996. Compliance Assessment Reports provide some details on compliance with the site plan and other conditions on the license. Compliance Assessment Reports also require producers to submit basic data on the progress of their rehabilitation efforts. Compliance Assessment Reports are discussed in further detail in section 6.6 of this report. A sample copy of a Compliance Assessment Report can be viewed at: http://www.gravelwatch.org/orig-gw/docs/ara-stds-v1.0/590-591-592.pdf
**Summary:**

Despite many allegations of environmental damage caused by aggregate extraction, specific documentation of impacts after operations have begun remains an ongoing information gap in Ontario. While some of this information may be gleaned from Compliance Assessment Reports, aggregate inspectors and MNR have indicated that these forms may not always be reliable. Some studies have attempted to address issues such as assessing the impact of aggregate extraction operations on source water protection and additional industry-led studies are currently being conducted to determine the cumulative impact of aggregate extraction operations on groundwater resources, but additional work needs to be done. Currently, much of the research related to the environmental impacts of aggregate extraction focuses on potential impacts of operations and is conducted either by consultants hired by the proponent or by consultants hired by concerned citizens where funds allow.

A comprehensive third party assessment of the environmental and social impacts of the industry in Ontario would be beneficial in moving towards a long-term aggregates strategy. A more detailed understanding of the impacts of the industry would also enable further analysis of the broader environmental and social costs of aggregate extraction, which could be used to compare against the already well established economic benefits in future State of the Resource Reporting. For example, the surveying of aggregate sites, as was recently carried out on 31 recent licences for SAROS Paper 3: The Value of Aggregates, could be conducted on an ongoing basis and the results made public for analysis. Recently, MNR has made records of rehabilitation orders issued to aggregate producers available for public review.

**Recommendation:**

**Continue to study environmental impacts of aggregate extraction.** The Ontario government should identify an efficient means of undertaking a comprehensive study of the environmental, social and cultural heritage impacts of aggregate extraction in an Ontario-specific context that includes cumulative impacts, and provides a broader understanding of land use change issues such as the loss of agricultural land. This study should be led by an independent body, but with extensive input by MNR and MOE, as they have direct access to critical field data for determining trends. The study should also include input from other stakeholders such as environmental non-profit organizations, municipalities and the public. In addition, MNR should make a database of field audit information collected by aggregate inspectors available to the public in order to allow third parties to track trends in environmental impacts and identify potential problem areas that need greater attention.
5. Legal and Policy Framework for Aggregates in Ontario

5.1 History of Aggregates Policy in Ontario

Aggregates policy in Ontario has evolved over time from a system in which municipalities had a substantial amount of control over the siting and regulation of aggregate extraction, to a primarily province-led system. Ontario’s aggregate industry first came under significant regulation during the 1950s. Growth in economic activity and the resulting demand for aggregates, combined with the movement of populations into the urban fringe, led to increased impacts on local communities. By the late 1960s, there was increasing conflict between the aggregate industry and municipalities and substantial levels of aggregate production taking place.

Until the 1970s, the Planning Act enabled municipalities to establish by-laws to prevent the opening of new pits and quarries. This changed in 1971 with the introduction of the Pits and Quarries Control Act, which came about in response to a request by the aggregate industry that MNR review aggregates issues in the province. The Pits and Quarries Control Act established a licensing system for aggregate extraction operations, to be administered by MNR, which applied to important production areas in Southern Ontario, Sault St. Marie and Sudbury. However, this Act was viewed as insufficient to address the problems associated with the aggregates industry, and concerns were raised about the lack of strong regulations or site plan requirements, and inconsistent enforcement.

Provincial planning for aggregates became increasingly formal in the early 1980s with the cabinet approval of the Aggregate Resources Planning Policy in 1982. In 1986 the provincial government introduced the Mineral Aggregate Resources Policy Statement (MARPS). This policy statement was made under Ontario’s Planning Act, and was a precursor to the Provincial Policy Statement. The MARPS was a key development in the movement towards an explicit close-to-market management strategy for aggregate resources in the province.

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68 Ibid.
70 Ibid.
71 Personal Communication, Ontario Ministry of Municipal Affairs and Housing, May 2010.
declared aggregate resources to be a matter of provincial interest and included the provision to preserve as much of the aggregate resource occurring in the municipality as is realistically possible. The Commission on Planning Development and Reform, established in the early 1990s, recommended in its final report, *New Planning for Ontario*, that this provision of the MARPS be maintained in future incarnations of provincial planning policy.\(^{72}\) The recommendations of the Commission on Planning Development and Reform were implemented as the Comprehensive Set of Policy Statements, which formed the basis of the current Provincial Policy Statement. The general planning principles for aggregates first established in MARPS have continued through to the most recent edition of Ontario’s Provincial Policy Statement.

### 5.2 Provincial Policy Statement, 2005

The current Provincial Policy Statement (PPS) provides direction to decision-makers on matters of provincial interest that relate to land use planning and development, and promotes provincial policy objectives. The PPS is issued under the authority of Ontario’s *Planning Act*. All decisions on land use planning that are made at the provincial and municipal levels, including decisions of the OMB, must be consistent with the PPS.

In the 2005 PPS, protection for aggregate extraction in the context of provincial land use planning was strengthened with the addition of a clause stating that demonstration of need for the resource or an analysis of supply and demand is not required. Between 1997 and 2005, the key provision of the PPS governing aggregates had read:

2.2.3.1 As much of the mineral aggregate resources as is realistically possible will be made available to supply mineral resource needs, as close to markets as possible.\(^{73}\)

In 2005, the language of the PPS was amended to state as follows:

2.5.2.1 As much of the mineral aggregate resources as is realistically possible shall be made available as close to markets as possible.

Demonstration of need for mineral aggregate resources, including any type of supply/demand analysis, shall not be required, notwithstanding the availability, designation or licensing for extraction of mineral aggregate resources locally or elsewhere.\(^{74}\)

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The 2005 Provincial Policy Statement is currently undergoing a five-year review. During the review process, it has been argued by the Niagara Escarpment Commission that the lack of requirements to include an analysis of supply and demand is a barrier to undertaking comprehensive planning that would ensure that establishment of new pits and quarries is justified.

### 5.3 Aggregate Resources Act

The Aggregate Resources Act (ARA) replaced the Pits and Quarries Control Act in 1990 and added more stringent requirements for aggregate licences including more detailed requirements for site planning, as well as broader geographic coverage that was not previously a part of the Pits and Quarries Control Act.

The ARA governs the management of the aggregate resources of Ontario. The Act controls and regulates aggregate operations located on Crown and private lands through a system of licences and permits. Pits and quarries located on private lands are regulated through the issuance of licences. Pits and quarries located on crown lands are regulated through the issuance of permits. Temporary “wayside” permits may also be issued to provide aggregates for specific development projects. The ARA also includes requirements for the rehabilitation of land from which aggregate has been excavated. One of the purposes of the ARA is to minimize adverse impact of aggregate operations on the environment.

### 5.4 Supporting Policy on Aggregates: Provincial Standards and the Policy and Procedures Manual

In 1997, standard criteria were introduced for licence, aggregate permit and wayside permit applications. The Aggregate Resources of Ontario Provincial Standards (AROPS) establish the specific conditions and operational standards that an aggregate extraction operation must follow. However, the standards have been criticized for not establishing tests that producers must meet prior to the approval of a new operation or the expansion of an existing operation.

In addition to the provincial standards, MNR has developed the Aggregate Resources Program Policies and Internal Procedures Manual to guide implementation of the ARA. The manual predates the Provincial Standards but was updated in 2006 to reflect the AROPS, provide additional details on how to interpret the standards in practice and reflect MNR experience with the standards since 1997.

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75 CIELAP has submitted comments to the Ministry of Municipal Affairs and Housing for the 2005 PPS review in collaboration with other environmental non-profit organizations. PPS 2005 review comments with relevance to aggregate resources can be viewed in Appendix A.


5.5 Natural Heritage Reference Manual

MNR’s Natural Heritage Reference Manual (NHRM) provides technical details for planning and approval authorities, as well as other stakeholders, to guide implementation of the natural heritage policies in the 2005 Provincial Policy Statement.

The NHRM is informed by a systems-based approach to the protection of natural heritage features, which considers the relationship between features and areas at the landscape level, as opposed to protection of features in individual areas.\(^80\) The NHRM promotes the protection of natural heritage at the landscape level through the preservation of large natural areas capable supporting a wide range of species habitats and ecological processes wherever possible. The NHRM also encourages the protection of corridors connecting large natural areas. The maintenance of corridors enables species to move between large natural areas, enhancing the resilience of populations to various stressors. Municipalities and conservation authorities may consult the NHRM in identifying local natural heritage systems in official plans, which should be protected from land uses that may have a negative impact on local ecology.

The most recent edition of the NHRM outlines the potential environmental impacts that can result from pits and quarries, but states that they can be accommodated within a natural heritage system if rehabilitation practices restore or improve the quality and level of connectivity within the system over the long term.\(^81\)

5.6 Other Provincial Land Use Policies Governing Aggregate Management in Ontario

A number of additional land use laws and plans apply to areas in Southern Ontario that are rich in aggregates. The oldest of these is the Niagara Escarpment Plan (NEP), developed under the authority of the 1973 *Niagara Escarpment Planning and Development Act*.\(^82\) The Act attempts to ensure that only development compatible with the natural environment occurs on the Niagara Escarpment. The NEP, most recently revised in 2005 and updated in 2010, includes land use policies and criteria for proposed developments. The NEP divides the Niagara Escarpment into seven land use designations including Escarpment Natural Area, Escarpment Protection Area, Escarpment Rural Area, Urban Area & Minor Urban Centre, Escarpment Recreation Area and Mineral Resource Extraction Area. While the Mineral Resource Extraction area currently represents the smallest area in the NEP, aggregate producers may apply for an amendment to the Plan to change Escarpment Rural Areas to Mineral Resource Extraction Areas. Operators of pits and quarries extracting more than 20,000 tonnes of aggregate annually are required to apply for a NEP amendment.\(^83\) Grandfathering clauses allow existing pits and quarries to continue operating.\(^84\)


\(^82\) R.S.O. 1990, c. N.2.

\(^83\) *Ibid*.

Between 2001 and 2006, the Ontario government introduced three new regional planning initiatives to address the projected high growth in population and increasing public concern about the environmental impacts of unregulated urban sprawl. These plans attempt to reorient the nature of development across the Greater Golden Horseshoe (GGH) Region by mandating higher density in urban centers and setting minimum density requirements for greenfield development, while protecting large tracts of open space throughout the countryside.

In 2001, the provincial government passed the *Oak Ridges Moraine Conservation Act, 2001*[^85], which provided authority for the 2002 Oak Ridges Moraine Conservation Plan (ORMCP). The ORMCP is intended to protect the ecological and hydrological integrity of the Oak Ridges Moraine area, and ensure that only land and resource uses that maintain, improve or restore the ecological and hydrological functions region are permitted. Continuing with the environmental planning concepts first established in the NEP, the ORMCP divides the Moraine into Natural Core, Natural Linkage, Countryside and Settlement Area land use designations. Aggregate extraction is permitted throughout the ORMCP, with the exception of Natural Core areas.[^86] Natural Core areas in the ORMCP contain the greatest amount of natural heritage features, which are described in the plan as critical to maintaining the overall ecological integrity of the moraine. Nature Core areas make up 38% of the ORMCP. These too, however, may be considered as sites for new aggregate extraction operations when the ORMCP is reviewed in 2015 if aggregate resources close to GTA markets are determined to be in short supply by this time.[^87]

A few years later, the government expanded land use protection beyond the Niagara Escarpment and Oak Ridges Moraine to encompass a greenbelt around the GTA. The Greenbelt Act, 2005[^88] provided for the development of the Greenbelt Plan to provide permanent protection to agricultural lands, and natural heritage and water resource systems in the Greenbelt region. The Greenbelt Plan area includes the Oak Ridges Moraine and the Niagara Escarpment, although the land use plans governing those regions continue to be in effect. Aggregate extraction is permitted throughout the Greenbelt Plan area, with the exception of natural heritage and key hydrologic features, including significant wetlands, significant habitat of endangered or threatened species and mature significant woodlands.[^89] New requirements for aggregate producers operating within the Greenbelt Plan were also established when the Plan was introduced. A cap on the amount of disturbed area on individual aggregate extraction sites was established on an experimental basis by MNR, requiring that 50 % of excess disturbed area be rehabilitated by 2011.[^90] The ORMCP, Greenbelt and NEP plans all require the maintenance of buffer areas, which are defined as vegetation protection zones, separating natural heritage features from aggregate extraction and other forms of development.

[^85]: S.O. 2001, c. 32.
[^87]: Ibid.
[^90]: Personal Communication, Ministry of Natural Resources, July 2010.
The *Places to Grow Act, 2005*\(^91\) was enacted to provide authority for the creation of growth plans to guide planning for growth in designated areas of Ontario. The Act seeks to achieve growth that balances community needs, environmental protection and economic development. The 2006 Growth Plan for the Greater Golden Horseshoe (Growth Plan) directs projected population and employment growth to selected municipalities throughout the Golden Horseshoe region. The Growth Plan requires municipalities to accommodate new growth through intensification and redevelopment along major roads and transportation corridors within existing settlement areas and establishes commercial and residential intensification targets for urban and greenfield development.\(^92\)

While greenfield development will continue to be common, it is expected that the Growth Plan requirements will mean increased construction of high-rise and mid-rise buildings in mixed-use development. The Growth Plan may have varying effects on demand for aggregates in the GGH region, as objectives in the Plan include measures that may increase demand for aggregates in some projects, such as high-rise development, as well as those that may reduce the demand for aggregates in other areas, such as reduced road construction due to intensification along existing roads.

The net impact of various changes in urban development patterns over the long term was assessed in *SAROS Paper 1: Aggregate Consumption and Demand*, but data limitations precluded a detailed analysis of impact on demand, making it difficult to assess the final impact of the Growth Plan on demand for aggregates. However, *SAROS Paper 1* indicates that overall use of aggregates will include a greater percentage of higher quality crushed stone over the long term.\(^93\) The Growth Plan also indicates that the Ministry of Energy and Infrastructure and MNR will collaborate with municipalities and aggregate producers to develop a long-term strategy for the wise use and conservation of aggregate resources.\(^94\) To date, no substantive information on the proposed collaboration or its progress has been made available.

\(^{91}\) S.O. 2005, c. 13.


6. Current Issues in Aggregate Extraction in Ontario

6.1 Balancing the need for Mineral Aggregate with other Land Use Interests in a High Growth Region

The Environmental Commissioner of Ontario and other stakeholders have consistently called for a shift in the balance between the amount of land used to supply aggregate resources and other land uses in the province. Critics of the industry tend to hold the view that aggregate extraction takes precedence over most other land use interests in the province, pointing to the fact that aggregate extraction is in most cases permitted through amendments to the NEP, and is also permitted throughout much of the area subject to the ORMCP and the Greenbelt Plan.

Industry stakeholders, on the other hand, have suggested that the perception that aggregate extraction takes precedence over other land uses is based on the complexity of the regulatory environment for licensing new operations, combined with a lack of understanding among the general public of the industry and its importance. While the public may view the approvals system as biased toward the industry because few licence applications are turned down, many potential extraction operations are said to be abandoned by the industry prior to the application stage because the chance of approval being granted appears too remote in the current regulatory framework.95

Interview respondents contacted for this research consistently pointed to the need to ensure a better balance between natural heritage protection and aggregate extraction. In particular, some municipal government respondents held the view that while Ontario’s current close-to-market model seems logical, natural heritage features may not be given adequate protection under the current policy framework. One municipal government respondent acknowledged that increasing the distance between aggregate extraction sites and final job sites would lead to higher greenhouse gas emissions and construction project costs, but noted the need to balance this against the adverse social and environmental impacts on local communities currently supplying the aggregates close-to-market. Other respondents suggested that the current PPS should be clarified in terms of how the need for aggregates is weighed against the protection of natural heritage features. Many respondents felt that under the current PPS, provincial priorities are not presented in a way that can be applied consistently by municipalities. Some felt that a more defined ranking of provincial priorities would be beneficial.

Greater Golden Horseshoe Region Conservation Plans

The three regional conservation plans that apply to the “natural system” of the Ontario’s Greater Golden Horseshoe Region have been the subject of much controversy in relation to aggregate extraction. Beginning in the 1970s with the NEP (formally established in 1985), and followed by the ORMCP in 2002 and the Greenbelt Plan in 2005, the provincial government has attempted

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to establish protective measures that will ensure conservation of natural heritage occurs alongside natural resource extraction and urban development. The continued allowance of aggregate extraction in the ORMCP, NEP and Greenbelt Plans has been an ongoing source of contention for some stakeholders. The geological makeup of these areas makes them an attractive source of close-to-market aggregate for high growth areas of the GTA, but they are at the same time home to important ecological/hydrological features.

For the purposes of this report, CIELAP examined aggregate licences active in the ORMCP area. Using the Ministry of Natural Resources Aggregate Licensing and Permitting System (ALPS) database, we determined which aggregate extraction sites within the ORMCP area were still active in MNRs records as of January 2010. Licences within the ORMCP area were identified by matching lot and concession information in the ALPS database with a digital map of the ORMCP provided by the Centre for Community Mapping (COMAP), which maintains a map for the purposes of tracking development activity on the Oak Ridges Moraine. Using this process we were able to identify over 100 sites, primarily pits within the Countryside and Natural Linkage areas of the ORMCP, that remained active as of January 2010. In addition, we contacted MNR aggregate inspectors stationed at district offices covering areas within the ORMCP to determine how many aggregate licences have been issued and surrendered since the implementation of the plan. Inspectors from the Aurora District office and Peterborough District office responded to our request for information while an inspector from the Midhurst District office could not be contacted.

The results of CIELAP’s survey suggest that while only a handful of new operations have been established in the ORMCP, a majority of the operations that were established prior to the passing of the plan are still active. In the Peterborough District, aggregate inspectors stated that no new licences have been issued nor existing licences cancelled since the ORMCP came into effect in 2002. In the Aurora District, inspectors indicated that three new licences had been issued since the establishment of the plan, two of which have since been amalgamated into a single licence. In addition, 14 licences have been surrendered in the portion of the ORMCP covered by the Aurora District, not including those licences that have been amalgamated.

According to a 1994 Oak Ridges Moraine technical working paper, there were more than 100 active aggregate licences in the Oak Ridges Moraine, with most of these sites located in the

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97 The amount of time that some aggregate extraction sites remain open was also identified as a concern in stakeholder interviews. This issue in particular presents a challenge. On one hand, resource conservation requires maximization of existing sites prior to establishing new ones, regardless of their location in the province. On the other hand, host municipalities are required to accommodate sites and their impacts often for decades before a license is surrendered and final rehabilitation is completed. Some respondents pointed to the contention by aggregate producers that they need to maintain a variety of aggregate types readily available as contract specifications may require different blends of aggregate. As a result, producers must keep multiple pits open at any given time to remain competitive. This creates a disincentive to close long standing operations and prevents measures that would be considered desirable by some communities such as “staged extraction” wherein one site would be depleted and closed before another site is opened.
Whitchurch-Stouffville area. The authors of the study note that an excess of disturbed land on aggregate extraction sites was also an issue at this time, with 486 hectares of licenced land being rehabilitated and 1378 hectares classified as disturbed. It should be noted that some of the eastern region of the Oak Ridges Moraine, as currently defined, was not included in the 1994 definition of the Oak Ridges Moraine.

The ECO’s *Doing Less with Less* Annual Report to the Legislature indicated that 121 aggregate licences within the ORMCP area had been examined. The results of CIELAP’s survey suggest that there has been little net change overall in the number of aggregate licences in the ORMCP area since concerns about the area began to mount in the late 1990s. While, on one hand, this suggests that overall the policies of the ORMCP aimed at balancing aggregate extraction with conservation and other land uses are working, it also may signal a need for additional incentives for older sites to surrender their licences in order to further the goal of maintaining a continuous landform across the Oak Ridges Moraine region. Most of the sites surveyed in the ORMCP were classified as pits in MNR’s Aggregate Licensing and Permitting System, meaning that the amount of remaining reserves on these sites was not assessed in *SAROS Paper 5: Aggregate Reserves in Existing Operations*, which only assessed close-to-market quarries. Without this information, it may be difficult to determine whether an amendment to the ORMCP to allow for new aggregate extraction operations in Natural Core areas during the 2015 review period would be justified.

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99 Ibid.
Example of an Aggregate Extraction Operation in the Oak Ridges Moraine Conservation Plan

MNR imagery accessed through the Centre for Community Mapping’s (COMAP) Moraine Watch system depicting an aggregate extraction operation in the ORMCP in Uxbridge, Ontario. The first image provides an unobstructed view of the operation, while the second shows the location of the operation relative to the land use designations of the ORMCP.
Summary:

Ontario’s Niagara Escarpment, Greenbelt and Oak Ridges Moraine Conservation Plans all contain some level of additional requirements for aggregate operations beyond those contained in the ARA. However, many of these areas contain a number of pits and quarries that existed prior to passing of these plans, continue to operate and are not subject to these requirements. In particular, this research found that many of the pits and quarries on the Oak Ridges Moraine are likely to have been in operation since at least the early 1990s and while few new operations appear to have opened since the passing of the plan in 2002, few have closed. The amount of aggregate remaining in currently licenced areas of the ORMCP also remains unclear.

Section 35 of the ORMCP contains a policy requiring new aggregate extraction operations in the Natural Linkage land use designation to extract the resource and perform progressive rehabilitation as quickly as possible, however the plan would likely benefit from the introduction of a more defined timeframe within which depletion of the resource and rehabilitation must take place. Without a more specific definition of what constitutes quick extraction and rehabilitation it is likely that new sites on the Moraine will remain open for many years, as is the case with existing sites within the Plan currently.

In this context, the recommendation provided in SAROS Paper 6: Rehabilitation suggesting that MNR offer an increased tonnage to these producers so that the resource may be depleted and rehabilitation can be completed could be particularly beneficial in the ORMCP. In addition, MNR’s own research has suggested that, at least within the context of the Oak Ridges Moraine, compliance problems are significant. Hiring additional aggregate inspectors in these areas would also be beneficial to maintaining the ecological integrity of the plans.

Recommendations:

Increase producer requirements for monitoring and reporting. MNR should use additional provincial funding to increase enforcement of the ARA. At the same time producer requirements, especially for larger, more complex operations should be increased by requiring more detailed monitoring under the Compliance Assessment Report system, as well as more frequent site visits from MNR inspectors. MNR should issue fines against aggregate producers who submit incomplete or inaccurate Compliance Assessment Reports.

Introduce sunset clauses on aggregate licences. MNR should introduce a sunset clause on aggregate licences. While sunset clauses could be phased in gradually for the entire province, at minimum the use of sunset clauses for aggregate operations in the Oak Ridges Moraine, Greenbelt and Niagara Escarpment areas should be considered during the 2015 consolidated review of the three regional plans.

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6.2 Supply and Demand for Aggregates

The issue of need for aggregates has also been called into question by some stakeholders. It is well established that a steady supply of aggregate resources is important to the provincial economy, and in particular to the construction industry. However, some have called for a more detailed assessment of demand for aggregates relative to supply. Previous research undertaken in support of the development of an aggregate resource conservation strategy by Winfield and Taylor (2005) in *Rebalancing the Load: The Need for a Provincial Aggregates Conservation Strategy* pointed to the fact that the Ontario Aggregate Resources Corporation (TOARC) maintains statistics on annual production of aggregates but has not conducted in depth analysis of aggregate demand or usage patterns.\(^{101}\)

The assumption that there is an ever-increasing need for aggregate has been largely accepted in most areas of the provincial land use planning framework. In particular, this position is evident in the mineral aggregates policies in the PPS stating that neither demonstration of need, nor supply and demand analysis is required prior to establishing a new aggregate extraction operation. One exception to this assumption has been within the Niagara Escarpment Plan Area, where the Niagara Escarpment Commission has authority to review public need for a new or expanded aggregate extraction operation. Although the proponent is not required to undertake or submit a needs analysis, a protocol between MNR and the Niagara Escarpment Commission that was established in 2001 states that MNR will provide expert advice regarding the public need for aggregates.\(^{102}\) In practice, where the need for new or expanded operations within the NEP area has been scrutinized, the Commission has suggested that applicants have not investigated how aggregate might be supplied by other operations outside the NEP Area to fulfill the same need.\(^{103}\)

The 2001 version of the MNR-NEP protocol was recently updated to make the protocol consistent with the policies of the 2005 PPS. The updated protocol now states that the need for aggregates has generally already been established in the province and that policies on mineral aggregates contained within the PPS apply equally province wide, both within and outside of the Niagara Escarpment Plan area.\(^{104}\)

Most recently, the Niagara Escarpment Commission has drawn attention to the issue of demonstrating need for aggregates in comments submitted as part of the current five-year review

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\(^{103}\) Niagara Escarpment Commission. *Initial Staff Report - Proposed Niagara Escarpment Plan Amendment PG 159/05 (Harold Sutherland Construction Ltd).* Toronto: Queens Printer for Ontario. (2005), 21-22. [http://www.ontla.on.ca/library/repository/mon/12000/256897.pdf](http://www.ontla.on.ca/library/repository/mon/12000/256897.pdf)

of the PPS. The Niagara Escarpment Commission’s comments suggest that need for new aggregate extraction operations should be demonstrated, as is required for other proposed land uses under the current PPS.  

The findings of the SAROS update also acknowledge that better analysis of aggregate demand and consumption needs to take place. In particular, SAROS Paper 1: Aggregate Consumption and Demand indicates that, while there are sufficient data on the production of aggregates in the province, no similar data exist to describe the movement of aggregates between sites of production and consumption, making questions around need and demand for aggregates difficult to answer.  

**Summary:**

*SAROS Paper 1: Aggregate Consumption and Demand* (discussed previously in section 5.6 of this report) provided an important first step in developing a detailed knowledge of how various urban development patterns may influence demand for virgin aggregates. More detailed information concerning end uses of aggregates will be crucial to the development of a long-term aggregates strategy with the aim of reducing the demand for virgin aggregate. A database providing reliable data on the amount of virgin aggregate required for different urban planning and design approaches could complement a database of recycled materials as proposed in *SAROS Paper 4: Reuse and Recycling*. Both could serve as an important resource for municipal planners for limiting demand for virgin aggregate.

**Recommendation:**

Determine the impact of urban development on the demand for aggregates. As a first step towards creating an aggregates conservation strategy, MNR in collaboration with MTO and MMAH should undertake further research on the impact of different urban development approaches on the demand for virgin aggregates. Once urban design approaches that can reduce the need for virgin aggregate over the long term have been identified, these should be incorporated as requirements where feasible in an aggregates conservation strategy. For example, provincial infrastructure funding could be made conditional on the use of materials and/or designs that minimize the need for virgin aggregate.

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6.3 Underutilization of Recycled Aggregate

Another ongoing challenge in Ontario has been an underutilization of material that has the potential to be recycled and used as a substitute for virgin aggregate. Materials with potential for use as a substitute for aggregate include old asphalt from roads and highways, industrial by-products such as slag and ash, construction and demolition waste, old concrete, mine waste rock and, to a lesser degree, waste glass and ceramics, foundry sands, tires and shingles.

In 1991, MNR commissioned John Emery Geotechnical Engineering Limited (JEGEL) to assess the potential for conserving virgin aggregate through the use of recycled material. JEGEL identified quantities of the above materials throughout the province and assessed opportunities for greater use over the long term. JEGEL’s final report also identified a number of barriers to further use of the above materials, which included resistance by public agencies to the use of unfamiliar materials or construction technology, liability for failed technologies or materials, a lack of funding for new research and development, the physical properties of some forms of industrial waste and by-products, costs associated with the collection, storage and processing of materials, and the location and transportation costs for materials within the province relative to where markets exist. In particular, mine waste rock was identified as a material that could be utilized in Southern Ontario as a substitute for aggregate if an affordable transportation method to move the materials from the point of generation in northern Ontario were to be developed.

JEGEL was also contracted to update the 2009 component of the SAROS study that addresses recycling. It noted in the 2009 SAROS update that many of the same barriers identified in the 1992 study still exist in Ontario today. However, it does appear that during the time between the two studies some progress has been made toward increasing the amount of recycled material used as aggregate. The 1992 JEGEL study suggests that recycled aggregate would likely continue to fulfill about 3 to 5% of Ontario’s annual aggregate requirements. The 2009 SAROS states that approximately 7% of aggregates produced in Ontario are comprised of recycled material. 18 to 19% of the aggregates used in transportation infrastructure annually are now recycled material.

SAROS Paper 4: Reuse and Recycling included a review of municipal official plans to determine if provisions for recycled aggregate, such as the allowance of aggregate recycling facilities at

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108 Ibid, 36.
extraction sites, were common in the province.\footnote{Ibid, 10.} Eleven official plans were reviewed, with only three including specific provisions for the use of recycled aggregate.\footnote{Ibid, 11.} Industry and municipal respondents interviewed for this report indicated that recycling could be a concern at the municipal level due to the fact that aggregate recycling operations can have similar impacts to those associated with primary extraction, and the presence of recycling facilities at an existing aggregate extraction site can extend the lifespan of the operation. For example, the blending of aggregates present on-site with recycled materials imported from other locations could extend the lifespan of a pit or quarry.\footnote{Personal Communication, Ontario Sand Stone and Gravel Association, 2010.}

Municipal and provincial government respondents also felt that the physical limitations of many recycled materials would restrict the extent to which they can be used for high-end applications such as infrastructure development. However, there is support for the use of recycled aggregate at the provincial level, particularly within the Ministry of Transportation (MTO), where the potential to use recycled aggregate in road construction has now been researched and implemented in many projects. MTO specifications for pavement design do allow for the use of a number of recycled materials, such as waste glass and ceramics, or old asphalt that can be reprocessed on site. However, these specifications are based on safety and longevity criteria, which can be met through the use of either virgin aggregate or recycled material. In 2010, MTO introduced the Green Pave program, a points-based system similar in principle to the LEED standard used for sustainable building design.\footnote{Ontario Ministry of Transportation. "GreenPave - Ontario’s First Pavement Sustainability Rating System." Road Talk 16, no. 1 (2010). http://www.mto.gov.on.ca/english/transtek/roadtalk/rt16-1/} Green Pave assigns points for both the use of long life pavements and pavements that incorporate recycled materials.\footnote{Ibid} While it is too early to assess the success of the program, it is a promising step that could promote greater municipal usage of recycled aggregate in road and highway construction.

One of primary barriers identified in \textit{SAROS Paper 4} was the lack of an inventory of materials with potential for use as recycled aggregate. Many producers of by-products used as aggregate do not create inventories of this material separately from virgin aggregate.\footnote{LVM-JEGEL and MHBC Planning. \textit{State of the Aggregate Resource in Ontario Study Paper 4 (Appendix B)}. Ontario Ministry of Natural Resources, Toronto: Queens Printer for Ontario. (2009), 3.} Based on the level of detail on availability of recycled material in the 1992 \textit{Mineral Aggregate Conservation, Reuse and Recycling Study} compared to that of the 2009 study, it would appear that the state of information on this resource has declined with time. It is likely that further progress on the use of recycled aggregate in the province will depend on policy changes that either legislate more detailed record keeping on material availability, or send price signals that make the tracking and use of recycled aggregate more attractive in comparison to virgin aggregate. Initiatives in other jurisdictions aimed at achieving these goals are discussed in the following sections.
Minerals planning policies in some European jurisdictions tend to favor reduced consumption of virgin aggregate and enhanced recycling. ¹¹⁹ 2006 statistics published by the Union Européenne des Producteurs de Granulats, the aggregate producers association for the European Union, indicate that in Belgium, the Netherlands and the UK, roughly 15-20% of total aggregate production was comprised of recycled materials. In particular, the UK achieved high rates of aggregate recycling. In 2006, The UK produced 58 million tonnes of recycled aggregate, which represented 21% of overall aggregates production. ¹²⁰

A 2008 study published by the European Environment Agency acknowledged that the United Kingdom has both the highest aggregates levy of European jurisdictions and the highest recycling rate. However, the study found that the high recycling rate and reduced demand for primary aggregate in the UK cannot be solely attributed to the high levy rate. Instead, it suggested that a combination of measures must be present to reduce dependence on primary aggregate and reduce the environmental footprint of the industry. ¹²¹ For example, a different analysis of the UK aggregates levy and landfill tax speculated that the high rates of recycling in the UK were more the result of their landfill tax than the introduction of the aggregates levy. In Denmark, a raw materials tax and a landfill tax were introduced simultaneously. Similarly, the European Environmental Agency report suggests that Denmark’s landfill tax had a higher impact on recycling rates than the raw materials tax.

The 2009-2010 annual report of the EU-wide European Aggregates Association (UEPG) also acknowledges the importance of cost differences between virgin and recycled aggregate in furthering recycling objectives. The report indicates that, as of 2008, the UK, Netherlands and Belgium recycle nearly all of the available construction and demolition waste in their jurisdictions, representing 20-25% of their total aggregates output. All of these jurisdictions have established aggregate taxes or levies, landfill taxes for construction and demolition waste, or both. ¹²²

Due to a lack of available information on policies and legislation for some jurisdictions such as Belgium, it was not feasible to study all jurisdictions that achieve high rates of aggregate recycling.


¹²² Ibid.

The Netherlands

The Netherlands ranks highly in overall production of recycled aggregate among jurisdictions in the European Union, and also has one of the overall highest national recycling rates with 90% of materials suitable for use as a substitute for aggregate being utilized. The Netherlands has large remaining reserves of most surface minerals with the exception of gravel and some forms of high quality sand. Due to limited space within the Netherlands generally, availability of these resources is often subject to social and environmental constraints.

In the early 1990s, the Netherlands set a target to achieve 90% recycling of construction and demolition wastes, a target which has since been achieved. Initiatives to minimize construction waste began in 1993 and included the promotion of longer lasting construction materials and the development of easily disassembled products, as well as separation of various forms of building waste at the sites where it is generated. Initially, the Waste Substances Decree (1997) introduced a ban on construction and demolition waste that had the potential to be recycled. However, the ban has had to be lifted for many landfills due to an excess of material and inadequate incineration capacity to dispose of it. In 2001, the Ministry of Housing, Spatial Planning and the Environment noted that incineration capacity was expected to increase in the future and the lifting of the ban was not intended to be permanent. Landfilling, however, is heavily taxed.

Key policies and legislation include the Environmental Taxes Act, the Building Materials Decree, the Hazardous Waste Decree and the Waste Substances Decree. The Environmental Taxes Act was introduced in 1995 to encourage recycling and incineration as an alternative to landfilling. It has had considerable impact on the costs of landfilling construction and demolition waste. The cost of landfilling construction and demolition waste was 10 guilders per tonne in the 1980s, but had increased to 250 guilders per tonne by 2001. Construction and demolition waste in the Netherlands is most commonly converted into “granulated rubble” which is used as a road base and in some cases as an alternative to natural gravel in concrete manufacturing. The Dutch government provides a bonus to contractors that use recycled aggregate in place of virgin aggregate for projects falling under the supervision of Ministry of Transportation, Public Works and Water Management. The Building Materials Decree established quality standards for construction materials coming from secondary sources and provided a certification process to give certainty to buyers regarding the performance of the materials.

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126 As of Feb 2011, one guilder would be an approximate 1.37 Canadian dollars
128 Ibid.
130 Ibid.
Sweden

The SAROS jurisdictional review conducted for Paper 2: *Future Aggregate Availability and Alternatives Analysis* noted that Sweden has a population of 9 million and a similar climate to that of Ontario. Aggregate resource management policies in Sweden were studied in detail in the Pembina Institute’s 2005 *Rebalancing the Load* report, but some noteworthy aspects of the Swedish policy and legislative framework are highlighted below.

As one of Sweden’s 16 Environmental Quality Objectives, a goal was established to cap the extraction of natural gravel. These objectives were incorporated into legislation in 2004, which provides that natural gravel extraction will not exceed 12 million tonnes annually. The Geological Survey of Sweden states that this Environmental Quality Objective should result in the use of natural gravel only in cases where a substitute is not available (taking the area into consideration), and the preservation of gravel deposits with significance in maintaining the drinking water supply or to the natural or cultural landscape. Recycling is being encouraged as a means of meeting the proposed target, with a goal of 15% of aggregates used coming from recycled material by 2010.

Sweden also adopted a national law, the Swedish Environmental Code, which amalgamated 15 former environmental policies into a single piece of legislation in 1999. The Environmental Code provides guidance on considering the approval of new aggregate extraction operations, stating that

> In connection with the consideration of applications for quarrying permits, the demand for the material to be extracted shall be balanced against the damage that the quarrying is likely to cause to wild flora and fauna and the environment in general. A permit must not be granted for a quarrying operation that is likely to be detrimental to the habitat of any endangered, rare or care-demanding animal or plant species. The need of cultivable

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137 Ibid.
agricultural land shall be taken into account in connection with the consideration of applications for permits for the quarrying of topsoil.\textsuperscript{138}

**Summary:**

While use of recycled and secondary material in Ontario will only make a relatively modest contribution to the province’s total aggregate use, it is also likely that there is substantial room for improvement in current recycling practices. The potential for substitution will not be fully known until the province is able to undertake a comprehensive inventory of suitable materials and identify financial incentives to encourage industry stakeholders to share this information. Ontario’s Ministry of Transportation has already laid the groundwork for much of this work to take place by developing pavement specifications that allow for the use of recycled material and is currently supporting best practices such as the use of crushed concrete in road base, the introduction of the Green pave program and numerous other initiatives, many of which have been in place since the 1980s or earlier. The province should actively pursue the creation of an electronic database for recycled materials as recommended in **SAROS Paper 4: Reuse and Recycling**. The province should also seriously consider mandatory requirements to utilize recycled materials where these are available after an inventory of useful materials has been completed.

While it is currently not possible to determine the full extent to which recycled and secondary materials could serve as a substitute for virgin aggregate due to the data limitation encountered in the SAROS study, an aspirational recycling target could be beneficial in beginning the process of making greater use of these materials across the province. The use of recycling targets in the Netherlands and Sweden appears to have had a positive result on recycling rates. The recently passed Ontario **Water Opportunities and Water Conservation Act, 2010**\textsuperscript{139} enables the Minister of the Environment to create province-wide aspirational (non-binding) targets for water conservation as well as additional water conservation targets that vary by municipality. A similar approach applied to aggregate recycling could be beneficial where significant quantities of appropriate material are located in conjunction with a broader provincial aspirational target.

The conclusion in **SAROS Paper 4** that most municipal official plans do not sufficiently accommodate aggregate recycling suggests that some form of provincial requirement may be necessary in order to achieve increased recycling on a broader scale. For example, a provincial requirement could be considered to reduce barriers to the establishment of recycling operations in the municipal official planning/zoning process.

Previous studies examining the impact of taxation schemes on demand for the resources, recycling or implementation of other best practices have shown that a natural resources tax combined with a landfilling tax works best. Landfill taxes have been demonstrated to increase recycling of aggregate material and suitable substitutes in the Netherlands, Belgium, the United Kingdom and other jurisdictions.


\textsuperscript{139} S.O. 2010 c.19
Recommendation:

The provincial government should promote and where possible, require the use of recycled aggregate to the fullest extent possible without compromising safety or durability of infrastructure by doing the following:

a) **Follow the SAROS recommendation to create an inventory of recycling activity and available materials.** MNR should pursue all recommendations provided in *SAROS Paper 4: Reuse and Recycling* to improve the rate of aggregate recycling in the province.\(^\text{140}\)

b) **Establish provincial targets for recycling aggregate.** As a component of the province’s proposed Aggregates Conservation Strategy, adopt a recycling target of 10 to 15% substitution of virgin aggregate for recycled/secondary material. Recycling targets should also be increased incrementally over time as knowledge on the availability of suitable materials and recycling practices improve.

c) **Remove municipal barriers to recycling aggregate.** MMAH, in collaboration with the Ministry of Infrastructure and MNR, should use provincial legislation to address municipal official planning barriers to the use of recycled aggregate. For example, municipalities designated as urban growth centres under the *Places to Grow Act, 2005* should be required to accommodate recycling facilities and encourage the use of recycled aggregate in infrastructure, as appropriate.

d) **Introduce a landfill tax to reduce unnecessary landfilling of usable material.** As a component of a long-term aggregates strategy, the Ontario government should combine an aggregates royalty increase for virgin aggregate with a provincial landfill tax that will reduce the disposal of waste products that have the potential to act as a substitute for virgin aggregate.

6.4 Site Plan Amendments

Some respondents also highlighted the problem of site plan amendments for existing aggregate operations, which can sometimes carry significant environmental or social impacts. Site plan amendments are defined as instruments issued by MNR, and major site plan amendments are subject to the *Environmental Bill of Rights*.\(^\text{141}\) As a result, major site plan amendments must be posted on the Environmental Registry to allow for public comment. Aggregate producers are also required to circulate proposed major site plan amendments to local municipalities. MNR’s Aggregate Resources Program Policies and Internal Procedures Manual (the Manual) includes a list of site plan amendments considered to be major. These include changes such as reduction of

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\(^{140}\) Key recommendations from *SAROS Paper 4 Reuse and Recycling* Include: Create an online database allowing public agencies to input their recycled aggregate use data; Develop guidelines on materials to be tracked and guidelines for standardizing the data being input into the system from across the province; Provide additional funding for staff and training on the database systems; Tie funding to proper completion of the data input activities. (This may require the development of a legislative framework); Create annual report cards outlining the successes and opportunities for improvement for recycled aggregate use across the province.

\(^{141}\) R.S.O. 1993, c. 28
the setbacks separating extraction activities from significant features such as woodlands, rivers or streams, and lowering the depth to which extraction occurs. Producers commonly make requests to vary conditions of aggregate licences and these must also be posted on the Environmental Registry. In many cases, these are requests to increase the amount of aggregate that can be removed from the site annually (referred to as the maximum annual tonnage rate) to meet heightened demand.

The same process is not required of minor site plan amendments. Minor site plan amendments can be approved by an MNR aggregate inspector without external comment. Examples of minor site plan amendments in the Manual include importation of different types of aggregate to the site for blending, changes to the phasing of the operation to allow for blending, adding or relocating stockpiles of material and the amalgamation of multiple licences. In EBR comments submitted on proposed revisions to the Manual made in 2006, some municipalities noted that this distinction between minor and major site plan amendments allowed some environmentally significant amendments to evade broader scrutiny, in particular where producers initially obtained a licence to extract aggregate above the water table and later requested a site plan amendment to extract aggregate below the water table. MNR responded to these concerns by establishing a new policy on site plan amendments to extract below the water table, requiring that requests for such amendments include formal notification of local agencies and the public along with a consultation process.

Despite the changes made to the Manual some stakeholders suggest that the site plan amendment process continues to be an avenue through which producers are able to ease the approvals process by gradually increasing the local impacts of the operation over time.

To further assess issues relating to site plan amendments raised by some interview respondents, CIELAP reviewed online records stored in the Environmental Registry of requests for major site plan amendments and requests to vary conditions of aggregate licences that were made between 2004 and 2009. The review was conducted to determine what type of site plan amendments were typically requested, as well as MNR’s rate of approval for these requests. In total, CIELAP compiled for review nearly 200 requests for site plan amendments and variances to licence conditions. The most common requests for site plan amendments were to: lower the final excavation level (25%); reduce setbacks on site (23%); and allow changes to rehabilitation plans (14%). The remainder of requests varied, ranging from the creation of a new entrance or exit to a site, to the addition of asphalt or recycling equipment to the site. The vast majority of these requests were ultimately approved by MNR (89%), while 1% were denied by MNR and the remaining 10% were eventually withdrawn by the applicant. Similarly, a majority of requests to

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143 Ibid.


vary licence conditions to allow increases in annual tonnage were approved by MNR. In some cases, conditions were placed on the approvals to minimize the impacts of increased truck traffic. Although major site plan amendments and requests to vary licence conditions are posted on the Environmental Registry, the public is often not aware that these amendments have been requested and few comments are typically received on the Registry proposals.

From a provincial perspective there is a case for maximizing the use of available aggregate on existing sites by allowing site plan amendments for increased depth of excavation, removal of setbacks or varying licence conditions to increase tonnage; however, some host municipalities and citizens view this approach as potentially misleading. Records of proposed site plan amendments and their approval rates on the Environmental Registry also suggest changes that could have significant local impacts are rarely turned down when they are requested. While it is beyond the scope of this study to determine whether some site plan amendments currently defined as minor also warrant broader review by local agencies, some municipalities have requested that some amendments currently defined as minor be reclassified as major. In either case site plan amendments for increased tonnage and potentially other amendments could be an opportunity to tie new permissions to progress in rehabilitation. This would be in keeping with recommendations provided in *SAROS Paper 6* regarding rehabilitation, which are discussed further in section 6.5 of this report.

**Summary:**

Some stakeholders have described the use of site plan amendments to change the conditions of an aggregate licence as a means of “breaking the battle into two parts” in order to minimize public opposition, while others have been even more critical, describing this approach as “a mockery of the entire application process as it misleads local residents and municipalities as to the extent of the ‘development.’” A greater effort needs to be made to inform the public about the true extent of an aggregate extraction operation up-front to minimize future conflicts and improve the public perception of the industry. Significant amendments to original site plans for increases in annual tonnage, depth of extraction, addition of new facilities or removal of setbacks should also be made conditional on a consistent track record of producer compliance.

**Recommendation:**

*Make major changes to aggregate operations conditional on use of best practices.* MNR should revise the current procedure for major site plan amendments to encourage producers to implement best practices. Approval of requests, such as for tonnage increases, increases in the depth of extraction, removal of setbacks or addition of new equipment to a site should be conditional on evidence of successful progressive rehabilitation to date and/or a tightened timeframe for resource depletion and final rehabilitation.

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6.5 Rehabilitation

The issues associated with rehabilitation efforts for worked out sites in the province have been well documented by the Ministry of Natural Resources’ internal reviews, as well as by the Environmental Commissioner and other organizations. Many of the barriers to increasing the quality and quantity of rehabilitation have also been identified in the updated SAROS. A number of concerns are raised in these studies, including: the lack of widespread, visible progress in rehabilitation (both real and perceived); funding challenges for both current and abandoned aggregate extraction sites; and the overall quality of rehabilitation performed.

Municipal government respondents that were interviewed for this study expressed concern over the length of time that operations are open while seemingly little visible rehabilitation takes place. These respondents also noted concerns, in some cases, with the end uses of these sites. Peel Region, a municipality which has traditionally been a major source of aggregates for the GTA, has tracked rehabilitation progress in detail to assess the performance of aggregate producers. In the chart provided below, trends in the amount of rehabilitated land relative to disturbed land are presented based on data collected by Peel Region from aggregate producers’ annual Compliance Assessment Reports. Compliance Assessment Reports for active pits and quarries in Peel for 2009 indicated that there was a total of 700 hectares of disturbed land, compared to 300 hectares of rehabilitated land on record. Records of the same active operations dating back to 1997 indicate that the amount of rehabilitation has been steadily increasing, progress has been slow and the total amount of rehabilitated land hasn’t yet exceeded 50% of the total licenced area.\textsuperscript{148}

Figure 1: Cumulative Disturbed Land Vs. Rehabilitated Land in Peel Region, Ontario: 1997-2009

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{cumulative_cumulative.png}
\caption{Cumulative Disturbed Land Vs. Rehabilitated Land in Peel Region, Ontario: 1997-2009}
\end{figure}

\textsuperscript{148} Personal Communication, Region of Peel, June, 2010.
The experience in Peel Region is consistent with those of other municipal respondents, and likely reflective of a broader trend in the province. During a 2006 EBR review of MNR’s Aggregate Resources Program Policies and Internal Procedures Manual, several municipalities presented statistics to demonstrate how little land had been rehabilitated in their jurisdictions. MNR’s records indicate that between 1995 and 2005 an average of 1,056 hectares of land were disturbed for the purposes of aggregate extraction annually, while only 461 hectares were rehabilitated annually.

A 2006 review of rehabilitation practices carried out by MNR (the Review) following a request submitted under the Environmental Bill of Rights (EBR) revealed that, in general, more rehabilitation orders should be issued in the province. While MNR has been issuing a greater number of rehabilitation orders in recent years, it was noted that “even without solid data, it can be argued that many more rehabilitation orders are required.” Part of this review focused specifically on rehabilitation and other compliance issues within the ORMCP area and determined that 39 out of 121 sites assessed within the ORMCP had deficiencies in rehabilitation that could warrant the issuance of a rehabilitation order under the ARA. MNR has also noted that unless producers voluntarily begin rehabilitation, MNR must rely on aggregate inspectors to enforce rehabilitation requirements. Given that MNR staff do not have the capacity to visit all sites each year and instead aim to field audit 20% of all sites in the province, this may be a strong impediment to rehabilitation. Compliance monitoring issues are discussed in further detail in section 6.6 of this report.

The review also suggested that MNR could improve transparency by making the number of rehabilitation orders issued publicly available. This has since taken place and the number of rehabilitation orders and their locations must be posted on the MNR website. The statistics indicate that between 2002 and 2008 close to 100 rehabilitation orders were issued. In a majority of these cases, MNR has noted that the producer came into compliance after the issuance of the order, suggesting that orders are an effective means of ensuring that rehabilitation progresses and

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153 Ibid.

concludes as required. The review also suggests making the names of producers who have received rehabilitation orders from MNR public. While producers’ names have not been included in the currently available MNR data on rehabilitation orders, doing so would be a further disincentive to avoiding rehabilitation.

The review also discusses the creation of incentives for performing rehabilitation that may include reinstatement of the security deposit system in place prior to 1996. The security deposit model required aggregate licence holders pay a fee that was calculated based on the number of tonnes extracted from the site annually and MNR maintained accounts to manage these fees for each licence. Licence holders could be reimbursed from this account once rehabilitation work was completed and an annual report detailing the rehabilitation was submitted to MNR. Most MNR aggregates staff believed that the security deposit system was an effective means of ensuring rehabilitation took place, but required substantial staff capacity to maintain. A reinstatement of the security deposit model would not be possible with existing MNR staff levels.

Under the 1996 Aggregate and Petroleum Resources Statute Law Amendment Act, changes were introduced that shifted rehabilitation funding from a security deposit system for individual sites to a single superfund. The superfund is supported by a portion of the per tonne licence fees paid by aggregate producers and is wholly managed by the Ontario Aggregate Resources Corporation (TOARC), a company owned by the Aggregate Producers’ Association of Ontario (APAO) (now the Ontario Sand, Stone and Gravel Association). TOARC uses the superfund to finance the rehabilitation of abandoned pits and quarries and sites where licences have been revoked.

In 1996, the APAO suggested that these changes would result in greater levels of rehabilitation, as individual security deposits were in some cases insufficient incentive to carry out proper rehabilitation when aggregate producers failed to do so themselves. It was anticipated that the superfund model could make millions of dollars in rehabilitation funding available for any site, as required. MNR observed that under the security deposit model, unsuccessful pits and quarries where not much aggregate was extracted were in some cases problematic to rehabilitate. Since only a small amount of money had been deposited into the account, there was no incentive for the producer to complete rehabilitation and also a lack of sufficient funding for MNR to step

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157 Ibid.

in and complete the rehabilitation process. While there are numerous of examples of successful rehabilitation in the province, concerns about compliance with rehabilitation requirements remain in spite of the superfund model now being in place for over a decade. A complete list of MNR’s key findings and recommendations from the Review can be found in Appendix B of this report.

Most recently, a survey of 50 active licences and 50 surrendered licences was carried out for SAROS Paper 6: Rehabilitation to determine the overall quality and quantity of the rehabilitation that had taken place. Of the 50 active licences surveyed, 58% of licencees had begun progressive rehabilitation while 40% of licencees had not yet started rehabilitation. The report notes that it would be necessary to assess whether opportunities to begin rehabilitating exist on those sites where rehabilitation has not commenced before drawing conclusions from the survey. For example, industry representatives have suggested that some of these sites may not be in a phase of their site plan that requires rehabilitation. MNR should determine the reasons for rehabilitation not taking place on sites that were reviewed for SAROS Paper 6 to allow for a more detailed assessment of progressive rehabilitation moving forward. New information relating to this component of the SAROS should be published if it becomes available.

One municipal respondent indicated that they were at one time interested in the concept of “staged extraction,” whereby opening new aggregate extraction sites in a municipality would be conditional upon older sites being exhausted and rehabilitated, however this was opposed by the aggregate industry. Because there are multiple aggregate producers competing for construction contracts, which may require different types of aggregates or blends of multiple types of aggregate, numerous sites must remain open in order for producers to maintain an inventory of materials that will allow them to be competitive in the marketplace.

The same respondent also suggested that where many aggregate operations are located within a concentrated geographic area, area-wide rehabilitation plans would be beneficial in promoting a co-ordinated approach to establishing final land use. Currently, there is no provincial requirement for multiple producers to cooperate with municipalities in the development of an area-wide plan. This creates a disincentive for producers to do the extra work required for this type of approach. Municipalities also have no jurisdiction to require producers to participate in area-wide plans. This could be an opportunity to introduce an incentive system for areas where a substantial amount of land has been disturbed. For example, the use of area-wide rehabilitation for portions of the Oak Ridges Moraine where multiple pits are located could contribute to the creation or improvement of natural cores and corridors over the long term.

While there are barriers to the concept of staged extraction, a pilot program is currently being pursued within the Greenbelt Plan area to require that aggregate producers adhere to a

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161 Personal Communication, Municipality of Clarington, June 2010.
“maximum allowable disturbed area.” MNR requires that disturbed areas exceeding the established maximum be rehabilitated by 2015, and that 50% of excess disturbed land be rehabilitated by 2011.\(^{162}\) Results of the pilot project are not yet available but are expected later in 2011.\(^{163}\)

The type of rehabilitation typically taking place was also identified as a concern both in *SAROS Paper 6: Rehabilitation* and by some respondents interviewed for this report. Municipal respondents noted that the most common end use for aggregate extraction sites were lakes, which may in some cases have very little ecological activity. Some respondents were not able to comment specifically on the quality of final rehabilitation because this stage had not yet been achieved on sites in their jurisdictions.

Consultants visiting aggregate extraction sites for *SAROS Paper 6* observed that 24 sites being rehabilitated to natural heritage or open space had a significant amount of non-native, or in some cases invasive species present on site. This inventory and interviews with site operators determined that many producers use commercial seed mixes in their rehabilitation efforts.\(^{164}\) However, it should also be noted that all 24 of these sites were found to be in general compliance with their rehabilitation plans, suggesting that higher standards could be established.\(^{165}\)

It should also be noted that there are a number of good examples of rehabilitation to various end uses throughout the province. For example, Erie Sand and Gravel rehabilitated a former gravel pit in Gosfield South Township in Essex County to agricultural land capable of producing specialty crops.\(^{166}\) *SAROS Paper 2: Future Aggregate Availability and Alternatives Analysis* also presents a map depicting 19 sites throughout the GGH region which are now publicly accessible greenspace.\(^{167}\) A municipal respondent in Simcoe County noted that while many aggregate extraction sites were still too new to comment on, final rehabilitation plans for newer licences were more detailed and ambitious in comparison to those of older licences.

*SAROS Paper 6: Rehabilitation* provides a number of useful recommendations to MNR with respect to rehabilitation. Some of the key recommendations urge MNR to:

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\(^{163}\) Personal Communication, Ministry of Natural Resources, July 2010.


\(^{165}\) Ibid.

\(^{166}\) Ecological Services for Planning Ltd. *Erie Sand and Gravel Application for Outstanding Achievement in Property Rehabilitation Award - Specialty Crop Agricultural Rehabilitation.* (1995).

establish a time limit after which the producer and the public know that a site should be rehabilitated;

allow an increase in the maximum annual tonnage that can be extracted from sites with only a small amount of material remaining. This will help to ensure that the remaining aggregate material is depleted so that operators can proceed with rehabilitation sooner;

establish site plan limitations on maximum disturbed areas (consistent with the pilot project occurring in the Greenbelt);

Allow expansion of sites only on the basis of progress that has already taken place with rehabilitation; and

increase the quality of final rehabilitation in areas where there are multiple licences on a deposit, by requiring comprehensive (area-wide) rehabilitation plans.

Summary:

Numerous sources point to the fact that much more could be done to improve the progressive and final rehabilitation of pits and quarries in Ontario. While we acknowledge that there have been many successful examples of rehabilitation that could be more widely promoted and improve the aggregate industry’s reputation in this area, it is also evident that significant policy change is required in order to improve rehabilitation practices on a wide scale. Many of the necessary changes to improve rehabilitation practices have already been identified through MNR’s 2006 review carried out under the EBR, as well as in SAROS Paper 6. A logical first step toward implementing these improvements would be to reintroduce the security deposit model previously in place before 1996, as has been contemplated by MNR, and recommended in SAROS Paper 6. This approach would be more consistent with Ontario’s Mining Act\(^\text{168}\), which requires mining companies to submit financial assurances along with their proposed rehabilitation plans.

Recommendations:

MNR should commit to implementing all key recommendations already identified through their EBR review of rehabilitation in 2006 and in SAROS Paper 6: Rehabilitation.

MNR should strongly consider reintroducing the security deposit model for rehabilitation of worked out pits and quarries. As recommended in SAROS Paper 6: Rehabilitation, MNR should consider reintroducing the security deposit model for aggregate licences to increase the financial incentive to rehabilitate worked out sites.\(^\text{169}\)


\(^{169}\) Other key recommendations provided in SAROS Paper 6 should be also implemented, including: Offering an increase in annual extraction limits to sites with only a small amount of material remaining to expedite final rehabilitation; Expanding site plan limitations on maximum disturbed area on active licenses (limitations on maximum disturbed area have already been enacted on lands in the Greenbelt Plan), with expansion being conditional on rehabilitation taking place; Requiring producers to co-operate on the development of appropriate area-wide rehabilitation plans where many operations are clustered in a single area.
6.6 Compliance Monitoring

The Environmental Commissioner of Ontario (ECO) has consistently raised concerns regarding the aggregate industry since the mid-1990s in annual reports to the legislature. The ECO first began drawing significant attention to aggregates issues in 1996 when the *Aggregate and Petroleum Statute Law Amendment Act* was passed, which amended the ARA. The *Aggregate and Petroleum Statute Law Amendment Act* introduced significant changes in how the aggregate industry was regulated. Prior to the amendment, all aggregate extraction operations were monitored by MNR on an annual basis.\(^{170}\) In addition to this annual monitoring, reports on compliance were prepared every 4 years, which included input from the municipalities in which aggregate operations were located.\(^{171}\) The *Aggregate and Petroleum Statute Law Amendment Act* transferred many compliance-monitoring responsibilities from MNR to the aggregate industry through the introduction of the Compliance Assessment Report system, which requires aggregate producers to monitor their own compliance with the conditions of their licences and submit this information to MNR.\(^{172}\) The ECO suggested that the transition to industry self-monitoring was motivated by cost savings rather than environmental protection, as this was introduced during a period of significant cuts to both MNR and MOE staff levels triggered by the Conservative government’s “common sense revolution”.\(^{173}\)

Both MNR and Rob Cook, then executive director of the Aggregate Producers Association of Ontario (now the Ontario Sand, Stone and Gravel Association), indicated that the transition to industry self-monitoring would free up remaining MNR aggregate inspectors to focus on producers with the most significant compliance issues, and that the new Compliance Assessment Reports would provide more detailed site audits than were previously undertaken by MNR inspectors.\(^{174}\)

That year, MNR reduced the number of aggregate inspectors from 41 to 32 positions. Based on publicly available data, the number of aggregate inspectors appeared to be highest in 1994, with 66 in total.\(^{175}\) As of July 2010, the number of aggregate inspectors in the province remained at 32.\(^{176}\)


\(^{171}\) *Ibid.*

\(^{172}\) *Ibid.*


\(^{176}\) Personal Communication, Ontario Ministry of Natural Resources, July 2010
Ensuring compliance with the requirements of the ARA has continued to be one of the key challenges associated with the industry. While there are likely many producers willing and able to successfully self-monitor their activities and remain in compliance with the provincial regulatory framework, there is a lack of MNR staff capacity to ensure that this indeed the case. It is likely that a lack of MNR visibility in the field enables non-compliant producers to evade fines, stop-work orders or other enforcement measures.

In 2002, MNR carried out a comprehensive internal review of producer compliance with the requirements of the ARA. MNR examined 11,000 Compliance Assessment Reports for quality and completeness of information, timeliness of submission and industry understanding of the information in the report. The review determined that information such as the depth of extraction, extent of rehabilitation, and feedback from consultation with municipalities, was commonly left out of the reports. In addition, some aggregate producers were found to have repeatedly submitted information in their Compliance Assessment Reports that did not reflect the actual conditions on site. MNR noted that these issues related to compliance reporting resulted in an additional workload for MNR staff already facing challenges meeting annual targets for field audits. In particular, MNR reported difficulties in meeting field inspection targets to verify Compliance Assessment Reports from areas of northern Ontario.

While not as comprehensive, a second internal review of compliance carried out by MNR in 2006 and 2007 revealed ongoing challenges. The ECO’s 2007 report, Doing Less with Less, indicated that when MNR surveyed licencees operating within the ORMCP area, 100 out of 121

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177 While MNR’s internal review of Compliance Assessment Reports is detailed in the Environmental Commissioner of Ontario’s 2001-2001 Annual Report, the review itself is not a public document.
179 Ibid.
180 Ibid.
licencess had compliance problems. There have not been any additional surveys of compliance under the ARA on the basis of a provincial land use plan boundary since 2007.

Based on these findings, it appears that the expected outcomes of industry self-monitoring have not been as positive as initially anticipated by some stakeholders in the mid 1990s when the Aggregate and Petroleum Resources Statute Law Amendment was introduced. MNR field inspections continue to provide an important function in revealing potential issues on site that may not be captured in Compliance Assessment Reports. Due to limited staff capacity to carry out inspections, it is likely that many compliance problems go unnoticed for long periods of time. Some stakeholders have described the current regulatory system as “complaints driven”, with most compliance issues being addressed by provincial regulators following complaints from the public.

**Summary:**

Many of the problems currently associated with the aggregate industry can be attributed to a lack of resources to properly implement the existing legislative and policy framework already in place. The Environmental Commissioner of Ontario’s Annual Reports have consistently pointed to a lack of MNR budget and staff capacity since the Aggregate and Petroleum Resources Statute Law Amendment Act was passed in 1996. In 2010, MNR indicated that it has 32 field inspectors and no plans to hire additional ones. In 1994 there were 66 aggregate inspectors in total, meaning that fewer inspectors are now overseeing the implementation and enforcement of the ARA, while substantially more aggregate is being extracted overall and from a greater number of licenced operations. Increasing the monitoring and enforcement capacity of MNR would reduce conflicts with the public, and improve the overall environmental performance of the industry.

**Recommendation:**

Increase the number of aggregates field inspectors. The Ontario government should make funding available to restore the number of aggregate field inspectors to a level that will enable more frequent monitoring of a greater number of pits and quarries in the province.

**6.7 Pricing and Accounting for the Cost of Aggregates**

A number of stakeholders interviewed for this project suggested that the low cost of aggregates is a barrier to improving the environmental performance of the industry. Some saw this cost as enabling inefficient use of aggregate within close-to-market areas of the province such as Southern Ontario. Other respondents considered the current provincial aggregates royalty rate to be insufficient to cover the costs of impacts on roads caused by transporting the resource and other local level impacts. At the same time, all respondents recognized the essential role of aggregates in the construction of infrastructure. Industry stakeholders pointed to the fact that,

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since a majority of aggregates are purchased by public agencies for infrastructure projects, a higher price paid for aggregates would inevitably be passed on to the taxpayer.

Respondents noted the role of societal choices in establishing the price of aggregates, suggesting that paying higher prices may come to reflect the changing values of society as close-to-market sources of aggregate become increasingly scarce and more controversial to extract. A higher price for virgin aggregates that was more reflective of the social and environmental impacts associated with aggregate extraction could send a price signal that would make the use of recycled aggregate more competitive by comparison. One respondent suggested that paying a higher price for aggregates would reflect a more widespread trend in paying more for natural resources generally, as environmental constraints increase over time.

Other respondents pointed to the high financial costs and staff time associated with municipal involvement in OMB hearings. Some citizen respondents felt that costs incurred in fighting seemingly inappropriate aggregate extraction operations at the OMB resulted in a system in which the public must bear the cost of dispute resolution to ensure environmental protection.

Aggregate extraction fees and royalties in Ontario

Prior to 2007, critics had noted that Ontario’s aggregate licence fee had remained unchanged since 1990. In 2007, the licence fee for aggregate extracted on private land was increased to 11.5 cents from 6 cents per tonne extracted. At the same time, the royalty rate for aggregate extracted on crown land, which had remained unchanged for 30 years, was increased to 50 cents per tonne from 25 cents per tonne extracted. Some of this additional revenue was used to hire 15 new aggregate inspectors. However, the additional staff for compliance enforcement was partially offset by an expansion of the geographic area covered by the Aggregate Resource Act that was also introduced in 2007.

Revenues from the current per tonne licence fee are distributed to several parties. 1.5 cents per tonne is paid to upper tier municipalities (raised from 1 cent under the pre 2006 structure). 6 cents per tonne is paid to lower tier municipalities (raised from 4 cents per tonne under the previous structure). The remainder is distributed to the Crown and the Aggregate Resources Trust. Some municipal government respondents at the regional level noted that the majority of their share of the aggregates royalty is currently used to cover road maintenance costs.

Quantifying the Costs and Benefits of Aggregate Extraction

SAROS Paper 3: The Value of Aggregates provides a comparative analysis of the environmental and economic costs and benefits of aggregate in the province. The analysis presented in SAROS

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Paper 3 included detailed assessments of both upstream and downstream economic benefits associated with aggregate extraction. However, SAROS Paper 3 does not attempt to assign a dollar value to the social and environmental impacts of aggregate extraction.

To determine the environmental impacts associated with aggregate extraction, the authors of SAROS Paper 3: The Value of Aggregates surveyed 31 of the most recently licenced aggregate sites to determine whether significant features are being preserved. The authors of the study assessed the percentage of land on sites that had been disturbed for aggregate extraction versus the number of features remaining, including watercourses, ANSIs, significant woodlands and wetlands and buffer areas. Taking into account the expected outcomes of final rehabilitation plans for the sites over the long term, the authors then calculated the expected extent of overall change to the landscape, which was used as the basis to estimate the impact of aggregate extraction on ecosystem services. Using this method the authors determined that on average, 69% of the licenced area was disturbed for aggregate extraction, while 31% was protected as significant environmental features. The most substantial net loss in natural features was woodlands; roughly 50% were removed and not restored following extraction, but instead rehabilitated to other natural features. The authors of SAROS Paper 3 determined that assigning a dollar value to ecosystem services, either lost or preserved, on the sites was beyond the scope of the study.

Past studies have assessed a dollar value for natural heritage features in Southern Ontario. In 2008, MNR’s Southern Region Planning Unit commissioned a study by Spatial Informatics Group entitled Estimating Ecosystem Services in Southern Ontario. The authors employed what they refer to as ‘value transfer methodology,’ by aggregating ecosystem services valuation studies conducted in areas with comparable environmental and socio economic conditions to Southern Ontario to produce estimates of the dollar values for the study area. The study authors drew on areas in North America, Europe and New Zealand to arrive at dollar values for ecosystem services in Southern Ontario. Based on this methodology, the report provided a conservative estimate of the value of Southern Ontario’s natural heritage features and acknowledged limitations due to the relative newness of the concept of ecological valuation and the limited number of value estimates available in the literature. Nonetheless, their conservative estimate found that Ontario’s natural heritage features...
collectively could be worth over $84 billion in total.\textsuperscript{192} While the results of this study are largely theoretical and should not be used as a basis for policy, they do provide some perspective on the possible value of remaining natural heritage features in Southern Ontario.

While the SAROS papers provided an assessment of both the upstream and downstream economic benefits associated with aggregate extraction, they did not provide an analysis of the upstream and downstream environmental and social impacts with a comparable level of detail. While this is in part due to the differences in established methodologies for economic valuation in comparison with ecosystem services, this was a missed opportunity to provide some preliminary estimates of ecosystems services, either lost or gained, as a result of aggregate extraction.

The United Kingdom’s Aggregates Levy

The much higher per tonne charge incurred on aggregate producers in the United Kingdom compared to Ontario (2 UK pounds per tonne, or 3.20 CAD as of September 2010) has been cited in the past as evidence that the province is not charging enough for use of the resource. One notable difference is that the establishment of the UK aggregates levy was precluded by an examination of the social and environmental costs of aggregate extraction. Leading up to the establishment of the Aggregates Levy in 2002, the UK government commissioned an extensive study entitled the \textit{Environmental Costs and Benefits of the Supply of Aggregates}. The study assessed public willingness to pay to stop environmental externalities of aggregate extraction both within the local areas of those surveyed and in nationally significant landscapes.\textsuperscript{193}

The UK Department of Revenue and Customs stated that the purpose of the Aggregates Levy is to address the environmental costs associated with quarrying that are not already covered by regulation, including noise, dust, visual intrusion, loss of amenity and damage to biodiversity. The levy aims to bring about environmental benefits by making the price of aggregates better reflect these costs and encouraging the use of alternative materials such as recycled materials and certain waste products.\textsuperscript{194}

Further details on the initial intent of the levy were discussed in the 2001 Budget Speech, where the UK government indicated the levy would ensure that the impact of aggregate extraction is better reflected in its price. The tax was also intended to serve as a signal of which activities the

\texttt{http://www.mnr.gov.on.ca/stdprodconsume/groups/ir/@mnr/@lueps/documents/document/279512.pdf}

\textsuperscript{193} UK Department for Communities and Local Government. \textit{Environmental Costs and Benefits of the Supply of Aggregates - Phase 2} (1998).  
\texttt{http://www.communities.gov.uk/archived/publications/planningandbuilding/environmentalcosts.}

\textsuperscript{194} Her Majesty’s Revenue and Customs. \textit{FAQ: Aggregates Levy}. 2010.  
\texttt{http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageContactUs_ShowContent&id=HMCE_PROD_008552&propertyType=document#downloadopt}
government intended to encourage and discourage, with a primary goal being a shift toward the use of alternative materials in place of virgin aggregate.\textsuperscript{195}

Since the UK levy was introduced, its proceeds have funded a number of projects administered through the Aggregates Levy Sustainability Fund, which was established when the levy was announced. As of 2007, the Fund has supported close to 1200 projects including equipment purchases, infrastructure grants, habitat mapping and upgrades to playgrounds and town halls in communities affected by aggregate extraction.\textsuperscript{196} The UK aggregates levy also supports the a component of the Waste and Resources Action Program (WRAP) referred to as AggRegain, which is aimed at further reducing the demand for virgin aggregate through the removal of barriers to increased use of recycled material.\textsuperscript{197}

The UK aggregate levy is an ongoing source of conflict between the aggregate industry and the UK government. The UK aggregates industry is currently working to eliminate the levy. A proposed increase to the levy has been cancelled.\textsuperscript{198}

While the SAROS study does not contain any specific recommendations to increase the current licence fees or royalty rates in Ontario, various components of the SAROS note beneficial initiatives taking place in the UK that are supported by levy proceeds. SAROS Paper 4 reviewed the AggRegain initiative in the UK supported by the aggregates levy and suggested it could serve as a model for the development of a similar initiative for Ontario.\textsuperscript{199} The impact of the UK levy of per capita consumption of virgin aggregates is also addressed in SAROS Paper 1. Here the study authors question, but do not rule out, the role of the UK aggregates levy in reducing per capita consumption of aggregates and increasing recycling rates.\textsuperscript{200}

The results of a jurisdictional review of rehabilitation practices in SAROS Paper 6 concluded that Rehabilitation efforts in the United Kingdom emerged as being particularly exemplary, and can be at least partly attributed to widespread promotion and acknowledgement of high quality efforts, innovative partnerships between industries, non-government


\textsuperscript{197} UK Department of Environment, Food and Rural Affairs. “AggRegain Home” http://aggregain.wrap.org.uk/wrap_aggregates/


organizations, and in some cases research institutions, and recognition of potential complementary relationship between human needs and nature conservation. This leadership and research is likely in large part due to the significantly higher per tonne fee collected through their Aggregates Levy.201

Summary:

Previous studies on aggregate resource management have drawn attention to the fact that the aggregates levy in the UK is many times higher than Ontario’s licence fees and royalties. In addition, SAROS Paper 6 has indicated that the UK aggregates levy has led to some of the examples of best practice that Ontario could follow. While implementing an aggregates levy increase to UK levels could be detrimental to Ontario’s economic recovery, increasing licence fees and royalties would allow for additional hiring at MNR to support compliance monitoring efforts and would increase revenues to fund new initiatives as a long term aggregates strategy is implemented.

Recommendations:

Gradually increase the current aggregate royalty rate to fund reforms. MNR should increase the current per tonne licence fees and royalties charged on the extraction of aggregates. As a starting point, the rate should be increased to a level sufficient to continue to fund additional staff capacity within MNR. Additional revenue from future increases should be used to further recycling efforts, extend the geographic areas covered by the ARA, improve rehabilitation efforts and support further research into how the industry can improve practices. The fee and royalty rate increases should be phased in incrementally over time.

7. Long-Term Considerations for Aggregates Management in Ontario

7.1 Barriers to “Close-to-market” Management of Mineral Aggregate Resources

Generally, the policy of extracting mineral aggregate resources close-to-market makes environmental and economic sense, as evidenced by the number of jurisdictions that follow this practice. SAROS Paper 2 examined fifteen jurisdictions, primarily in Europe and the United States, and determined that most of them supported close-to-market extraction either explicitly or informally as a result of market forces.

The introduction of the ORMCP, Greenbelt Plan and NEP, have made the maintenance of a close-to-market policy increasingly difficult for aggregate producers. Although new or expanded pits and quarries are permitted through much of the ORMCP, Greenbelt and NEP, the restrictions currently imposed by the plans have meant that proposals are less likely to move forward in these areas and those that do often meet public opposition. It has been noted by consultants involved with the industry that increasing protection in the NEP and ORMCP is shifting aggregate production to more remote sources.202 This was documented as early as 1999 in Simcoe County, prior to the passing of the NEP, ORMCP or Greenbelt Plans:

In recent years, the mineral aggregate areas (sands, gravel) in Simcoe have gained considerably in economic value for the County, because the aggregate resources in the GTA have been depleted to within 50 km of the GTA. The close proximity of Simcoe to the GTA means that there is a relatively low cost of transporting the extracted aggregates to construction sites in Southern Ontario.

A conflict that often arises is the presence of rich gravel deposits under rich, high quality soil resources. The sites with the greatest development pressure are those adjacent to the Barrie/Orillia urban area and those with easy access to Metropolitan Toronto.203

In 2009, Simcoe County produced 10.4 million tonnes of aggregate, one of only two regional municipalities in the province to produce over 10 million tonnes that year.204 While detailed information on how much of Simcoe County’s aggregate production is used in the GTA is not publicly available, the County’s Duntroon Quarry has been identified as a supplier for the GTA and the quarry operators have recently applied for an expansion.205 In the town of Brechin

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202 Azimuth Environmental Consulting. Aggregate Services Overview. [http://www.azimuthenvironmental.com/Services/Pits%20and%20Quarry/pitsandquarry.htm](http://www.azimuthenvironmental.com/Services/Pits%20and%20Quarry/pitsandquarry.htm)


Ontario, a quarry was approved in 2004 but has not yet been developed. The licence holder, R.W. Tomlinson Ltd. has stated that its intention is to supply aggregates to the GTA market. A proposed quarry in Grey County (located west of Simcoe County) is expected to export 90% of the aggregates it produces to the GTA if approved. Grey County has also produced an Aggregate Resources Master Plan, which anticipates that demand for aggregates in the GTA will significantly increase in the coming decades as closer aggregate reserves are depleted. The Grey County Aggregate Resources Master Plan also assesses different transportation options to meet this demand.

Gradually increasing haul distances from the GTA are also anticipated to some extent in SAROS Paper 2. The transportation alternatives analysis carried out for this component of the study estimated that the current average haul distance for pits located close to GTA markets is 35 km. However, it was estimated that this would increase to 45 km by 2020 and then by an additional 0.5 km each year over a 30-year period, reaching an average of 60 km by 2050.

Similarly, the 1992 SAROS report predicted that, between 1990 and 2010, Ontario would be faced with “a critical economic, social and environmental situation in terms of protection of, and access to, aggregate resources required to meet the increasing demands of Ontario residents.” As a result of protective policies in the GTA and surrounding region, new extraction sites were being identified at distances further from the GTA market.

### 7.2 Distance from Markets and Long-Term Aggregate Supply: Policy in Other Jurisdictions

*SAROS Paper 2: Future Aggregates Availability and Alternative Analysis* includes a review of aggregates management in other jurisdictions. This review began with an initial scan of 30 jurisdictions, which were then scoped down to 13 jurisdictions for which information was most readily available. These jurisdictions were Australia, the Cayman Islands, the Czech Republic, Denmark, Italy, the Netherlands, New Zealand, Sweden, the United Kingdom, California, and Canada.

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209 *Ibid*


211 *Ibid, 18.*

212 *Ibid, 18.*
Illinois, Maryland, Pennsylvania, Virginia and West Virginia. Following a preliminary review of these jurisdictions, the authors of SAROS Paper 2 selected the United Kingdom, Illinois, Sweden, Australia and the Cayman Islands for a more detailed review of aggregates policies.

The SAROS Paper 2 review concludes that most jurisdictions, with the exception of the Cayman Islands and New Zealand, support a close-to-market extraction of aggregates either through specific policies or informally as a result of market forces. The support for close-to-market extraction in these jurisdictions is summarized in the following table.

<table>
<thead>
<tr>
<th>Jurisdiction Studied</th>
<th>Level of Support for Close-to-market (CTM) Aggregate Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>No clear support for either CTM or long distance extraction</td>
</tr>
<tr>
<td>Australia</td>
<td>Several Australian states aim to protect CTM aggregate resources</td>
</tr>
<tr>
<td>Cayman Islands</td>
<td>Moving towards a long distance extraction policy</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>No clear support for either CTM or long distance extraction – both are considered where supported by domestic demands</td>
</tr>
<tr>
<td>Denmark</td>
<td>No clear support for either CTM or long distance extraction</td>
</tr>
<tr>
<td>Italy</td>
<td>No clear support for either CTM or long distance extraction</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Supports the protection of CTM resources</td>
</tr>
<tr>
<td>New Zealand</td>
<td>The Auckland Region supports a long distance extraction policy</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Supports use of CTM resources</td>
</tr>
<tr>
<td>United States</td>
<td>Aggregate resources are generally managed at the local or county level. Market forces encourage CTM extraction where available resources and demand are present.</td>
</tr>
</tbody>
</table>


While a majority of these jurisdictions do support close-to-market extraction in some form, the jurisdictional review also reveals that Ontario likely has one of the most explicitly defined close-to-market policies, as is written in the 2005 PPS. In a majority of cases internationally, it would appear that close-to-market extraction is left to be determined by market forces on a case-by-case basis. While perhaps beyond the scope of the SAROS study, broader examination of some of the above jurisdictions reveals other important lessons that could inform Ontario’s long-term aggregate strategy and/or aggregate conservation strategy.

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214 Ibid.
7.3 Jurisdictions Considering Alternatives to “Close-to-market” Aggregates

New Zealand

In past decades, New Zealand experienced a steady decline in per capita demand for aggregate resources despite continued economic growth. The decrease in demand was attributed to a ‘paradigm shift’ in technology and production methods over a short period of time, which led to more efficient use of aggregates. This trend peaked in the 1980s and now there is again increasing use of and pressure on aggregate reserves, especially in high growth regions such as Auckland.215

Auckland is the most highly populated urban area in the country and appears to experience similar challenges to those of Ontario in securing close-to-market aggregate resources. While New Zealand generally does not face a shortage of aggregate resources located near urban centres, land use conflicts make securing these resources for extraction difficult.216 Some research has called for government intervention to protect close-to-market reserves to avoid the financial, social and environmental costs of transporting further from market and to ensure an affordable supply of aggregates to meet future demand.217

New Zealand’s state level Regional Policy Statements are similar to the Provincial Policy Statement in Ontario. The creation of Regional Policy Statements is a requirement under the 1991 Resource Management Act. There are 16 regions in New Zealand in total, with each having its own Regional Policy Statement.

Regional Policy Statements address aggregate resources and other minerals in different ways from region to region. According to a study conducted by the Manager of Petroleum and Minerals Policy in New Zealand, 13 of the 16 regional policy statements have provisions addressing the effects of minerals extraction on other resources. In addition, 9 of the 16 regional policy statements address the potential impacts of other resource uses on the availability of minerals.218

The issue of ‘reverse sensitivity’ is addressed in several regional policy statements – eight of New Zealand’s Regional Policy Statements contain provisions to address reverse sensitivity, defined as competing land uses within areas containing mineral deposits, which can result in impacts that cannot be mitigated within the quarry boundary.219 The term reverse sensitivity is

216 Ibid.
217 Ibid.
219 Ibid.
similar to the concept used in Ontario’s 2005 PPS that protects mineral aggregates from other land uses that would preclude their exploitation.

Auckland’s Regional Policy Statement (Auckland RPS) acknowledges that close-to-market reserves of aggregates are declining and that some of these reserves will not be available due to urban development in close proximity. The Auckland RPS recognizes that there are higher community expectations relating to environmental quality, noting that these changes in community values may not permit the use of some resources. The Auckland RPS also notes that the Auckland Region is becoming increasingly dependent on the aggregate resources of nearby jurisdictions, acknowledging that this dependence is causing environmental impacts due to increased transportation.\(^{220}\) The Auckland regional government has recently undertaken a feasibility study on the bulk transportation of aggregates by rail from the neighboring Waikato Region, the nation’s largest aggregate producer. At the time of writing, the regional government had decided to maintain the current practice of trucking aggregates from outside the Auckland region to meet demand instead of developing new rail infrastructure.\(^{221}\)

Section 13.4 of the Auckland RPS provides guidance on mineral aggregate extraction and discourages aggregate extraction in areas “where the operations would have significant impacts on natural or cultural heritage, the natural character of coastal environments, wetlands, lakes, rivers or their margins or exacerbate the effects of natural hazards.”\(^{222}\) Aggregate reserves are also protected by the Auckland RPS due to prohibition of land uses limiting aggregate extraction that could benefit regional development and the economy.

The Auckland RPS also provides the following criteria for assessing proposals for new aggregate operations:

(i) The extent to which extraction methods and operations make efficient use of the resource
(ii) The extent to which reuse can be made of existing material.
(iii) The extent to which alternative sources of suitable material are reasonably available, particularly where seabed, lakebed or riverbed is involved.\(^{223}\)

**Cayman Islands**

While it relates to a significantly smaller jurisdiction than Ontario both in terms of population and economic growth outlook, the Cayman Islands’ Aggregate Policy is of interest. It states that the number of quarries should be managed based on the principle of supply and demand and as a tool for growth management. The policy requires the establishment of threshold quantities of licenced aggregate reserves. No new quarries are to be approved until the combined total of


\(^{223}\) *Ibid.*
reserves in all licenced quarries has been reduced to a 5-year supply. The maximum amount of aggregate that can be licenced at a given time is restricted to a 12-year supply. Quarries are required to produce biannual reports to allow the Cayman Islands Central Planning Authority to assess the state of aggregate reserves.224

7.4 Current Transportation Scenarios for Aggregates in Ontario

The key considerations in choosing how to transport aggregates are the additional costs incurred by the transportation and the flexibility of the transportation system to accommodate a range of demands for aggregates in multiple locations. Trucking of aggregates is the most flexible mode of transportation as it allows for individual shipments to occur at intervals determined by the demands of the project, and schedules can be adjusted quickly to meet customer needs.225 Aggregate trucks are capable of moving throughout most areas of a typical aggregate operation, which means that they can be loaded at a variety of locations on site. Trucking generally requires less initial capital investment compared to fixed transportation systems.226 Delivery by truck can take place wherever road infrastructure exists and in most cases no special equipment is required for unloading aggregate at its destination.227 Road transport also enables producers to respond quickly to increases or decreases in the demand for aggregates.228 In a majority of jurisdictions trucking has been the dominant mode of transportation. Similarly, Ontario has historically moved 90% of aggregates by truck229 and this continues to be the case.230 Trucking of aggregates is often a contentious issue for local municipalities due to nuisance inflicted on residents located near haul routes and the wear and tear on roads caused by trucks over time. Increasing demand for aggregate results in additional noise, dust and vibration from more frequent shipments from pits and quarries and affects larger areas as sites open further from markets.231

Reductions in greenhouse gas emissions can be realized through truck transportation of aggregates over short distances. However, the baseline amount of greenhouse gas emissions

224 Cayman Island Central Planning Authority. Cayman Island Central Planning Authority's Aggregate Policy. (2004), 5.
226 Ibid.
227 Ibid.
generated by current transportation practices is difficult to quantify in Ontario because detailed information about movement of various types of aggregate from extraction sites to job sites is considered to be proprietary. As a result, it is challenging for stakeholders outside of the aggregate industry to analyze the extent of aggregate trucking under current practices in Ontario.

Goods Movement in Central Ontario: Trends and Issues, a 2004 study commissioned by the Ontario Ministry of Transportation (MTO), notes the difficulty of tracking aggregate truck activity due to the “dispersed nature of origins and the transient and temporary nature of often multiple destinations” that can be associated with construction projects.

For residential developments, granular aggregates are first required for street foundations and drainage. In addition, asphalt must be provided through a process involving several steps. Asphalt mixing plants are built close to highways to improve the efficiency of transportation. Trucks move raw material from pits or quarries to the asphalt plants, while smaller loads of processed aggregate are delivered to the final job site. “Readymix” concrete, comprised of aggregates and portland cement, is required for the foundations of homes and additional structures. Readymix is distributed from concrete plants at intermediate locations similarly to asphalt. Additional types of aggregates may also be required for landscaping purposes and for erosion protection.

Contractors can access aggregates through the use of short-term permits issued for temporary wayside pits or quarries located close to the job site, or by purchasing them from existing local producers. However, construction projects can require multiple types of aggregate, not all of which may be available locally.

For major highways, the haul distance of aggregates from quarries to job sites can be influenced by the location of aggregates capable of meeting MTO standards for highway safety and pavement longevity. The characteristics of the aggregates used in making asphalt have a significant influence on the amount of friction provided by highways. Until the 1970s, highways in southern Ontario were paved with asphalt using primarily local aggregates. In more recent years, improved MTO safety standards have led to increased haul distances for aggregates used in major highway construction. Construction of southern Ontario highways that carry a daily average of 2500 or more vehicles per lane now require specialized skid resistant aggregate to reduce the frequency of accidents. These skid resistant aggregates are sourced mainly from Precambrian rock in central or northern parts of the province. Comparable aggregates are not locally available in southern Ontario. If used, the aggregates that are widely available in Southern Ontario must be blended with skid resistant aggregates in order to meet the MTO

232 Ibid, 198.
233 Ibid, 198.
standard.\footnote{Ontario Ministry of Transportation. *Skid Resistant Aggregates in Ontario*, Toronto: Queens Printer for Ontario, (2002), 14. \url{http://www.nssga.org/after/ Symposium/2002-17.pdf}} New sources of skid resistant aggregates must be tested at MTO laboratories as well as in the field on small test sections of highway before being approved and listed by MTO as an appropriate source for contractors. The number of quarries listed as approved sources of skid resistant aggregate is still relatively small compared to the total number of aggregate licences and permits in the province. According to MTO, the average per tonne cost of skid resistant ranged from 54-60 dollars based on the most recent data gathered between 1998 and 2001.\footnote{Ibid, 13}

Each year, MTO issues the Paver of the Year Awards to recognize construction companies who complete MTO contracts to a high standard. The details of the winning contracts are often outlined in trade publications or in company promotional materials and typically include details on the sourcing of aggregates and other materials used on the job site. The winning contracts offer some insight into the flow of materials from pits and quarries to the job site in the context of provincial highway construction. Examples of highway projects in southwestern Ontario demonstrate the need to move appropriate aggregates over longer distances to achieve the necessary blends of asphalt for the job.

A 2008 pavement rehabilitation project carried out by Capital Paving on Highway 402 in MTO’s West Region used hot mix asphalt from Capital Paving’s asphalt plant located in Puslinch, Ontario made with aggregates from Lafarge’s Dundas quarry, as well as two asphalt mixtures using aggregates from Fowler Construction Ltd’s Rosewarne quarry.\footnote{Bateman, Andy. "Graham Bros Takes 2009 Paver of the Year Awards." *Rock to Road Magazine*, 2009. \url{http://www.rocktoroad.com/content/view/1082/38/}} The Dundas quarry is located relatively close to the job site near the city of Hamilton, Ontario while the Roswarne Quarry is located in Bracebridge, Ontario approximately 300km away.\footnote{Ibid}

Similarly, a highway rehabilitation contract located near the city of Brantford, Ontario, Dufferin Construction used a combination of aggregates from their own quarries located in Flamborough and Milton, Ontario, as well as aggregates and sand from a quarry operated by Aecon Construction Materials in Marmora, Ontario. Flamborough and Milton are located relatively close to the job site near Brantford, while Aecon’s Marmora quarry is located approximately 200km away.\footnote{The Mineral and Locality Database. “Lafarge Dundas North Quarry”. n.d. \url{http://www.mindat.org/loc-5739.html}}

Other projects in MTO’s West Region have utilized aggregates shipped by barge from northern Ontario. A highway reconstruction project carried out by Huron Construction Company Ltd. On Highway 40 in Sarnia, Ontario used materials shipped from two separate quarries. Aggregate

\begin{itemize}
  \item \footnote{Bateman, Andy. “Miller Group Scores Twice.” *Rock to Road Magazine*, 2007. \url{http://www.rocktoroad.com/content/view/852/38}}
\end{itemize}
materials were purchased from Ontario Trap Rock – Bruce Mines quarry located near Sault St. Marie and a quarry located on Manitoulin Island.  

While the transportation scenarios presented above may not be the norm, they do demonstrate that there are examples of aggregates currently being trucked over distances well above the current close-to-market average of 35km for the GTA area, or the projected long term average of 60km cited in SAROS Paper 2: Future Aggregate Availability and Alternatives Analysis. The primary reason long distance trucking was required in these examples appears to be a lack of skid-resistant aggregates close to the highway construction sites where they were required. In addition, these examples also point to a need to consider the net effect of multiple truck trips from different pits, quarries and processing facilities required to meet provincial specifications, given that over 50 percent of Ontario’s aggregates are used for the construction and repair of roads and highways.

7.5 Transportation of Aggregates in Other Jurisdictions

Recognizing the increasing competition amongst various land users in the GTA and the surrounding countryside, the provincial government commissioned a feasibility study regarding transportation of aggregates from more remote locations in northern Ontario as part of the SAROS update. The study primarily examines greenhouse gas emissions and travel costs associated with road, rail, marine or combinations of these three options. Rail transport, where it can be made feasible through economies of scale or to transport materials having a high enough value to justify the investment in infrastructure should be considered as an option in the transition to a more balanced approach to aggregates management.

SAROS Paper 2 raises some important points regarding transportation alternatives that are necessary to consider for a long-term aggregates strategy, such as impacts on the cost of aggregates, greenhouse gas emissions that could result from longer transportation distances and the inevitable need to move aggregates from ports or rail terminals by truck to construction sites. However, a preliminary review of rail transportation in other jurisdictions suggests that there could be benefits to this approach and that it is possible in some contexts for an aggregate producer to remain viable while using alternatives to trucking.

United States

As in Canada, most of the freight rail network in the United States is privately owned. The Staggers Rail Act of 1980 shifted responsibility for most freight rail lines from the public to the private sector. The aggregate industry in the United States is still primarily reliant on truck

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http://www.rocktoroad.com/index.php?option=com_content&task=view&id=938&Itemid=134


transportation. However, the quantity of aggregate being transported by rail in the US is increasing. In 1997, 2.8% of aggregate produced in the US was transported by rail.\(^{249}\) By 2002, this figure had increased to 4.6%.\(^{250}\) State funding is available in some jurisdictions for rail infrastructure expansion. In Maine, state funding has supported rail infrastructure development to move aggregate though the Maine Industrial Rail Access Program. Project examples include investment in new rail sidings to ship 75,000 tonnes of aggregate annually that would otherwise travel by highway. State support has also been used to provide new rail access to gravel pits.\(^{251}\)

A number of other examples of aggregates being transported by rail can be found throughout the US. Some of the largest aggregate producers in the US have described rail as a solution to delays caused by highway congestion or as a way of reducing negative responses from local communities. Martin Marietta Aggregates, the second largest aggregate producer in the US states on its corporate website that

> A major trend in the aggregates industry is the increase in long-distance shipments by rail, barge and oceangoing vessel. In 1994, approximately 93% of Martin Marietta's shipments were by truck and 7% by rail. In 2001, truck shipments were 77%, rail shipments were 15% and water shipments accounted for 8%.\(^{252}\)

GE Capital, which has extensive involvement with the aggregates industry, notes that more than 35,000 railcars currently serve the US aggregate market today and that rail transport is continuing to gain market share.\(^{253}\)

Hanson Aggregates, another top producer, states that they are increasingly relying on rail to avoid congested highways and reduce backlash from local communities. Hanson Aggregates recently transported one million tonnes of aggregate for the construction of Texas State Highway 130 by short rail over a distance of approximately 70 miles (113 km) to avoid the impacts of trucking on local communities and potential delays due to weather and traffic congestion. The job would have required 40,000 truck trips, but was achieved using 10,000 rail car shipments. Truck transport of up to 16 km was still required to move aggregate to the job site.\(^{254}\)

Rail transportation is also described as playing a key role in transporting aggregates in the state of Florida. A 2007 report by Lampl Herbert Consultants for the Florida Department of

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Transportation concluded that “efficient rail transport will continue to be the linchpin to providing crushed stone materials into Florida’s construction marketplace.”

Over 40% of Florida’s crushed stone is extracted from the Lake Belt District, a 57,515 acre area located outside of Miami. Lake Belt quarries are characterized as “mega quarries”, with their collective production averaging 50 million tonnes annually. 80 percent of the limestone produced in the Lake Belt is used for high-end applications requiring hard crushed stone. The superior physical properties of the limestone extracted in the Lake Belt District compared to limestone found in other areas of the state enable producers to export to other cities in Florida over a significant distance while still turning a profit. In most cases, long distance transportation of limestone is achieved by rail. A network of rail lines and distribution terminals are used to distribute crushed stone from quarries in the Miami area to Orlando and Jacksonville. The Lampl Herbert Consultants report provides some insight into why rail transportation is feasible in Florida:

Truck haulers charge about 30 cents a ton-mile. This covers fuel, labor, depreciation, loading and unloading times, traffic delays, and backhauling empty to the mine. For the Lake Belt, the delivered price of crushed stone doubles about every 23 truck-miles from a quarry. Thus, the fact that Lake Belt production far exceeds demand in its proximate markets means that other economic forces are at work e.g. higher quality [aggregates] and mega-mine efficiency.

New Hampshire Northcoast Railway transports aggregate over a distance of about 161 km to markets in Massachusetts. This method is described as more cost effective than trucking over the same distance, allowing New Hampshire quarries to be more competitive in the Boston area and removing approximately 100 aggregate trucks per day from the I-93 and I-95 highways, which run parallel to the rail line.

Capitol Aggregates in Texas currently transports 80% of the material produced at its Marble Falls Quarry by rail using a mile long, 100-car train. The 100 car train can be loaded within 6

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257 Ibid, 9

258 Ibid, 9

hours via a tunnel running underneath 6 different stockpiles, which enables blending of materials on site and requires only three staff to complete the loading process.\textsuperscript{260}

CSX Rail serves 18 quarries on its 21,000-mile network, which includes redistribution terminals throughout the northeastern US.\textsuperscript{261}

United Kingdom

Similarly to the US, rail transportation of aggregates in the UK currently accounts for a small component of overall transportation at 9% of the total.\textsuperscript{262} Transportation of aggregates by rail over longer distances is feasible in the UK for situations where high quality aggregates are not available locally.\textsuperscript{263} There also appears to be government support for increasing the amount of aggregate transported by rail where appropriate, as demonstrated in the examples provided below.

\textit{SAROS Paper 2: Future Aggregate Availability and Alternatives Analysis} points out that the UK’s Mineral Policy Statement requires local governments to recognize the relative environmental benefits of trucking over short distances compared with trucking over longer distances. However, the policy statement does not indicate that the environmental benefits of trucking aggregates from close-to-market exceed those of rail or marine alternatives. Efforts in the UK to improve capacity to transport aggregates by rail or marine suggest a growing preference for alternatives to trucking, at least in some scenarios. “Freight Facilities Grants” are made available from the UK government for the development of rail as well as marine infrastructure to divert freight traffic from roads. However, as of 2010 this program is currently under review and may cease depending on the outcome.\textsuperscript{264,265} In some cases, freight facilities grants have been used to develop rail infrastructure for the transportation of aggregates.\textsuperscript{266} The SAROS Consolidated Report prepared by MNR suggests that government intervention would be necessary to encourage a modal shift for the transportation of aggregates. The UK experience confirms this observation to some extent, but the US experience suggests that rail infrastructure for the movement of aggregates may be possible even in the absence of government support.

\textit{SAROS Paper 2} discusses the United Kingdom’s Minerals Policy Statement in its jurisdictional scan for other areas that follow a close-to-market policy, pointing to the policy’s recognition of the benefits of close-to-market sources over long distance trucking. This reference appears to

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\textsuperscript{260} Clines, Kerry. \textit{Rules for Rail: The key to successful rail distribution is communication - with the railroads and with customers}. July 1, 2010. \url{http://www.aggman.com/transportation-rail/}
\textsuperscript{261} CSX Rail. \textit{Maps/Locations - Aggregates Facilities}. n.d. \url{http://www.csx.com/index.cfm/customers/commodities/minerals/aggregates/mapslocations/}
\textsuperscript{263} British Geological Survey. “Transport Economics” \url{http://www.bgs.ac.uk/planning4minerals/Economics_8.htm}
\textsuperscript{264} UK Department of Transport. “Rail Freight Grants”, \url{http://www.dft.gov.uk/pgr/freight/railfreight/rfg/}
\textsuperscript{265} University of Leeds – Good Quarry Website. \textit{Alternatives to Road Haulage} \url{http://www.goodquarry.com/article.aspx?id=39&navig=9#alternatives.}
\textsuperscript{266} Practice, Scotland Freight Best. \textit{Freight Facilities Grants - What Can I Get}. April 2009. \url{www.freightbestpractice.org.uk}
\end{flushright}
recognize the benefits of short distance versus long distance trucking, but not that trucking is the preferred mode of transportation.

The UK’s Minerals Policy Statement also discusses the bulk transportation of minerals, setting out a policy that would:

seek to promote and enable the bulk movement of minerals by rail, sea or inland waterways to reduce the environmental impact of their transportation; promote facilities at ports and rail links that have good communications inland, so that bulk minerals can be landed by sea and distributed from ports, as far as is practicable, by rail or water; safeguard and promote rail links to quarries where there is potential to move minerals by rail.\[267\]

Similarly, SAROS Paper 2 discusses a preference for close-to-market mineral extraction and transportation in Scotland, pointing to Scottish Planning Policy 4: Planning for Minerals, which also supports the use of rail or marine transportation for minerals:

Where there are significant transport impacts on local communities full consideration should be given to the provision of routes that avoid settlements. Where rail, coastal or inland shipping are not viable alternatives to road haulage, the key issues are usually related to site access, vehicle control and monitoring under the conditions of the extraction site’s planning permission.\[268\]

Of note, Scottish Planning Policy 4: Planning for Minerals has since been superseded by a new policy statement that demonstrates further support for the transportation of minerals by rail or marine:

Extraction should only be permitted where impacts on local communities and the environment can be adequately controlled or mitigated. Wherever possible, haulage should be by rail, or coastal or inland shipping, rather than by road. Where there are significant transport impacts on local communities routes that avoid settlements as far as possible should be identified.\[269\]

The revised Scottish Planning Policy and the UK’s Mineral Policy Statement suggest that while close-to-market is supported in some scenarios, it is not the definitive management approach and rail and marine are seen as more desirable than transportation by road in some scenarios.

Lafarge UK has been making efforts to increase the amount of aggregates transported by rail, since the early 1980s. The most prominent example is the transportation of aggregates from Lafarge’s Mountsorrel Quarry in Lincolnshire, England. Lafarge operates an aggregates train


that connects to 12 commercial depots capable of supporting rail traffic. The most recent depot constructed in 2002 is expected to eliminate more than one million kilometres of truck travel per year. As of 2008, Lafarge was transporting 17% of the aggregates it produced globally by rail and marine. In 2009, Lafarge signed an agreement with Réseau Ferré de France, the company that owns and maintains the French rail network, to increase the amount of aggregates it transports by rail in France by 50% by 2010.

Rail Transportation over short distances

In 2006 the Environmental Commissioner of Ontario suggested that an improved provincial transportation policy is needed that encourages greater use of rail transportation. The ECO recommended that the government consider an approach to preserving and redeveloping railroad

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A report commissioned by the Ontario Ministry of Transportation and the Railway Association of Canada in 2007 concluded that the total economic and social benefit of Ontario’s short rail lines is up to $1.18 billion annually.\footnote{275}{Railway Association of Canada. \textit{Ontario’s Railway Ties - Economic Growth for a Greener Ontario (2008 Pre-Budget Consultation).} (2008), 1. \url{http://www.railcan.ca/documents/presentations/1674/2008_01_15_RAC_Pre_Budget_Submission_Government_of_Ontario_en.pdf}} The Railway Association of Canada’s 2008 submission to the Minister of Finance in pre-budget consultations argued that it is no longer sustainable to continuously expand Ontario’s road and highway network to move both goods and population.

While expressing skepticism about the benefits of moving toward a more rail based transportation scenario for aggregates, the authors of \textit{SAROS Paper 2} do indicate that some long distance transport of aggregate by rail or barge could be feasible, cost effective and environmentally sound. In particular, rail transportation over short distances involving smaller quantities of aggregate is described as being potentially viable.\footnote{276}{MHBC Planning, LVM-JEGEL and Golder Associates. \textit{State of the Aggregate Resource in Ontario Study Paper 2: Future Aggregate Availability and Alternatives Analysis.} (2009), 106. \url{http://www.mnr.gov.on.ca/stdprodconsume/groups/lg/@mnr/@aggregates/documents/document/stdprod_067830.pdf}} According to Statistics Canada data, Ontario already ships small quantities of sand, gravel and crushed stone by rail both within the province and to other jurisdictions. The average weight of aggregates transported by rail within the province was only 27,528 tonnes annually between 2001 and 2008.\footnote{277}{Ibid.} Currently, Ontario is exporting a much larger quantity of aggregates by rail to the United States; an annual average of 467,273 tonnes over the same time period.\footnote{278}{Ibid.}

A 2007 Report by the US National Highway Research Council entitled \textit{Rail Freight Solutions to Roadway Congestion} describes rail transportation over short distances as being potentially competitive with truck transport:

\begin{quote}
Multiple market segments are served by the trucking industry, not all of which are competitive with rail. Local and regional trucking accounts for most truck movements in
\end{quote}

\footnotesize
\begin{flushleft}
\begin{enumerate}
\item 274 Ibid.
\item 278 Ibid.
\end{enumerate}
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urban areas, and rail is competitive for almost none of this traffic (high-volume moves of sand and gravel, road salt, coal or oil products are the major exceptions).\textsuperscript{279}

In Scotland, short rail has been determined to be competitive with truck transport over short distances. Lafarge is currently using short rail to transport cement powder from its cement manufacturing site in the town of Dunbar to a processing plant and distribution site in Uddingsington, South Lanarkshire. Over the course of 2008, use of this transportation method allowed for 5,019 fewer movements of heavy vehicles, which reduced highway congestion and resulted in 722 tonnes of avoided CO\textsubscript{2} emissions.\textsuperscript{280}

### 7.6 Potential Co-Benefits of Rail Transportation

The development of infrastructure to allow for the transportation of aggregate over longer distances could also enable the use of some secondary materials that is currently not feasible. A 1991 study commissioned by MNR entitled \textit{Mineral Aggregate Conservation Reuse and Recycling} concluded that mine waste rock in particular would be of interest for use in construction applications if favourable transportation costs allowed for its use in Southern Ontario.\textsuperscript{281}

Many regions of Ontario were identified as having large quantities of mine waste rock at the time of this study in 1990. However, the study found that little use was being made of mine waste rock in Southern Ontario. The potential for mine waste rock with to cause environmental problems\textsuperscript{282} and the fact that much of the material is located in northern Ontario were listed as barriers in the MNR study.\textsuperscript{283}

The 2009 update of the 1991 study, prepared by JVM-JEGEL, indicates that efforts are still needed to develop technology and processes that will allow for the use of secondary and tertiary materials such as mine waste rock. Barriers to more widespread use in Southern Ontario, including co-mingling of good material with poor material and distance from suitable markets also remain.\textsuperscript{284}

The construction of railways uses considerably less aggregate than highway construction, raising the possibility that a focus on rail construction could reduce the cycle in which large quantities of aggregate are transported by road, increasing wear and tear on highways and the municipal road

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\textsuperscript{280} UK Department for Transport & The Scottish Government. \textit{Freight Best Practice Scotland Case Study - Short Haul Rail Freight on Track for Profits in Scotland}. \texttt{http://www.freightbestpractice.org.uk/scotland}.


\textsuperscript{282} Mine waste rock can contain arsenic or produce acidic leachate, resulting in contamination of soil, groundwater and surface water


network and thereby creating higher demand for aggregate. Rail ballast can also be recycled (by cleaning the material) and potentially either reused as railway ballast or in lesser applications where the quality of the stone is degraded by the cleaning process.285

While there would surely be some community impacts associated with increased aggregate extraction activity in Northern Ontario, greater use of these resources to serve high growth urban markets in Southern Ontario would bring increased economic benefits to the North. The Ministry of Northern Development and Mines has stated that rising demand for aggregates in the GTA area and in southwestern Ontario, in combination with the expense of developing aggregate extraction operations in Southern Ontario, creates significant opportunities for producers in Northeastern Ontario.286 In response to the conclusions of SAROS Paper 2 on transportation, the Niagara Escarpment Commission has commented:

One could argue that if alternative means were developed to transport the material [aggregates], there could be other jurisdictions that would benefit economically from the improved transportation infrastructure with less environmental cost if only resources could be brought to bear to locate alternative aggregate supplies outside the GTA and the NEP, which have been a source of supply for many decades.287

### 7.7 Current Policy Barriers to Rail Transportation in Ontario

It has been estimated that through payment of fuel taxes and licensing fees, the trucking industry pays for roughly 50-60% of its impact on the highway system. The Railway Association of Canada has suggested this creates an imbalance where the rail industry pays for the full cost of its supporting infrastructure, while highways are partially subsidized by the public. Ontario currently permits some of the heaviest trucks in North America to operate on its highways, resulting in more frequent repair costs.288 These repairs in turn generate demand for additional quantities of aggregate.

In the United Kingdom, the Aggregates Levy Sustainability Fund provides grants for shifting to rail from road transport. These are distributed through the Department of Transport, which oversees transportation related components of the Aggregate Levy Sustainability Fund.289

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As the province moves toward a longer-term aggregates management strategy, a wider variety of rail transportation scenarios over different distances could be investigated. However, this shift would require some changes in transportation policies to promote greater equity in the funding of rail and road transportation.

In 2006, the Environmental Commissioner of Ontario held a roundtable discussion aimed at establishing a vision for a long-term aggregates strategy to the year 2020. Rail and marine transportation of aggregates over longer distances was discussed during the roundtable, with participants generally agreeing that there are opportunities for aggregate extraction and shipping from Northern Ontario provided that social and environmental impacts are mitigated and the extraction process itself is regulated. Participants also suggested that this was primarily a long-term option and that plans would need to be put in place in the short term to protect existing transportation infrastructure as well as for future transportation corridors. Large volumes of aggregate would be required to generate interest within the rail industry. Industry stakeholders also noted that costs could increase substantially as a result of moving to rail transportation.

Stakeholder support for rail transportation in interviews conducted for this report was mixed. Some respondents were supportive of rail as a long-term option, while others pointed to issues identified in SAROS Paper 2: Future Aggregate Availability and Alternatives Analysis, such as the potential for increased costs and greenhouse gas emissions as a result of the remaining need to truck to aggregates to final destinations and other factors. However, the above review of aggregates transportation in other jurisdictions suggests that there is a wide range of opinions on transportation alternatives that warrant further examination prior to development of a long-term aggregates strategy for Ontario. In the United States, transportation of aggregates by rail appears to be viable in some cases, both with and without government intervention. In some parts of the UK, the development of transportation alternatives for aggregates appears to be an explicit policy goal.

Summary:

SAROS Paper 2: Future Aggregates Availability and Alternatives Analysis provided a much needed update to the last transportation analysis undertaken in 1980. However, results of the brief jurisdictional review of aggregates transportation undertaken in this report suggest the province should continue to explore transportation alternatives including long- and short-distance rail transport as well as marine transport, with a particular focus on developing rail transportation options as part of a long-term strategy. Participants in the Environmental Commissioner of Ontario’s 2006 Aggregate Round Table: Towards a Long Term Aggregates Strategy for Ontario agreed that while rail may not be economically realistic for the short-term it does warrant consideration as a component of a long-term strategy. Negative impacts of transportation alternatives, such as additional GHG emissions resulting from the construction of new rail infrastructure or upgrading of existing rail infrastructure to support the movement of

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291 Ibid.
292 Ibid.
aggregate from northern Ontario may be offset over the long term by reduced impacts of long distance trucking as high quality close-to-market aggregate reserves continue to decline. Additional benefits of this strategy may include reduced land use conflicts and resultant OMB hearings and increased economic growth in northern areas of the province. While some degree of trucking will be inevitable at the final delivery stage, implementation of best practices within the trucking industry could offset the impacts of trucking were movement of material from rail terminals to job sites is required.

Continued analysis of transportation alternatives should include a jurisdictional review of aggregates transportation, for example an in depth review of rail and marine supporting policies such as the UK Minerals Policy Statement and Scotland’s Minerals Planning Policy Statement. Rail transportation should also be assessed in a broader discussion of costs and benefits, for example the potential co-benefits listed above. Other factors such as relative maintenance costs, for example repaving of roads along aggregate truck haul routes versus replacing rail ballast (both in terms of frequency of maintenance required and impact of the maintenance process itself) could also be included in future analyses. Rail or marine transportation could also be considered for the provision of skid-resistant aggregate to high growth areas where it currently needs to be trucked over distances well above the current average distance for close-to-market transportation.

Generally speaking, Ontario’s rail transportation network has continually declined as a viable mode of freight transportation. Provincial funding schemes need to be rebalanced to promote the improvement and expansion of the provincial rail network.293

A lack of publicly available information on the aggregate industry has played a role in creating a challenging relationship with the public and municipalities. A more detailed data set to improve understanding of how materials currently move from pits and quarries to markets, such as that provided through MTO’s Paver of the Year Awards, could improve management of the resource. Currently, there is no means of scrutinizing how much aggregate is transported where, making assumptions around close-to-market difficult to challenge.

**Recommendations:**

**Continue to investigate long-term alternatives to close-to-market aggregate extraction supported by truck transportation.** MNR, in collaboration with MTO, should lead research into using rail transportation from as a long-term option for the movement of aggregates to high demand areas. This research should include an analysis of various transportation alternatives that will take into account a broad range of costs and benefits including social and economic

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293 The Railway Association of Canada has previously provided recommendations of this nature for Ontario which include “The Province of Ontario should enter into a shared funding agreement with the Government of Canada and Ontario’s Short Line industry to establish an infrastructure program for the renewal of basic rail infrastructure; The upgrading of track, beds and bridges to accommodate the current North American standard of 286,000 lb. car loading weights and to operate at commercially suitable speed; and The construction of sidings and reload centers in communities served by Ontario’s short line and regional railways” Source: 
benefits and environmental factors. This research should inform the eventual development of a provincial rail strategy.

**Improve knowledge of how different types of aggregate are used and how they move from the extraction site to the job site.** MNR, in collaboration with TOARC and OSSGA, should make information on annual tonnage and transportation routes of existing operations available to municipalities and to third party bodies.
8. Conclusions

An overview of the history of aggregates policy in Ontario demonstrates that the aggregate industry in the province, in partnership with MNR, has made substantial progress in some areas. These areas include increasing the aggregate licence fee and royalty rates and extending the geographic area covered by the ARA in 2007, providing an updated SAROS in 2009, acknowledging staff capacity limitations and proposing measures to improve rehabilitation. However, the results of this research suggest that some aspects of the ARA and other elements of the policy framework for aggregates need to be improved.

One of the overarching issues in the province is government capacity to enforce the existing aggregates program requirements; an issue that has been documented extensively by the Environmental Commissioner of Ontario. This could be remedied in part by establishing a royalty structure for aggregates that allows for continued economic growth but also better represents the social and environmental impacts associated with aggregate extraction in the province. A review of other jurisdictions has determined that price increases, in combination with landfill taxes that act as disincentives to the waste of useful materials, have been at least partially responsible for major successes such as increases in recycling, implementation of transportation alternatives and the funding of additional research into best practices seen elsewhere and in particular in the United Kingdom.

It is also clear that proposed licences for additional extraction will likely meet with ongoing resistance in years to come in communities within the Greater Golden Horseshoe region of Ontario, as a result of the changing values and demographic makeup already underway. As a result, the province should begin to reconsider its aggregate transportation strategy to encourage a more significant amount of rail freight capacity. Other jurisdictions such as the UK have acknowledged shifting societal values and reflected this both in the price of virgin aggregate and by encouraging some infrastructure choices such as rail and marine transport of mineral aggregates.

Information gaps and a general lack of publicly accessible information are both barriers to improving Ontario’s current aggregate extraction, transportation, usage, recycling and rehabilitation practices. This has been discussed to some extent in SAROS Paper 4, which dealt with recycling, but numerous other information needs remain. Some information currently considered proprietary would be useful to inform urban planning and design, planning decisions and operations under the close-to-market model as appropriate. In particular, information on the demand, end uses and materials flow of aggregates in the province could form an information baseline for furthering the Aggregates Conservation Strategy. Detailed, publicly available information concerning the entire lifecycle of aggregate resources in the province is essential to establishing best practices. Measures need to be taken to ensure that all necessary information required to develop a provincial aggregates strategy becomes available for analysis by interested stakeholders, while protecting industry interests at the same time.

2.5 MINERAL AND AGGREGATE RESOURCES

ISSUE: Although the PPS 2005 recognizes that protecting natural heritage is necessary for Ontario’s long term prosperity, environmental health and well being, natural heritage is not always accorded value equal to that placed on other provincial interests.

Specifically, aggregate extraction receives extraordinary priority over all other interests, since no demonstration of need is required when considering pit and quarry applications. The requirement to ensure aggregate is available as close-to-market as possible has led to incredible pressure in municipalities in the Greater Golden Horseshoe (GGH) and the lack of requirement for recycling or reusing aggregate has resulted in few operators developing a sustainable aggregate policy to guide their operations. As well, the allowance for aggregate extraction on prime agricultural land continues to damage and destroy areas that should be used for food production and the provisions of ecosystem services.

The PPS 2005 also refers to the “interim nature” of aggregate extraction, a misleading term that ignores the long-term environmental damage that this activity causes. Finally, with no clear emphasis on end use and rehabilitation, pits and quarries are often left open for years on end, disrupting the ecological function of natural heritage features and systems.

Policy 2.5 of the PPS should be amended to achieve a more sustainable balance of aggregates extraction with other land uses by:

- requiring that the need for virgin mineral aggregate resources be demonstrated, given the priority on recovered and recycled aggregates;
- removing the requirement that mineral aggregate resources be made available as close to markets as possible;
- requiring provincial and regional provision for the recovery and recycling of aggregate resources to ensure conservation;
- removing language that suggests that aggregate extraction is an interim land use;
- prohibiting aggregate extraction on prime agricultural lands; and,
- strengthening wording to ensure that adequate progressive and final rehabilitation takes place within a reasonable period of time determined in consultation with the host municipality.
RECOMMENDATION: Amend policy 2.5.2.1 to read as follows:

2.5.2.1 Demonstration of need for virgin mineral aggregate resources shall be required prior to any new or expanded extraction of mineral aggregate resources. Aggregate producers shall be required to provide information on the suitability of alternatives to meet demands.

Prior to any new or expanded extraction of mineral aggregate resources, any sources of recovered or recycled mineral aggregate resources shall be considered to ensure the conservation of mineral aggregate resources.

Municipalities shall accommodate aggregate recycling facilities where appropriate.

RECOMMENDATION: Amend policy 2.5.3.1 to read as follows:

2.5.3.1 Progressive and final rehabilitation shall be required to accommodate subsequent land uses and promote land use compatibility. Final rehabilitation shall take surrounding land use and approved land use designations into consideration, and maintain and add ecological services wherever possible.

Measures shall be put in place to monitor progressive and final rehabilitation and ensure that they are carried out within a reasonable period of time determined in consultation with the host municipality. Measures should include the posting of a rehabilitation security deposit to be returned only when rehabilitation has been judged to be sufficient.

RECOMMENDATION: Amend policy 2.5.4.1 to read as follows:

2.5.4.1 Extraction of mineral aggregate resources shall not be permitted on prime agricultural land.

The Collaborative’s submission to the Ministry of Municipal Affairs and Housing can be read in its entirety at:

http://www.citizensenvironmentalliance.org/pdf/Submission%20of%20Planning%20for%20Sustainability%20101029.pdf
Appendix B: Summary of Key Findings and Recommendations from MNR’s Review of the *Aggregate Resources Act* With Respect to “Rehabilitation of land from which aggregate has been excavated” (2006)

In accordance with the EBR, MNR undertook a review and the review has concluded that:

- The fundamental principles of the ARA, and the specific sections of the Act, provide a solid foundation for achieving the purpose of carrying out progressive and final rehabilitation of aggregate sites.

- The ARA has the enforcement tools necessary for aggregate inspectors to ensure that progressive rehabilitation is carried out according to the ARA, the regulations, the site plan, and the condition(s) of the licence or permit. The tools available include the use of suspensions, charges, and subsection 48(2) Minister’s Orders (the latter being the preferred method to enforce the aggregate industry’s requirement to perform progressive rehabilitation);

- Although there are many examples of companies performing excellent progressive rehabilitation, it is apparent that a significant component of the aggregate industry is not making sufficient efforts to progressively rehabilitate their aggregate sites as evidenced by an inventory of licences conducted on the Oak Ridges Moraine and from discussions held with aggregate inspectors.

The report recommends for sites, where the site plan does not have specific requirements to progressively rehabilitate or is sufficiently vague or too flexible as to render the plan unenforceable, the use of site plan amendments to more definitively establish the timing of rehabilitation requirements for some sites;

- Newly disturbed area has exceeded the area rehabilitated for the ten-year period examined but not to the extent (2:1 ratio) alleged by the applicants. The review applicants’ analysis did not consider all extenuating factors including regulating additional areas of the province disturbed prior to being regulated under the ARA, lack of integrity in the data (i.e. unreliable/unsustaintiated), and the failure of rehabilitation data to capture licences surrendered within a calendar year. MNR believes that the statistics do not indicate a significant increasing trend in disturbed area over the past ten years once all relevant factors are considered. However, the extent that these individual factors affected the actual ratio is uncertain, as MNR did not maintain a statistical database to document areas disturbed at the time the sites were designated under the ARA;

- MNR, in collaboration with key stakeholders, will examine in detail, within 2 years, the merits of a rehabilitation incentive system, including the re-introduction of the former rehabilitation security deposit system.
There has been a lack of rehabilitation of revoked sites being performed by TOARC. The existing authority under the ARA or within the MNR/TOARC agreement (hereinafter referred to as the Indenture Agreement) does not allow MNR to direct TOARC or the Management of Abandoned Aggregate Properties (MAAP) program staff to undertake rehabilitation of specific sites. MNR has been assured by the Board that TOARC will be rehabilitating more of these sites in the future. The report recommends that MNR continue to monitor the rehabilitation efforts of sites where licences have been revoked, and if required, seek an amendment to the Indenture Agreement (including whether the current governance structure of the Board is appropriate), to ensure that satisfactory results are achieved, in cooperation with TOARC and the OSSGA.

The allegations that the transparency of The Ontario Aggregate Resources Corporation (TOARC) is not adequate and that MNR’s partnership with TOARC violates MNR’s SEV for openness, were both determined to be unfounded. TOARC is transparent in its dealings under the ARA and in its relationship with the MNR. This relationship is not in violation of the Ministry’s SEV. TOARC’s Board of Directors (consisting of eight members representing a variety of interest groups) publishes quarterly reports and an annual report with respect to the Corporation and the Trust in accordance with an Indenture Agreement. TOARC also produces an annual report regarding the Abandoned Pits and Quarries Rehabilitation Fund, known as the MAAP program. MNR recognizes and supports the need to ensure transparent public access to information and data about environmental performance. The report recommends that MNR seek an amendment to the Indenture Agreement to ensure transparent public access to as comprehensive a range of information and data as possible by applying the principles of the Freedom of Information and Protection of Privacy Act (FIPPA) to all TOARC Board decisions (including how sites are evaluated and selected for rehabilitation). In addition, public transparency may be further increased by broadening the partnership with the scientific, research and technical communities.

The existing rehabilitation data does not allow MNR to accurately analyze the effectiveness and efficiency of the existing management of rehabilitation efforts across the province. The report recommends changes to improve the reliability of the data including recommendations related to:

- more education and training for industry;

- establishing mechanisms for data sharing between TOARC and MNR;

- the creation of base-line data;

- the use of new technologies (i.e. GIS technology, satellite imagery) to determine landscape changes (i.e. disturbed area) within licenced and/or permitted sites and to track those changes over time. A pilot project will be established for sites within the GTA, by April 1, 2007;

- the feasibility of developing an electronic filing system for the compliance assessment reports and improving efficiencies to data management for new licence and permit
applications and existing reporting requirements under the ARA (e.g. production, rehabilitation) by April 1, 2007; and

- developing mechanisms by April 1, 2006 to improve the accuracy of reported rehabilitation information including the merits of requiring licencees and permittees to annually report (i.e. rehabilitation report) on their compliance with respect to their rehabilitation requirements.

- Transparent public reporting plays a key role in driving the transition of companies, industries, and economies towards the ultimate goals of continuous improvement and sustainable development. This strategy should also increase industry awareness of their responsibilities and act as a deterrent to those poorly performing members of the aggregate industry. The report recommends the creation of a central database of sites where rehabilitation orders have been issued and for MNR to provide a list of these sites on their Internet website, by December 2006.

- Additional matters for improvement will be considered by the government including options to address limited (and decreasing) capacity (staff and support dollars), which has challenged the ministry’s ability for inspection and enforcement obligations. To be effective, an integrated environmental compliance assurance strategy must maintain a strong abatement and enforcement presence and be backed up by the threat of credible enforcement action. Amendments to the ARA and the regulations may also be required, depending on which options are implemented to promote/ensure rehabilitation, and improve its reporting monitoring and enforcement. MNR will undertake an assessment of its capacity for monitoring and enforcement including ensuring the rehabilitation of sites by April 1 2007.

- MNR is more actively issuing orders and shifting the focus to rehabilitation as a priority. For example, in fiscal years 2003-2004 and 2004-2005, 15 and 26 rehabilitation orders were issued, respectively, in contrast to the previous year when only 4 orders were issued. However, even without solid data, it can be argued that many more rehabilitation orders are required.

Recent government initiatives such as the policies of the ORMCP and the Greenbelt Plan, which require strict adherence to enhanced rehabilitation standards including maximizing rehabilitation areas and minimizing disturbed area on an on-going basis during the life-cycle of aggregate operations, and determining the maximum allowable disturbed area for each of the existing 88 mineral aggregate operations within the Protected Countryside Area of the Greenbelt Plan, demonstrates the governments’ renewed commitment to rehabilitation and ensuring the protection of the environment. MNR has also recently implemented a new compliance leadership model that will improve how MNR carry out compliance activities and realign enforcement services to support government priorities and the strategic direction and priorities outlined in MNR’s “Our Sustainable Future” document. Changes to be implemented include: establishing an integrated “Compliance Steering Committee” and the development of an improved framework to support risk-based compliance planning. Better risk assessment will ensure enforcement resources are focused and in support of MNR’s strategic priorities.
Complete list of recommendations made in MNR’s Review:

1. Effective immediately, Aggregate inspectors, through reinforced policy direction, be directed to determine what progressive rehabilitation, in accordance with the site plan, is being performed whenever they are inspecting a pit or quarry to ensure compliance with the Act, the regulations (including the Aggregate Resources of Ontario Provincial Standards (AROPS)), the site plan, and the conditions of the licence.

2. Effective immediately, Aggregate inspectors, when determining inspection priorities, will include sites with historical rehabilitation compliance issues and/or sites with significant portions of the site disturbed as a priority.

3. Effective immediately, Aggregate inspectors, when carrying out the process for approving and/or reviewing a site plan for a new application, will ensure that progressive rehabilitation of the site is clearly illustrated and/or described on the plan and the disturbance of site is minimized.

4. Effective immediately, Aggregate inspectors, undertake a review of the existing site plan while performing an audit of a site, will determine whether the requirement to progressively rehabilitate the site is enforceable. For problem sites, where the site plan does not have this specific requirement or is sufficiently vague or too flexible as to render the plan unenforceable, MNR will initiate a site plan amendment request.

5. The Greenbelt Plan will be treated as a pilot area to assess whether the approach should be applied province-wide (to all existing aggregate operations).

6. Effective immediately, information obtained during an audit by MNR of the annual Compliance Assessment Reports or an inspection of a site will include the verification, by the aggregate inspector, of progressive and final rehabilitation and the disturbed area of the site.

7. MNR will establish a protocol, in co-operation with TOARC, by April 1, 2007, to transfer the information referred to in the recommendation above to TOARC.

8. MNR, in collaboration with the OSSGA and TOARC, will continue to educate and train the aggregates industry regarding the importance of providing accurate rehabilitation information and the legal consequences for failing to provide that information.

9. MNR, in consultation with the OSSGA, will develop mechanisms, by April 1, 2007, to improve the accuracy of reported rehabilitation information including the merits of requiring the licencee/permittee to submit an annual rehabilitation report.

10. MNR will explore the feasibility of developing an electronic filing system for compliance assessment reports (CARs) and improving efficiencies to data and information management for new licence and permit applications and existing reporting requirements under the ARA (e.g. production, rehabilitation) by April 1, 2007.
11. MNR will incorporate the use of new technologies (e.g. GIS technology, satellite imagery) to determine landscape changes (i.e. disturbed area) within licenced/permitted sites and to track those changes over time. A pilot project will be established for sites within the GTA by April 1, 2007.

12. MNR will work with TOARC to conduct more research and education regarding techniques to promote better rehabilitation of pit and quarry sites (e.g. more efficient or effective techniques or materials, cost saving methods).

13. MNR has, and will continue to enhance their role in research initiatives (e.g. improved database system, promoting rehabilitation) by maximizing opportunities to partner with TOARC and the scientific, research and technical communities.

14. MNR and TOARC will establish a formal cooperative approach, as soon as practicable, to improve information management systems including the creation of base-line data, ensuring compatibility of the data and the ability to generate data to monitor and promote rehabilitation.

15. Effective immediately, Aggregate inspectors will be directed to continue to issue subsection 48(2) rehabilitation orders, where applicable, as a priority when inspecting aggregate operations.

16. MNR, in collaboration with TOARC and the OSSGA, will continue with the recent enhanced efforts to educate and train the aggregates industry regarding the importance of performing progressive rehabilitation, methods to enhance rehabilitation and the legal consequences for failing to perform the required rehabilitation.

17. MNR will create a central database of sites where a rehabilitation order has been issued and provide a list of those sites on their internet website, by December 2006.

18. MNR will immediately undertake an assessment of its capacity for monitoring and enforcement including ensuring the rehabilitation of sites.

19. MNR, in collaboration with key stakeholders will examine in detail, within 2 years, the merits of a rehabilitation incentive system including the re-introduction of the former rehabilitation security deposit system.

20. MNR will seek an amendment to the Indenture Agreement (and legislative amendments, if required), as soon as practicable, to ensure that the protection of source water is included as one of their selection criteria for rehabilitation candidates under the MAAP program.

21. MNR will continue to encourage TOARC to perform more rehabilitation of revoked licence and permit sites.
22. MNR will continue to monitor TOARC’s rehabilitation efforts of sites where licences have been revoked and if required, seek an amendment to the Indenture Agreement (including whether the current governance structure of the Board is appropriate), to ensure satisfactory results are achieved.

23. MNR will seek an amendment to the Indenture Agreement to ensure transparent public access to as comprehensive a range of information and data as possible by applying the principles of FIPPA to all TOARC Board decisions (including how sites are evaluated and selected for rehabilitation), in co-operation with TOARC and the OSSGA.

24. MNR (through MNR’s representative on the Board and staff liaison) will ensure that TOARC makes greater efforts to educate the public and stakeholders regarding the trust’s rehabilitation efforts and to publicize (e.g. news releases, educational videos for schools, website) their results.

25. The government will explore the feasibility of designating, by regulation, under the ARA all significant aggregate resource areas in Ontario (i.e. non-designated private land) as soon as is reasonably possible to create a “level” playing field and to ensure rehabilitation requirements and environmental safeguards under the ARA are applicable throughout the province.