# WAWAITIN GENERATING STATION
# MATTAGAMI RIVER
# FISHERIES IMPACT ASSESSMENT
# 2006

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Prepared for: Ontario Power Generation Inc., Northeast Plant Group
801 Mountjoy Street
P.O. 966
Timmins, Ontario
P4N 7H1

Prepared by: George Coker and Cam Portt
C. Portt and Associates
56 Waterloo Avenue
Guelph, Ontario
N1H 3H5

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# 1.0 INTRODUCTION

C. Portt and Associates was retained, as part of the SENES Consultants Limited project team, by Ontario Power Generation Inc. (OPG) to conduct a fisheries impact assessment of the proposed Wawaitin Generating Station (GS) redevelopment. The Wawaitin GS is located approximately 25 kilometres (km) southwest of the Timmins city centre on the Mattagami River (Figure 1). This report presents the results of the fisheries impact assessment, that is based upon investigations of aquatic habitat and the fish community at the Wawaitin GS in 2005 and 2006, as well as the proposed redevelopment works.

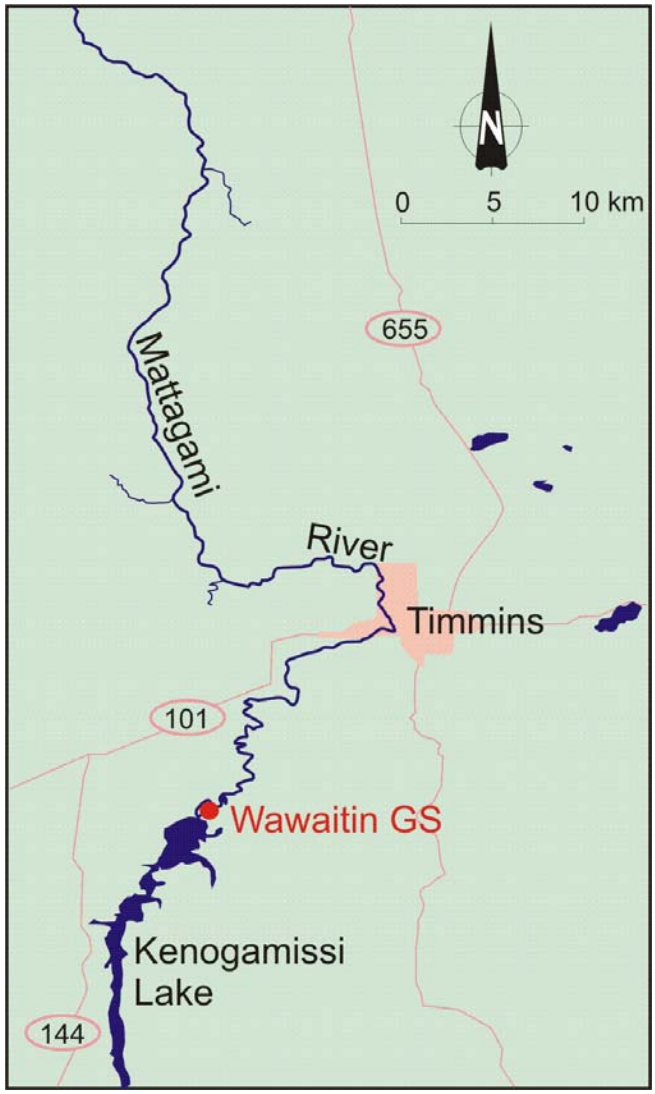



**Figure 1: Location of the Wawaitin GS on the Mattagami River near Timmins, Ontario.**

# 2.0 METHODS

The results of investigations of the existing conditions at the Wawaitin GS (C. Portt and Associates, 2006a; 2006b; 2006c; 2006d) were used in conjunction with information provided by OPG regarding the proposed GS expansion project to assess the potential impact of the project on the fisheries resources that utilize the Wawaitin GS site.

An additional fish collection was conducted by C. Portt and Associates staff (G. Coker, J. Reid) on June 21, 2006. Fish were collected by electrofishing in wadeable areas along the shore of the riffles that extend downstream of the tailrace using a Halltech Model HT 2000 backpack electrofisher. At this time the habitat was checked for any gross changes that might have occurred since the detailed habitat characterization, conducted in June 2005.

# 3.0 RESULTS OF JUNE 21, 2006 FIELD INVESTIGATION

The fish collected by electrofishing were 1 young-of-the-year (YOY) northern pike (*Esox lucius*), 3 logperch (*Percina caprodes*), 3 spottail shiner (*Notropis hudsonius*), 1 YOY yellow perch (*Perca flavescens*), 1 golden shiner (*Notemigonus crysoleucas*), 53 YOY suckers (*Catostomus* sp.), and 1 YOY cisco (*Coregonus artedi*). Young-of-the-year northern pike and YOY suckers, were also captured during the previous year's electrofishing on June 9, 2005; the other species were not.

As noted in C. Portt and Associates (2006c), YOY suckers probably originate from spawning in the fast water within the study area. Young-of-the-year northern pike likely originate downstream of the study area where the low grassy shoreline around the shallow lake area may provide spawning habitat for this species during the spring (C. Portt and Associates 2006c). Logperch are typical residents of riffle areas. The remaining fishes are expected to be present throughout the various habitats downstream of the Wawaitin tailrace, but likely in greater numbers in quieter water.

No significant changes in habitat from June, 2005, were apparent.

# 4.0 POTENTIAL IMPACTS TO FISH HABITAT

## 4.1 Generating station redevelopment

The existing four unit Wawaitin GS, with a maximum output of 10.4 megawatts, will be replaced by a new two unit GS with a maximum output of approximately 15 megawatts. A single penstock will replace the two existing penstocks (Figure 2). Though the new penstock and GS will not occupy the same location as the existing penstocks and GS, the intake will be located at the same position at the end of the intake canal (Figure 2), and the new tailrace will be a 48 m long channel that will discharge to the existing tailrace channel (Figures 2 and 3). The existing GS will be decommissioned and demolished, and the existing penstocks will be removed and/or buried in-place. The unused section of existing tailrace will be retained to provide fish habitat.

**Mitigation**

- In-water construction activities should be timed to avoid the spawning and incubation period of spring spawning fishes such as walleye (*Sander vitreus*) and suckers (Catostomidae), which typically excludes in-water work from April 1 to June 15.
- Dredged material should be disposed of on land above the high water level and suitably contained/stabilized to prevent the dredged material from re-entering the water.
- Sediment and erosion control measures should be implemented as required prior to work and maintained during the work phase, to prevent entry of sediment into the water. This should include sediment removal from water pumped from within cofferdam enclosures.
- All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner that prevents any deleterious

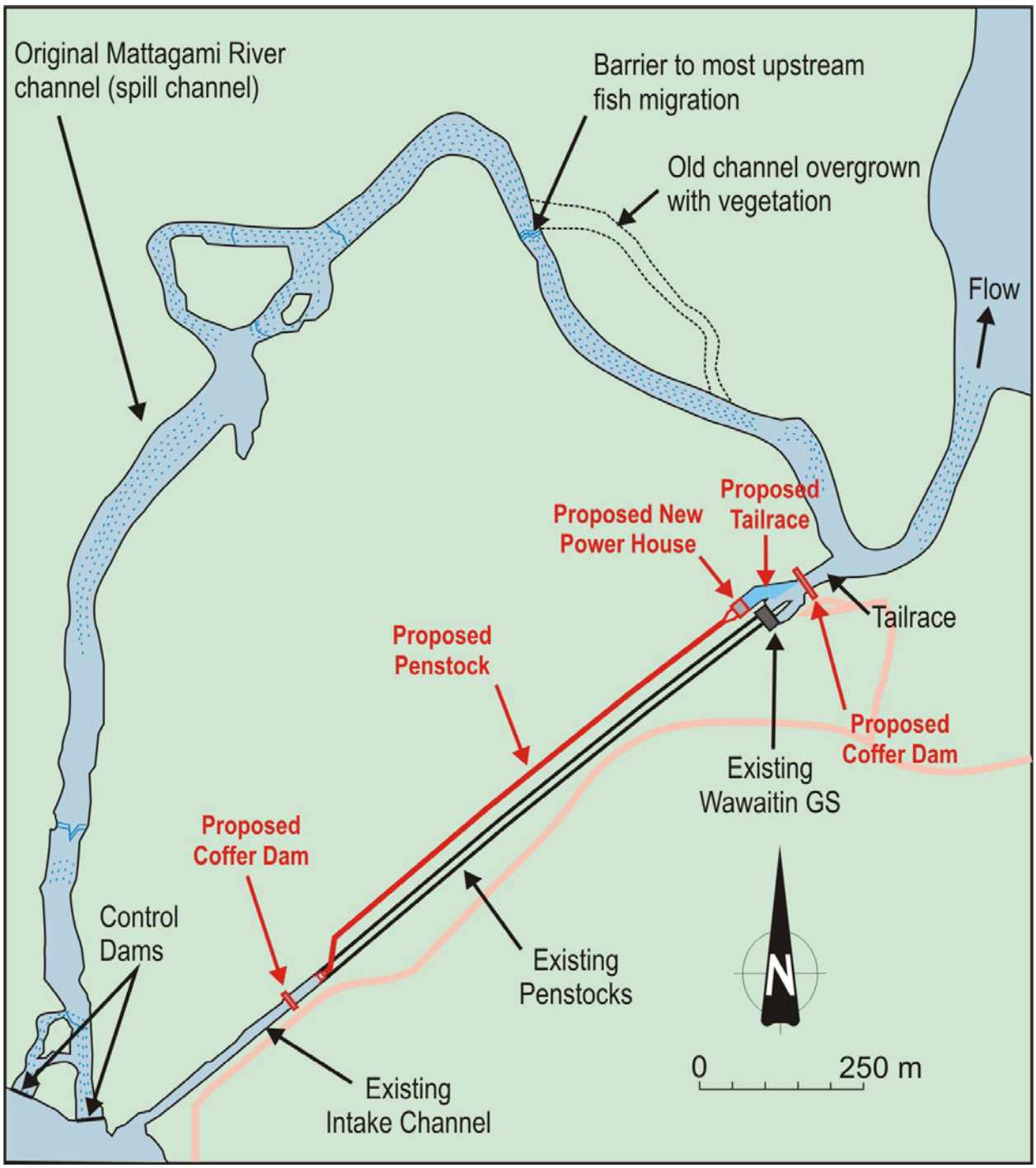



**Figure 2: Overview of the study area in the vicinity of the Wawaitin GS, showing the Wawaitin spill channel, the proposed redevelopment, and other features discussed in this report.**

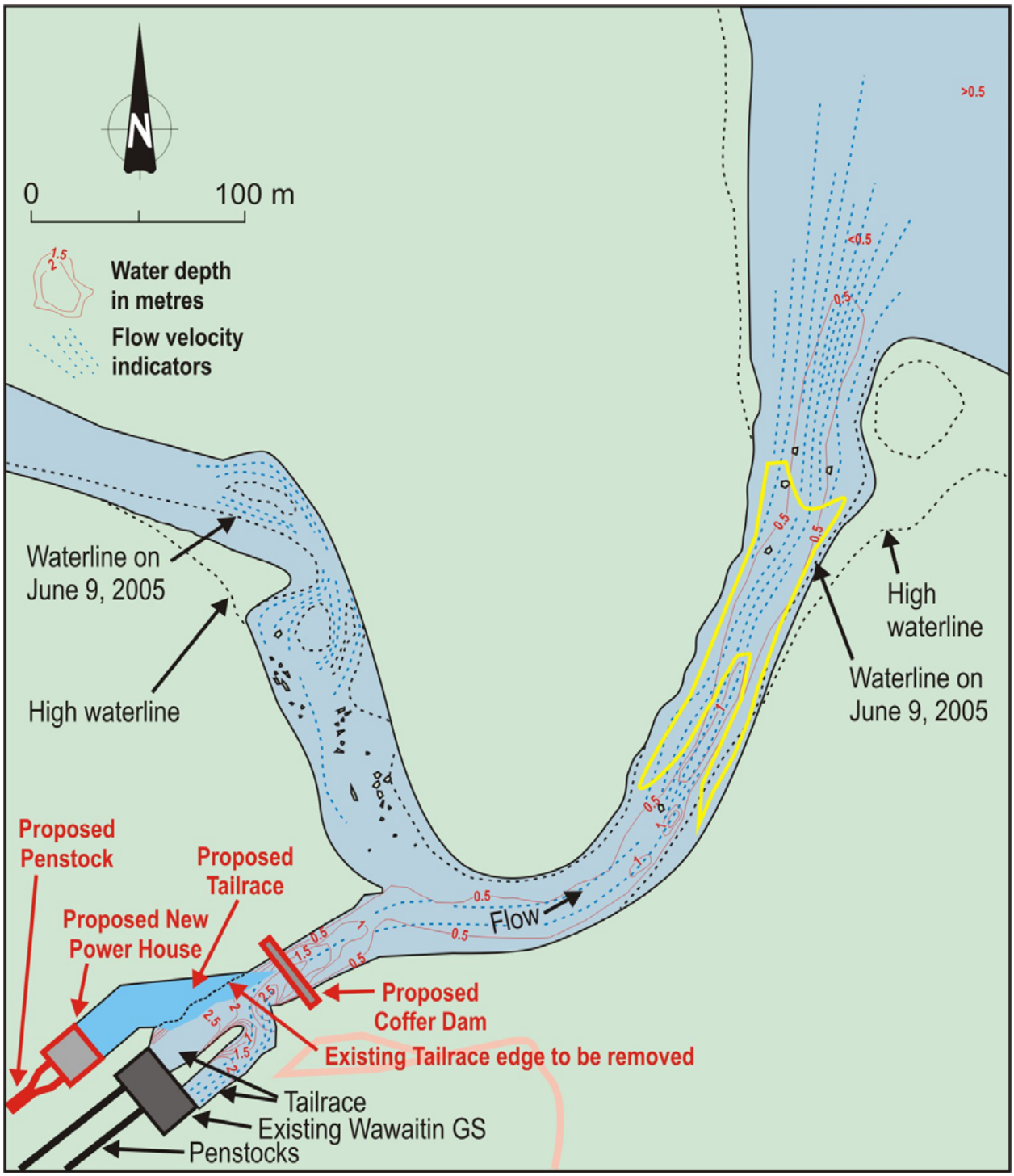



**Figure 3: Detail of the study area in the vicinity of the Wawaitin GS, showing the proposed redevelopment works, water depths, and walleye spawning area during 2005 and 2006 denoted by yellow line. Note that the blue velocity indicators denote faster water when close together, and slower water when more widely spaced.**

substance (e.g. petroleum products, debris etc.) from entering the water.

- The floor of the proposed tailrace connection with the existing tailrace, as well as any area of the exiting tailrace that is re-contoured, should be covered by a layer of cobble-sized material to provide better habitat.

**Assessed impact**

Direct physical impacts to small areas of previously constructed channel will occur where the existing intake structure will be replaced by a new intake structure at the same location, and where the tailrace of the new GS will connect to the existing tailrace. The existing intake channel and the tailrace have been constructed to facilitate the efficient conveyance of flow, and are therefore relatively flat and provide little habitat structure. In the case of the intake a few metres (< 5 m) of the channel bed and sides, outside of the existing intake structure, will likely require re-contouring to smooth the transition between the existing channel and the new intake structure. The substrate in the intake channel near the penstocks is unknown, but it likely consists of granular material with the concrete walls (Photograph 1).

In the case of the tailrace connection, a small section of the vertical channel side will be removed and the bed of the channel may require re-contouring to smooth the transition between the new tailrace channel and the existing tailrace channel. The area that will be altered is relatively small and not critical habitat, consisting of the bedrock side wall of the tailrace and the relatively flat cobble and gravel tailrace floor. It is thought that the cobble and gravel is a thin layer over excavated bedrock. The addition of a 20 m wide and 48 m long (dimensions estimated from preliminary SCP engineering drawings) section of new tailrace will create additional habitat of the kind found within the existing tailrace. Provided that the recommended mitigation measures are implemented, the net impact to fisheries production from direct habitat alterations will be negligible.

### 4.2 Temporary construction impacts

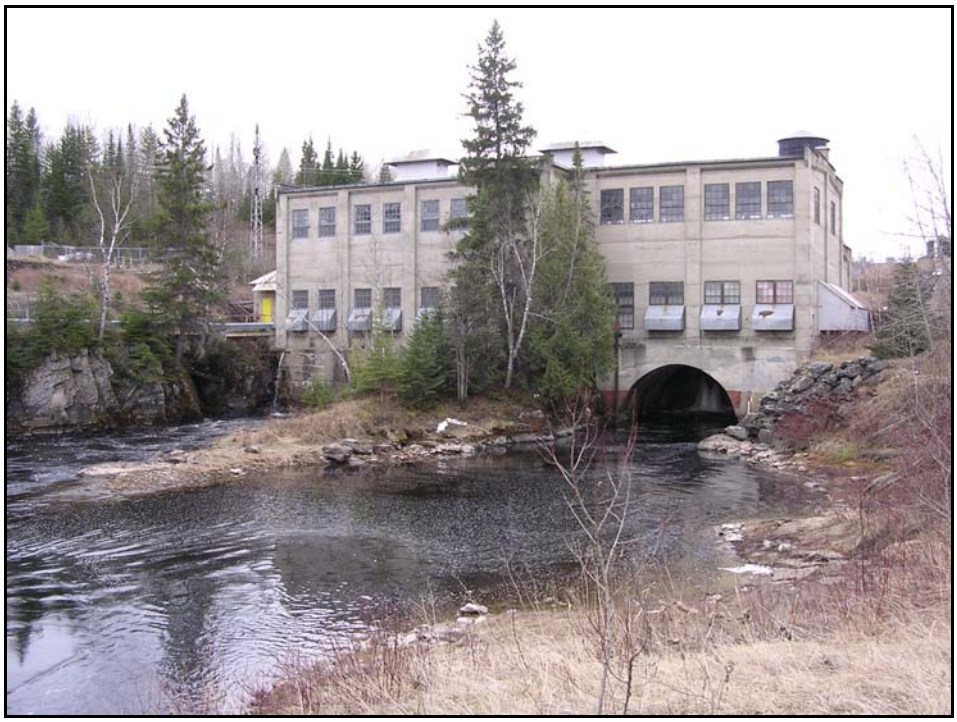
Temporary impacts to fish habitat will occur due to the placement of cofferdams and the dewatering of habitat within those cofferdams. A cofferdam is required in the intake channel to dewater approximately 630 $m^2$ (0.063 ha) of the channel in the vicinity of the penstock intake (Photograph 1). A second cofferdam is required to dewater approximately 2950 $m^2$ (0.295 ha) of the upper section of the existing tailrace (Photograph 2) to allow construction of the new tailrace and the decommissioning of the existing GS. It is anticipated that the cofferdams will be in place for 12 to 14 months.

During the period when no flow is being diverted through the GS, all flow in the Mattagami River will be passing through the spill channel (Figure 2).

**Mitigation**

- In-water construction and removal of cofferdams should be timed to avoid the spawning and incubation period of spring spawning fishes, such as walleye and suckers, which typically excludes in-water work from April 1 to June 15.

Photograph 1: View of intake channel looking upstream from the top of the penstock, April 22, 2005. Area in foreground will be temporarily isolated with a cofferdam and de-watered.



Photograph 2: View of tailrace looking upstream towards GS, April 22, 2005. Area in foreground will be temporarily isolated with a cofferdam and de-watered.

- If all water is being diverted through the spill channel at the time of the walleye spawning period, all water should continue to be diverted through the spill channel until the end of the hatch (June 15).
- Sediment and erosion control measures should be implemented as required prior to work and maintained during the work phase, to prevent entry of sediment into the water. This should include sediment removal from water pumped from within cofferdam enclosures.
- All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum products, debris etc.) from entering the water.
- Blasting, if required, should adhere to the Fisheries and Oceans Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/guidelines-conseils/guides/explosguide/chap3_e.asp#GUIDELINES).

**Assessed impact**

The relatively small areas that will be temporarily dewatered are portions of constructed channels with granular substrate in a range of sizes. Because these channels were designed to convey water efficiently, the bottom is relatively smooth with few protruding features that would provide structural habitat for fish. The areas impacted by the proposed cofferdams and dewatering are manmade habitats that are not thought to be critical for any life stages of any of the species present. The fact that they are temporarily unavailable is not expected to have any significant impact on the overall fish production of the system.

Diverting all flow through the spill channel will not result in increased erosion since the spill channel is the original channel of the Mattagami River, and has historically accommodated the total river flow. Flows in the important walleye and sucker spawning habitat that occurs downstream of the tailrace will not be altered during this construction period, as they are downstream of the confluence of the tailrace and the bypass channel, and flow in the Mattagami River will continue to be managed as it was prior to the redevelopment. Walleye spawning observations in 2005 and 2006 did not identify the spill channel as a significant spawning area for walleye or suckers, and no other critical or important habitats are thought to occur here that may be impacted by this temporary change in spill channel flow regime. The temporary change in spill channel flow regime is not expected to have a negative effect upon the resident fish community within the spill channel.

## 4.3 Operation of the new Wawaitin Generating Station

The redeveloped Wawaitin GS will remain a run-of-the-river hydroelectric plant and, therefore, redevelopment will not change the flow regime of the Mattagami River or the management of water levels in the upstream lake. The only difference will be in the distribution of water between the GS and the spill channel (Figure 2). Presently, water is spilled through the spill channel when flows exceed the 40 $m^3/s$ capacity of the GS, which occurs approximately 23% of the time (Ontario Hydro, 1992). The GS is capable of taking all river flow when flows are less than 40 $m^3/s$, however, when no water is being intentionally spilled there is approximately 1 $m^3/s$ of flow in the spill channel due to leakage through the control dam stoplogs, as well as from direct runoff within the watershed of the 2.6 km long spillway and drainage from an adjacent

wetland. The redeveloped Wawaitin GS will have a rated flow of 45 $m^3/s$ which will decrease the frequency of water spilled through the spill channel from approximately 23% to approximately 10% of the time (Fitchko, 2006).

The larger flow capacity of the redeveloped GS will result in faster flow velocities within the existing intake channel and the existing tailrace when more than the capacity of the present GS is passing through the proposed GS, which is most likely to occur during the period of March to early July. Maximum mean flow velocities at both locations are expected to increase from 0.8 m/s to 0.9 m/s. Downstream of where the tailrace joins with the spill channel, flow velocity and volume will not differ between pre- and post-redevelopment.

**Mitigation**
No mitigation is proposed.

**Assessed impact**
Water is typically only spilled through the spillway during the spring (March to June), and only when total river flow exceeds the capacity of the existing GS. The minimum spillway flow from leakage at the control dam and local watershed contributions is thought to be the limiting factor for the productive capacity of the resident fish community within the spill channel. Therefore, a further decrease in the frequency or duration of flows that exceed the minimum spill channel flow, is not expected to have significant further negative impacts upon the productivity of the spill channel fish community.

Since there are no known critical or important habitats within the intake channel and the tailrace, we do not anticipate that the approximately 0.1 m/s increase in the maximum mean water velocity that will occur periodically from March to early July, will have a significant or measurable impact on the productivity of local fish communities.

# 5.0 CONCLUSION

Provided that the recommended mitigation measures are implemented, it is our opinion that the redevelopment of the Wawaitin site, and the subsequent operation of the new and enlarged GS, will not have a significant or measurable impact upon the composition or production of the Mattagami River fish community.

The key points of this assessment are as follows:

- No critical fish habitats, such as walleye spawning habitats, will be directly altered.
- There will be no changes in the volume of water passing over the critical walleye spawning habitat downstream from the generating station tailrace, and thus no change in velocities.
- The areas that will be directly altered are manmade habitats (the intake channel and the tailrace) and, although they do contain fish, the fact that they will be temporarily unavailable is not expected to have a significant impact on the productive capacity of the

system.

- Following the completion of construction, the total amount of habitat in the intake will be essentially unchanged, and the total amount of habitat in the tailrace area will be slightly increased due to the construction of the new tailrace.

## 6.0 REFERENCES

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