

Biodiversity Offsetting: Opportunities and Challenges

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Aggregate resources are often located in, or near, areas that have environmental features. The potential conflict between aggregate resources and environmental values is a challenge that many applications inevitably face, particularly as legislation and policy continue to evolve.

In many cases there are opportunities to plan and manage extraction using innovative and creative techniques such as biodiversity offsetting to mitigate potential environmental impacts. Biodiversity offsetting has become a popular topic in the planning and conservation community and there are precedents that prove that this technique can work effectively to achieve results for both the aggregate industry and for environmental protection.

Offsetting, or compensation, may occur under an environmental assessment process as well as through the municipal land use planning process.

This presentation focuses initially on the opportunities and challenges in the context of the land use planning process in Ontario and then focuses on the practical opportunities and challenges as experienced in an aggregate extraction project in the Township of Clearview in the County of Simcoe.

The municipal planning framework for biodiversity offsetting is not explicitly set out in guiding legislation and policy other than for very species matters governed by the federal and provincial government (fisheries and threatened and endangered species). Currently, the opportunity for offsetting arises from the policy language of the Provincial Policy Statement 2014. This may change as the Province continues policy development. For example, Ontario is considering specific legislation and policy which may establish a No-Net-Loss approach to the management of remaining wetlands.

Due to a prohibition on any development within provincially significant wetlands, federal jurisdiction over fisheries and provincial jurisdiction in regard to endangered and threatened species, a municipal planner is limited to consideration of offsetting for a specific set of natural heritage features:

- Components of a municipally identified natural heritage system
- significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E
- Significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River)
- Significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River)
- Significant wildlife habitat
- Significant areas of natural and scientific interest; and
- Coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b) (Ministry of Municipal Affairs and Housing, 2014)

However, provincial policy sets out the minimum requirements for natural heritage system planning. Municipalities may also elect to broaden those requirements and set out policies for the protection of regionally and locally important features that are not covered by Provincial Policy Statement 2014 (e.g. locally significant wetlands). In these instances, the municipality may also set out policy with regard to the utilization of offsetting in relation to the planning process protecting those local features.

The determination of whether or not to utilize offsetting as a tool is fundamentally impacted by such matters as:

- The policies, programs and interests of other agencies such as Conservation Authorities;
- The nature and sensitivity of the feature or function being impacted;
- The scale and nature of the potential impact proposed to be offset;
- Community interests and acceptance; and,
- The feasibility of offsetting or likelihood of success.

Despite the potential range of situations in which offsetting may be a potential tool, policy should set clear limits. There are situations where the feature or function being impacted is of such significance, or sensitivity, that it should not be subject to impact. There are other situations where the full extent of impacts cannot be mitigated or offset.

A precautionary principle approach suggests that offsetting should not be utilized if there is any significant doubt as to the suitability of offsetting.

Offsetting can be a very useful tool in the management of natural heritage systems. It can offer flexibility and responsiveness to changing conditions. It can provide for significant gains to the quantity and quality of the natural heritage system. However, it is also potentially problematic in regard to effective implementation and achieving the ultimate objectives and goals of natural heritage system protection.

There are some fundamental guiding principles, such as those set out in the Best Practices Guide to Natural Heritage Systems Planning that can assist a municipal planner in making the determination of whether or not to utilize offsetting. These include:

- Only consider offsetting if avoidance and mitigation have been fully explored, are not feasible, and there is a public interest which suggests that proceeding on the basis of offsetting is preferable over denying a development or site alteration approval.
- Due to the risks of the offsetting approach, there should be a compelling reason to utilize it.
- Strong policies guiding the acceptability of offsetting are essential, and the municipality, and other approval authorities, should ideally maintain control over the determination of acceptability of the technique.
- Offsetting should only be utilized on the basis of a significant net gain.

The determination of the suitability of an offsetting proposal should be based on a full understanding of:

- The features and functions which will be lost;
- Their significance in the natural heritage system in terms of quantity, quality and function;
- The proposed replacement features and functions;
- The potential significance of the proposed offsetting features and functions in terms of quantity, quality and function.

An in-depth understanding of what will be lost and what will be gained is essential to decision making.

The approval of a large quarry expansion located on the Niagara Escarpment in the Township of Clearview provides an example of the opportunity to effectively employ offsetting while at the same time managing risks.

This project was subject to intense scrutiny and involved a year long hearing as well as a judicial review during which the issue of the appropriateness and checks and balances of an offsetting proposal were fully explored.

While there were a number of environmental features potentially impacted by the proposal, one of the more significant features in a hardwood forest, part of which could be avoided in the quarry design, but some of which would be lost and could not be subsequently rehabilitated since extraction below the water table was being proposed.

In this case municipal policy specifically permitted consideration of offsetting, or compensation, but only on the basis of a net gain approach.

The loss of portions of a woodland for an aggregate project was offset through the creation of a much larger contiguous woodland area. This included a planned approach to filling gaps in the contiguous woodland to reduce edges and increase interior forest habitat as well as the establishment of enhanced woodland connections or corridors.

The municipality was also provided with a ½ cent per tonne of aggregate extracted from the full quarry site to facilitate tree planting throughout the township as well as another ½ cent per tonne to fund an environmental land acquisition project.

To minimize the risk the municipality utilized performance standards and triggers.

The woodlands to be removed were incorporated into a latter phase of extraction. Prior to actual removal, however, the operator was required to demonstrate that offsetting forest creation efforts were succeeding through meeting specific performance measures regarding tree growth, species diversification and other considerations.

This did not entirely eliminate the risk, but it significantly minimized it.

It was not possible to delay removal until a mature woodland was in place, however phasing did allow for a sufficient period of time to allow a reasonable level of confidence that offsetting works had a high probability of success. This approach also ensured that the planting program would be fully completed and monitoring and maintenance were well under way prior to any woodland loss.

This technique does have limitations and the municipality also therefore approved an adaptive management plans approach which allowed for adjustments to ensure that offsetting objectives were met by:

- Adjusting the offsetting proposal to respond to changes in conditions; and/or
- Adjusting the project to avoid or mitigate impacts where offsetting results are not being achieved.

The aggregate proposal is now fully approved and extraction has commenced. The approval of the project also initiated the offsetting process including the creation of the woodland features. Since extraction within the woodland required that the woodland offsetting work be demonstrated to be effective, there is a significant effort under way to ensure that the offsetting project is successful and will meet the requirements stipulated to allow removal of the existing woodland area. This effort has demonstrated some of its own challenges and opportunities.

The targets that were established for the offset forest pertained specifically to the canopy. Prior to removal of the existing forest the offset forest was required to meet 95% canopy closure at a height of 10m with no more than 15% mortality. Due to the phasing of extraction these targets have a relative timeframe of 10-15 years. In addition, some of the species, included to enhance forest diversity, tend towards slow growth rates.

The limited timeframe to achieve substantial growth meant that typical aggregate rehabilitation models were insufficient. The installation of large quantities of large wire basket or balled and burlapped material was cost prohibitive and difficult to source. This led to the adoption of standard nursery production techniques to expedite growth. This included: vegetative suppression to reduce competition, fertilization, stimulation pruning, irrigation and insect control.

Plant selections included 25mm caliper whips, 40-60cm seedlings and 20-40cm coniferous seedlings. The disparity in sizes was partially to control costs and partially to facilitate different success rates of species regarding rooting habits and structure. Planting was conducted using a three-point hitch shoe plow pulled along straight, 2.5m offset rows. This technique was adopted to take advantage of narrow planting windows and because the area to be planted were agricultural fields. The result was a structured, nursery plantation along one axis to help in growth stimulation and a randomised appearance on the perpendicular axis due to modulation of planting spacing.

The ultimate success of these technique cannot be determined this early in the process, but growth rates in local nurseries are such that material is unsaleable after 10 years due to its excessive size. Some implications are observable at this point nonetheless.

- 1) Thorough understanding of transplant methods needs consideration during the design phase to account for varying success rates between methods.
- 2) Expediting growth of any species in an exposed, harsh environment requires intensive management and innovative techniques for integration.
- 3) Plantation style (uni-dimensional conformity) is absolutely critical to managing the juvenile trees to ensure survival and spur growth.

- 4) Trees are living organisms and effective supply chain management is imperative to securing quality material. Material needs to be sympathetic to the local conditions and arrive in vigor as no management method is sufficient to expedite growth of sub-optimal material.



Figure 1: Field Planted in Nursery Rows

As land use activities continue to interact with the natural environment, offsetting and compensation will continue to be techniques employed to maintain or ideally enhance the natural environment. Offsetting presents opportunities both at the policy and approvals stage, as well as in the implementation of approved offsetting plans. Continued refinement of policy and techniques, and monitoring of results, will inform the process and ensure that we actually achieve the objective of net gain.

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