Eastern Georgian Bay Stewardship Council

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Walleye Spawning Site Inspection Report

Lower Magnetawan River

Wallbridge Township

July, 2011

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Eastern Georgian Bay Stewardship Council

Executive Summary

During the spring and summer of 2011, the Eastern Georgian Bay Stewardship Council (EGBSC) in partnership with the Magnetawan First Nation, conducted an evaluation of walleye spawning habitat in the lower reaches of the Magnetawan River.

Excellent walleye spawning habitat currently exists at the Two-Foot Rapids. Although inconclusive from our investigation, it is likely excellent walleye spawning habitat also exists at the Deadman Rapids. Georgian Bay walleye have ready access to both these sites.

These are undoubtedly the two primary walleye spawning sites that once supported a healthy and thriving Georgian Bay walleye population. Physically, the sites have not been altered and it is highly unlikely quality or quantity of spawning habitat was a factor in the decline of the population; nor is it inhibiting the population from being rehabilitated. In light of the excellent spawning habitat present at these sites, we are highly doubtful that spawning enhancement work is likely to have any effect on the remnant walleye population.

We recommend more attention be paid to monitoring the impacts of fluctuating water levels on walleye egg mortality at the Two-Foot Rapids. Such information could be very helpful in future amendments to the Magnetawan River Operating Plan such that the flow regime could be modified to be more conducive to walleye reproductive success.

We further recommend the Upper Great Lakes Management Unit of the Ministry of Natural Resources review the multitude of studies that have been conducted in the vicinity of the mouth of the Magnetawan River, and consider various management options to rehabilitate the walleye population. Foremost among these – in our opinion, are rehabilitative walleye plantings accompanied by stringent harvest control.

Introduction:

In 2010, the Ministry of Natural Resources (MNR) and Eastern Georgian Bay Stewardship Council (EGBSC) were approached by Magnetawan First Nation (MFN) to consider fisheries management options to rehabilitate the walleye fishery in the Magnetawan River of Eastern Georgian Bay.

As a prelude to considering what options might be appropriate, the EGBSC recommended:

1. A literature search of existing information relating to the fishery be conducted (McIntyre, 2011),
2. A preliminary inspection of walleye spawning sites during the spring freshet, and
3. A follow-up inspection of walleye spawning sites during the low-flow, summer period to determine spawning substrate suitability.

This report is in fulfillment of recommendations #2 and 3 above. (Recommendation #1 was completed in a March, 2011 summary report – McIntyre, 2011.)

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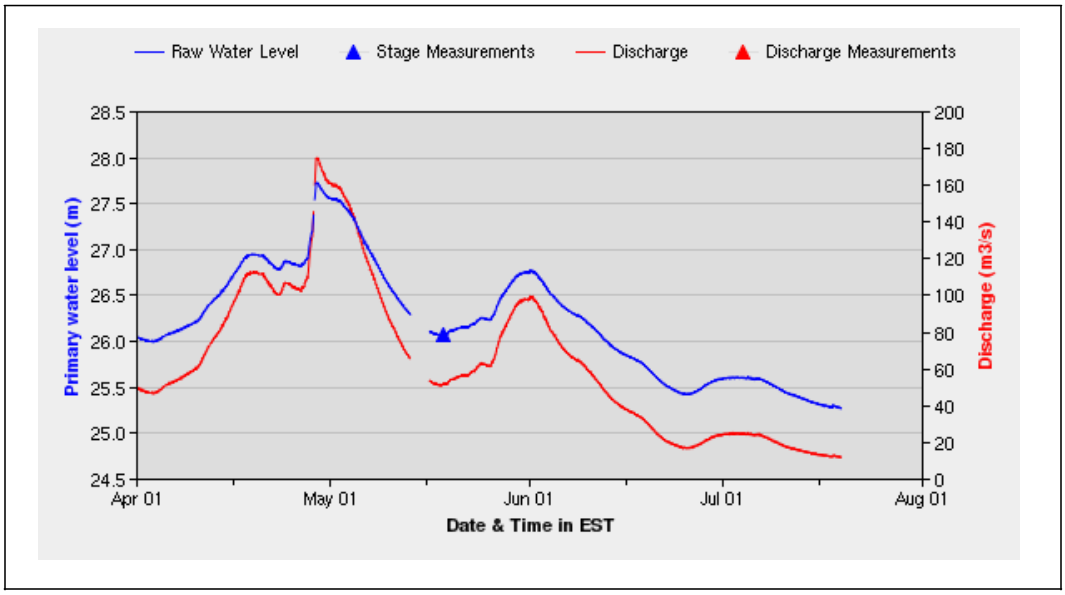
Background:

The lower reaches of the Magnetawan River are recipients of a regulated and complex flow regime. Flow is largely regulated by two dams (Feighens and Knoepfli) at the outlet of Ahmic Lake – four townships to the east. Operation of these dams is in accordance with the Magnetawan River Water Control Operating Plan (OMNR, 2004).

Flow is also influenced by other local factors including runoff and an odd, upstream bifurcation (split) of the river. Downstream of Trout Lake (Brown Township), a portion of the river drains via the South Branch of the Magnetawan River into Harris Lake and then via the Naiscoot River to Georgian Bay. Oddly, another segment of the South Magnetawan River re-unites with the Magnetawan River at Miner Lake (Wallbridge Township). Notwithstanding this odd double bifurcation of the river, compared to flow regime impacts originating from Knoepfli and Feighens dams, it has little impact on the lower reaches we are concerned with.

Flow volume (discharge) can vary dramatically from year-to-year as well as within years. The following figure shows discharge for 2011 from April through to July 19.

Figure 1. Water level and discharge on the Magnetawan River – April to July 19, 2011.



In his 1987 spawning habitat assessment report for the lower Magnetawan River, Kujala hypothesized that wide fluctuation of river levels (due to flow discharge) during the walleye spawning and incubation periods may be responsible for walleye reproductive failure. He cited a 76 cm drop in water level at the Two-foot rapids from April 23 to June 3, 1987. In this report, we also conclude this may be a significant stressor that is reducing walleye reproductive success.

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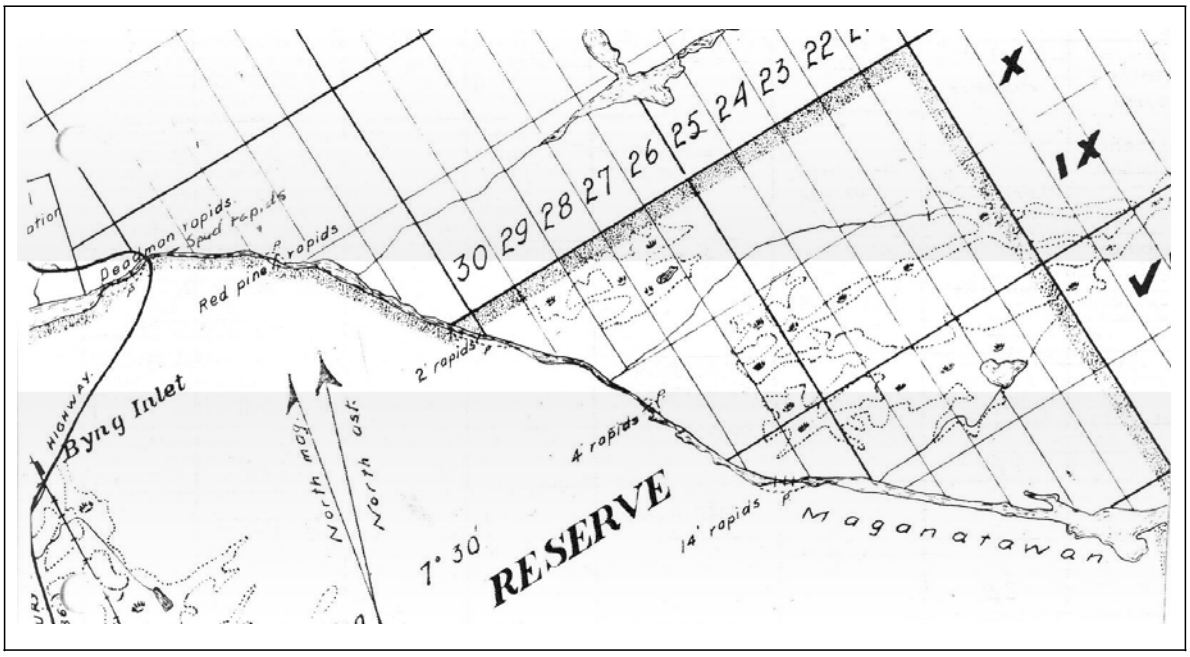
Setting:

Our particular area of interest for this assessment report deals with the lower reaches of the Magnetawan River where Georgian Bay walleye are likely to spawn. This includes the Deadman Rapids; Red pine Rapids and Two-Foot Rapids (Figure 2). As we concluded walleye are unlikely to by-pass the Two-Foot Rapids, we did not concern ourselves with the further upstream Four-Foot and Fourteen-Foot rapids.

The Spud Rapids (also known as the Potato Rapids) indicated in Figure 1 is a mere constriction of the river with no cataract present. No walleye spawning activity occurs here and the site has been given no further consideration for enhancement.

Figure 2. Location of various rapids and walleye spawning sites in the lower reaches of the Magnetawan River



According to Jerry Smith and Richard Noganosh, walleye do not spawn at the Spud Rapids or the Red Pine Rapids; nor is there any historical or anecdotal record to indicate they ever did. The Two-Foot Rapids is well documented as a spawning location for Georgian Bay walleye (Kujala, 1987). Although suitable walleye spawning habitat exists at the further upstream Four-Foot and Fourteen-Foot rapids, Kujala (1987) contended walleye are unable to by-pass the Two-Foot rapids to reach these sites. Our assessment support Kujala's position.

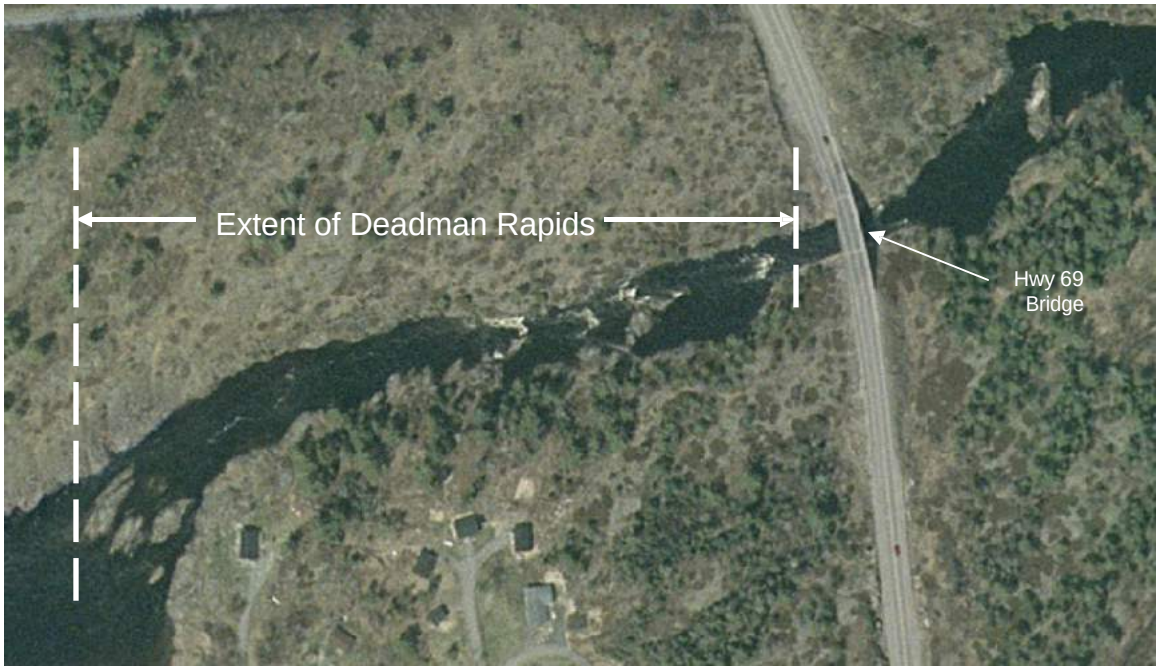
Deadman Rapids

On May 5, 2011, we had occasion to visit the walleye spawning site known as Deadman Rapids on the Magnetawan River. Included in the investigating party were: Jerry Smith, MFN Economic Development Officer; Richard Noganosh, MFN Lands & Resources Officer; Leslie Joynt, OMNR Resource Liaison Officer; Maureen Peltier, staff with the Anishinabek-Ontario Fisheries Resource Centre; and Eric McIntyre, Eastern Georgian Bay Stewardship Council. The site was re-visited on July 12 under summer (low flow) conditions. On this occasion the party included Richard Noganosh and Eric McIntyre.

Deadman Rapids is the first upstream set of rapids on the Magnetawan River of Eastern Georgian Bay. It is located approximately 8 kilometres east of the open waters of Georgian Bay and immediately west of the Hwy 69 Bridge.

Deadman Rapids is a relatively long stretch of river comprising several hundred metres (see Figure 3). It has a varied blend of characteristics including white-water rapids, swiftly moving runs and a complex series of eddies, vortices and channels. The site is easily viewed from the Hwy 69 Bridge that crosses the river to the east of Deadman Rapids (see cover photo).

Figure 3: Aerial view of Deadman Rapids showing its considerable length.



The complex morphology of the river with its varied currents, channels and islands provides an abundant mixture of flow velocities. It is hard to imagine that as flows vary throughout the normal course of the walleye spawning period and from year-to-year, that there isn't an abundance of locations providing optimal flow conditions for spawning walleye.

Optimal walleye spawning habitat is a combination of many factors, but the three most widely held important ones are:

1. Depth: 30 – 80 cm
2. Velocity: 0.6 – 0.9 cubic metres / second
3. Substrate: 25 – 150 mm in diameter (often interspersed amongst larger boulders).

(Above from "Walleye Stocking as a Management Tool"; Percid Community Synthesis Working Group – MNR, 1996.)

Photographic record of Deadman Rapids:

(commencing from western extremity and proceeding upstream)

Figure 4. South side looking towards north shore; at western extremity of Deadman Rapids where river makes final descent to Georgian Bay water level.

Note: At the time of our May 5 inspection (Figures 4 - 6), discharge volume was approximately 140 cubic metres per second.

Figure 5. Middle stretch of Deadman Rapids looking upstream with Hwy 69 bridge in background. Photo shows a rich diversity in flow velocities at various locations within the river.

Figure 6. Upper stretch of Deadman Rapids. Photo also shows a rich diversity of flow velocities within this stretch of the river.

The foregoing photographs display the relatively steep-sided nature of the granite shoreline on both sides of the river throughout the Deadman Rapids. This characteristic makes it non-susceptible to egg mortality associated with decreasing water levels during the incubation period. Regardless of flow volumes, spawning habitat remains covered with water.

However, we were unable to conclusively determine the amount of suitable walleye spawning habitat present. Although flow velocities looked highly suitable on both May 5 (140 cms – cubic metres per second) and July 12 (17 cms), for safety reasons we were unable to ascertain depths and substrate. A highly detailed study and analysis would be required to ascertain walleye spawning habitat availability; beyond our capabilities based on visual observations from shore.

Magnetawan First Nation members report walleye have always spawned at the Deadman Rapids. Notwithstanding the exceedingly high velocities the site is subject to during the spring freshet, a portion of the walleye spawning population annually by-passes this site to spawn at the upstream Two-Foot Rapids.

On July 12 we conducted an underwater inspection around a series of small islands at the foot of the Deadman Rapids where the river enters Georgian Bay (Figure 4). This is the most upstream point to which a barge could be taken and we considered it a likely location for spawning bed enhancement work. We observed depths in excess of 3 metres at locations where flow velocities appeared suitable for spawning. Consequently, an enormous amount of rock fill would be required to bring a created spawning bed up to preferred depths, and even then – the actual spawning area created would be small in proportion to the amount of material required. We consequently consider the site unsuitable for enhancement work.

Two-Foot Rapids:

On July 12, 2011, accompanied by Richard Noganosh, we had occasion to visit the Two-Foot rapids and Pine Rapids.

At the time of our inspection, according to the Environment Canada website (www.wateroffice.ec.gc.ca), discharge in the Magnetawan River was approximately 17 cms (cubic metres per second). In 2011, discharge peaked on or about April 28 at 180 cms (Figure 1).

The Two-foot Rapids is a cataract approximately 50 metres in length and characterized by relatively steep, granite cobble and/or bedrock shoreline (Figure 7). Under spring freshet conditions there would be little or no opportunity for walleye to find areas of reduced flow velocities to by-pass this site. Consequently, we concur with the 1987 assessment by Kujala that this site is a barrier to further upstream walleye migration during the spring freshet.

Note: It is possible – especially during years of low run-off, that some walleye may by-pass the Two-Foot rapids. However, the numbers would be so small that it is not a major consideration in any rehabilitation efforts.

Photo Record of Two-Foot Rapids:

(Photos taken on July 12, 2011; discharge approximately 17 cms)

Figure 7. Two-Foot Rapids – looking downstream.

Figure 8. Two-Foot Rapids – looking upstream

We conducted underwater observations at the base of the Two-Foot rapids. There was an abundance of suitable spawning substrate (Figure 9) present. Although our inspection was cursory, it was apparent good quality and quantity of walleye spawning habitat was present.

Figure 9. Walleye spawning substrate present at the base of the Two-Foot Rapids.

Furthermore, we noted suitable spawning habitat along the south shore that was exposed at the time of our inspection, but would be underwater during the spring freshet.

Figure 10 . Richard Noganosh indicating water level height experienced during a typical spring freshet. Note spawning habitat along shore.

We concluded there was no need for spawning habitat enhancement at this site. We do however recommend the site be periodically monitored during the walleye incubation period (late April to mid-May) to conclusively ascertain egg mortality related to declining water levels. This problem was noted by Richard Noganosh during our inspection as well as being a major concern of Kujala in his 1987 report. Data collected from this monitoring could be very useful in modifying flow regimes to improve walleye reproductive success in the future.

Pine Rapids

On July 12 we also inspected the Pine Rapids that were characterized by smooth, sloping bedrock on the south shore and coarse, broken boulders on the north shore with a slightly flatter gradient (Figure 11).

Figure 11. Pine Rapids – looking upstream.

We conducted underwater observations at the foot of the Pine Rapids. Substrate was almost entirely smooth bedrock with very little spawning rubble present. A very sparse amount of walleye spawning habitat may be present on the north shore – but it is of poor quality.

One could rationalize the site is a candidate for walleye spawning habitat enhancement, but there are a number of extenuating circumstances making this a dubious proposal.

1. Walleye can easily by-pass this site for the much better spawning habitat at the upstream Two-Foot Rapids, thereby making this a relatively unimportant walleye spawning site.

2. An abundance of suitable walleye spawning habitat also exists at the downstream Deadman Rapids, further reducing the importance of this site for walleye reproduction.
3. Historically, the once healthy walleye population in the Magnetawan River never did use this as a spawning site, suggesting that enhancing the site will likely have little benefit to the existing remnant walleye population.
4. This segment of the Magnetawan River does not have shoreline access, thereby complicating any enhancement work.

Acknowledgements:

The EGBSC wishes to thank the Magnetawan First Nation and in particular Jerry Smith for initiating this investigation. The scope of this rehabilitation initiative has been very broad with the intention of rehabilitating the Magnetawan River walleye population for the benefit of all. The Magnetawan First Nation has been very generous and community-minded in their objectives.

The EGBSC also wished to thank Richard Noganosh for his insight and providing much appreciated guiding service to us.

Literature Cited:

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