The Protection of Wetlands through Ontario's Drainage Act

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Abstract

The protection of wetlands through the Ontario Drainage Act *has been the subject of much debate. While seen as essential for increasing production and/or productivity of agricultural areas, drainage schemes have been approved at the expense of wetlands. Despite the Act's referral process to prevent significant loss of wetland area, incremental losses continue to occur. The referral process includes landowners, drainage engineers, drainage superintendents, local conservation authorities, and Ministry of Natural Resource officials. This research examines the recommended mitigation measures and wetland gains/losses in Zorra Township between 1978 and 1998. Data collection includes drainage files, wetland evaluation files, aerial photography, and interviews with government officials. The results indicate that while recommended mitigation measures of drainage schemes in the vicinity of wetlands have increased, incremental losses continue to occur. The negotiated settlements among drainage engineers and the referral agencies appear to be inadequate in terms of maintaining wetland areas.*

Introduction

Land drainage is an essential component of agricultural activity throughout the world. The intent is to increase the production and/or productivity of the land. However, many drainage schemes, which have been approved by provincial government agencies, have contributed to the loss of wetland areas in Ontario (Snell, 1987). While the approval of an individual drainage work may appear insignificant, the cumulative impact of these decisions results in significant losses of wetland area and functions (Hill, 1976; Spaling and Smit, 1995). The objective of this paper is to review the decision-making process for the approval of municipal outlet drainage in Ontario. A case study of Zorra Township provides insights into the process (Figure 1).

Agricultural Drainage

In 1972, a Select Committee reviewed the Ontario *Drainage Act*. The Committee made several recommendations including the need to incorporate environmental impact statements and benefit-cost analysis into municipal outlet construction and major repair proposals. However, the government chose not to accept them for petition (Section 4) and major repairs (Section 78) drainage works. Section 4 and Section 78 are the most frequently recommended drainage types because of a 33 1/3% grant that is returned to farmers to recover some of the costs associated with drainage improvement. Instead of requir-

ing that proponents provide an environmental impact statement and benefit-cost analysis, the government established a referral mechanism to those agencies that have an interest in wetlands (Figure 2).

Figure 1. *Zorra Township Provincially and Locally Significant Wetlands.*

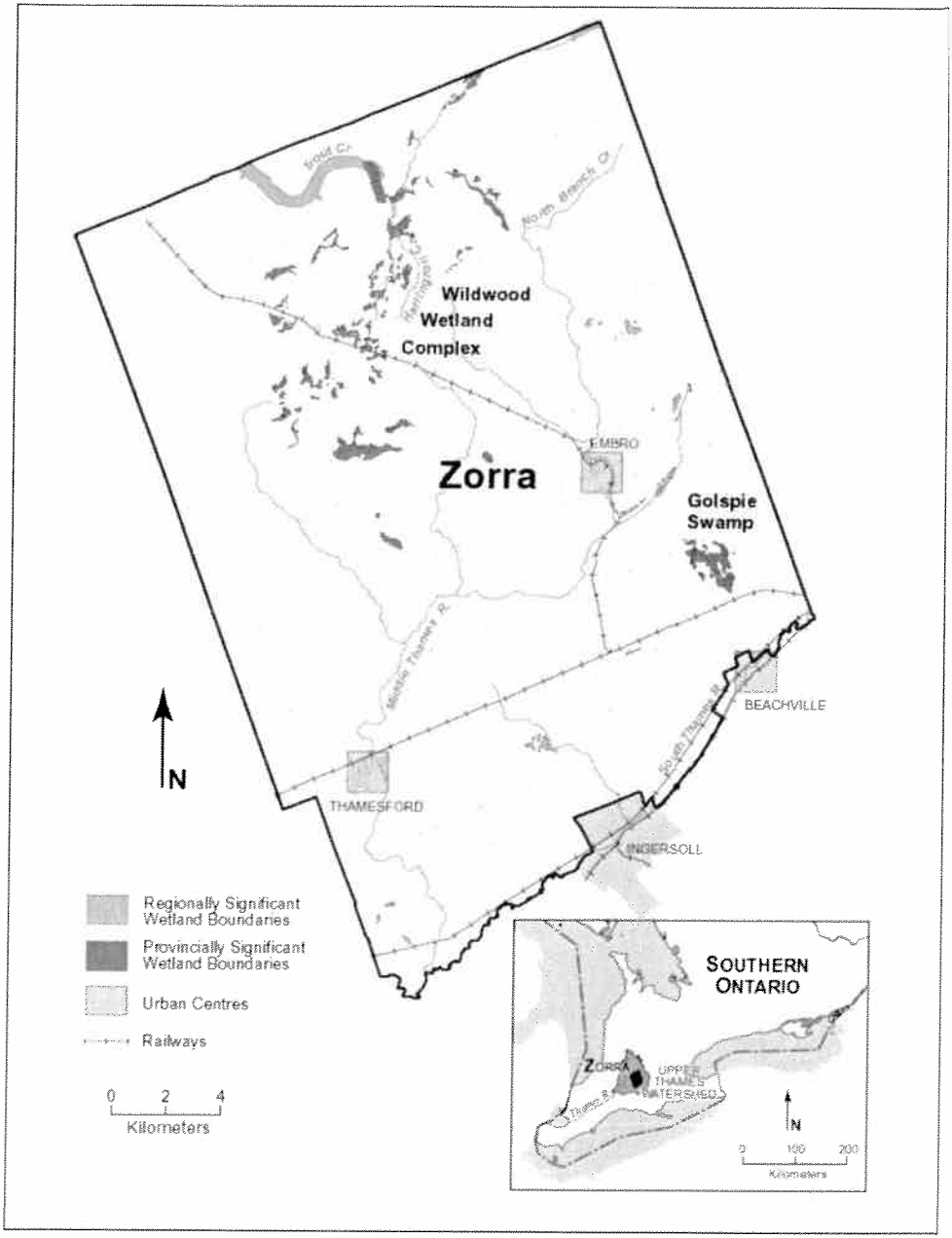
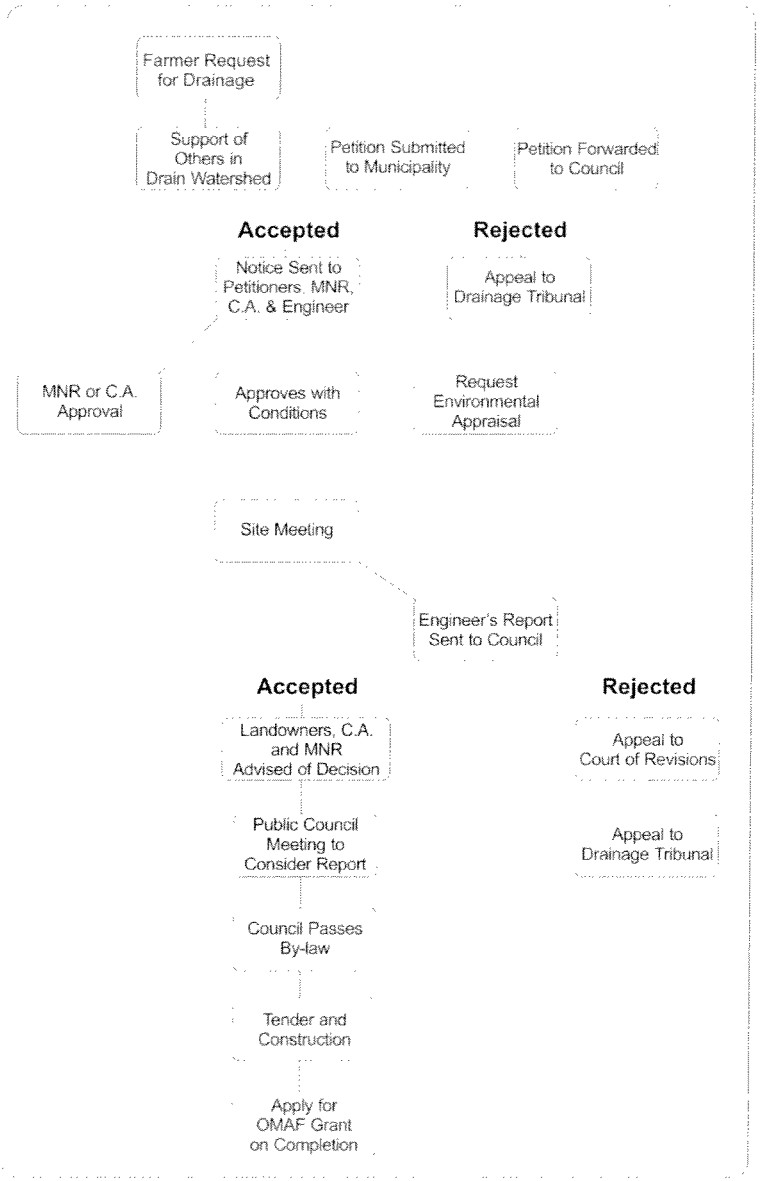


Figure 2. *The Ontario* Drainage Act *petition and major repairs approval process.*



Petition drains (Section 4) and major repairs (Section 78) are initiated primarily through a letter to Council requesting improved drainage at a specific location within the Township. Council has the option to accept or reject the request, however during the 20-year study period, no petitions were rejected. An engineer is appointed to coordinate the drainage work. Notice of accepting the petition is forwarded to the landowners within the drainage area, Drainage Superintendent and the referral agencies, which are the local Conservation Authority (CA) and Ministry of Natural Resources (MNR). In Zorra

Township, the Upper Thames River Conservation Authority (UTRCA) is the local CA. These agencies have the opportunity to identify any concerns they may have with respect to the drainage scheme. The engineer arranges a site meeting, and notifies the landowners, drainage superintendent, and referral agencies. The purpose of the site meeting is to discuss the drainage location and design. It also provides an opportunity for the referral agencies to identify any concerns. After the site meeting, the engineer writes the engineer's report, which includes the drainage location and design. The engineer's report is forward to the landowners, council, drainage superintendent and referral agencies. While the *Drainage Act* does not require that the MNR be notified of the completed Engineer's Report, the drainage superintendent would forward a copy to the local office. Barring any objection to the proposed drainage location and design, the report is read at a council meeting for discussion. It is at this time the general public can comment on the proposed work. If there are no appeals, a by-law is created. At this point the tenders for construction are reviewed, followed by the construction and subsequent grant for farmers. The purpose of the research is to assess how effective this process is in protecting wetlands.

Wetland Protection

The Ontario government has sent mixed messages about the protection of wetlands by excluding agricultural drainage from the current *Provincial Policy Statements (PPS)*. On the one hand, provincially significant wetlands are protected against urban development through the *Planning Act*, and *Environment and Natural Heritage Provincial Policy Statement*. Planners are to "have regard" to the list of PPS (Stadel *et al.*, 1995). The policy statement attempts to ensure there is no loss of provincially significant wetlands, and it encourages protection for locally significant. On the other hand, drainage schemes are not considered development; as a result provincially and locally significant wetlands are provided no official protection status under the Ontario *Drainage Act*. Instead, the previously discussed referral process is intended to protection Ontario's remaining wetland areas that have been identified through the *Ontario Wetland Evaluation System*.

The *Ontario Wetland Evaluation System* is a mechanism to quantify and rank wetlands. The evaluation system is the focus of much debate, however, it remains as one the cornerstones to Ontario's wetland protection system. Initially, wetlands were ranked on a scale from Class 1 to Class 7. Classes 1 and 2 were considered provincially significant and the remaining locally significant. The current system includes Class 1-3 as provincially significant. The evaluation system scores wetlands based on four categories: biological, hydrological, social, and special features. There is a maximum score of 250 for each category, for a maximum total score for each wetland of 1,000. A wetland with a score of 600 or more points, or over 200 in either the biological or special features categories are labelled provincially significant. The evaluation is significant in that more protection is afforded to provincially significant wetlands than the locally designated wetlands. Through this evaluation process, two provincially significant and five locally significant wetlands were identified in Zorra Township (Figure 1).

Methods

Zorra Township is an ideal location for this study because of the recent drainage activity and provincially and locally significant wetlands. Over the 20-year study period there were 139 drainage works. There were 81 petition drains (Section 4) and 58 major repairs (section 78). The total cost of the drainage works was $6,895,734.94, with $1,674,181.71 being returned to farmers to subsidize this activity. Three sources of data were used in this study: drainage files, wetland evaluation files and aerial photography. Each is discussed below.

Drainage Files

File on drainage works are located in Municipal or Township offices. The drainage files include information related to drain location and design, the application date, referral letters, completion times, and total cost and grant subsidy. In this particular study, the referral comments, and subsequent bargaining are of particular interest.

Wetland Evaluation Files

Ontario's wetland evaluation system establishes the methods for quantifying the functions and values of wetlands. As previously mentioned, the evaluation includes four components: biological, hydrological, social and special features. These provide a record of the value of each wetland or wetland complex.

Aerial Photography

The most accurate way to delineate a wetland boundary is through a field investigation. However, due to financial constraints wetland boundaries are only updated if there is pressure from development. Therefore, wetland boundaries were delineated through visual interpretation of aerial photography and soil maps. The wetland evaluation manual uses a 50% rule to identify wetland versus terrestrial areas. Areas where there is 50% wetland and terrestrial vegetation are identified as the boundary. Ground vegetation in forested areas does not appear on aerial photographs because of canopy cover. Therefore, the spatial extent of the forest swamps was delineated as the wetland boundary. This likely results in an overestimation of wetland area. However, lacking any other feasible methods of measurement, this approach is viewed as appropriate. The changes in wetland area were recorded for the years of 1978, 1989 and 2000.

The ortho-photography of Zorra Township for 2000 was used as a base layer to create photo mosaics for 1978 and 1989. The images were imported and geo-referenced in MapInfo. A digital file of provincially and locally significant wetland was obtained from the UTRCA. A 1:10,000 digital soil map was also overlaid on the images to identify the organic soils. Using these digital layers, wetland boundaries were digitized over the three time periods.

Results

Recommended Mitigation

During the review process there are five opportunities for stakeholders to comment on the drainage scheme (Figure 2). First, the initial submission of the Section 4 or 78 petition to council. Over the 20-year study period there was not one application that was rejected by the Zorra Township Council. Second, the referral agencies can comment on the drainage scheme by submitting a letter to the drainage engineer stating whether or not the agency has any concerns with the drainage works. Third, at the site meeting, the stakeholders in attendance can express concerns at that point. This is an important time in the approval process as the engineer has only completed a preliminary assessment of the work that is needed. This is a good opportunity for referral agencies to communicate with the landowners, drainage engineer, and drainage superintendent about the recommended best management practices (BMP). Fourth, a final copy of the engineer's report is forwarded to the landowners, drainage superintendent, and conservation authority. Although not required in the legislation, the drainage superintendent forwards a copy to the MNR. Provided there are no appeals, the fifth opportunity to comment on the proposed work is at Township Council. During the readings of the proposed drainage work in council, the general public has the opportunity to comment on the drainage location and/or design. After the third reading, the drainage work becomes a by-law and work is tendered for construction.

In reviewing the drainage referral comments, recommended mitigation measures were grouped into four categories: timing, erosion control, construction, and bank stabilization. It is important to note that the recommended mitigation measures are just that, recommended. Since neither referral agency can stop a drainage scheme through the Ontario *Drainage Act*, there are suggested measures that should be included in the design. This is reflected in the inability of referral agencies to have the mitigation measures incorporated into an engineer's design. For example, in one referral letter the UTRCA could not support the extension of a drain in the Golspie Swamp (Figure 1). Despite their rejection of the proposal, the drain was eventually installed. On other occasions, the engineer would support the recommended mitigation measures. For example, the UTRCA recommended a depth of 0.6m instead of the proposed 1.2 m ditch, which was supported by the engineer. The referral agencies have to rely on their ability to negotiate with the drainage engineer. But as reflected in the losses and gains of wetland area in Zorra Township, incremental losses continue to occur.

Wetland Area

Despite the ability to recommend mitigation measures, there appears to be a continued loss of wetland area in Zorra Township. Precipitation patterns five years prior to each of the aerial photography did not show a significant difference. Therefore, changing weather patterns and climate variability do not appear to be the significant cause for decreasing wetland area. Both the provincially and locally significant wetlands experienced losses (Table 1).

As designated in the *Ontario Wetland Evaluation System* (MNR, 1993), wetlands were

divided into provincially significant and locally significant. Despite the importance placed on provincially significant wetlands in Ontario, losses continue to occur. Between 1978 and 2000 there were approximately 0.8 km² of provincially significant wetland area lost. There was nearly 1.1 km² of locally significant wetland area converted to agricultural land. While it is difficult to compare the rate of loss before and after 1989 because of differences in the number of drainage works, it appears as though the rate of loss is decreasing. For example when comparing the locally significant wetland conversion, there is a decrease between 1989-2000 compared to 1978-1989. This could be a result of increased attention afforded to wetland areas.

Table 1. *Wetland losses in Zorra township, 1978-2000.*

Wetland Category	Number of Drainage Works		Wetland Area			Loss/Gain (%) 1978-2000
	1978-1988	1989-1996	1978	1989	2000	
Provincially Significant	10	3	18	17.3	17.2	-4.5%
Locally Significant	6	5	5.6	4.7	4.5	-20%
Other	86	29				

Conclusions

The results indicate that despite changes to the referral process in the 1970s, incremental wetland losses continue to occur. The inability of referral agencies to stop a drainage scheme limits their bargaining power. However, drainage engineers appear willing to negotiate with referral agencies to meet some of their recommendations. Comments by referral agencies should be linked to the wetland evaluation files. Despite detailed information in the wetland evaluation files, the referral agencies often neglect to cite the significant features of individual wetlands in their referral letters. This may help to maintain the functions and values of wetlands. While wetlands are evaluated on the biological, social, hydrological and special features, this assessment only recorded the loss of wetland area. More frequent evaluations of the complete range of wetland functions and values would be useful in getting a better understanding of the losses which are occurring. This would require the Ontario government to increase funding for wetland evaluation programs. More monitoring may lead to the identification of more wetland areas.

Under the current system of wetland protection within Ontario, provincially significant wetlands are afforded more protection than the locally significant. However, this system assumes that all of the wetlands have been identified in the evaluation process. The Ontario government should consider identifying all remaining wetland areas as significant.

If the objective is to have no loss of wetland area, mitigation measures should be directed at preserving the score of a wetland. An alternative approach would be to allow for off-site mitigation, similar to the U.S. *Clean Water Act's* Section 404 program. This program

allows for off-site forms of mitigation including wetland banking. While there are advantages and disadvantages to this type of mitigation, it is something that could be discussed in Ontario.

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