APPENDIX

H

ECOLOGICAL ENHANCEMENT AND MITIGATION MONITORING (EEMM) REPORT

Stantec

Memo

To:	Walker Aggregates Inc.	From:	Dan Eusebi Stantec Consulting Ltd., Waterloo, ON
File:	62602732	Date:	April 29, 2022

Reference: **Walker Aggregates Duntroon Pit, 2021 Millar Pond Amphibian Breeding Monitoring Results**

INTRODUCTION

Stantec Consulting Ltd. (Stantec) assisted Walker Aggregates Inc. (Walker Aggregates) in 2021 to conduct amphibian breeding monitoring of a wetland created as a compensation feature at the Duntoon Quarry Site (the Site) that was part of the conditions of approval for the Quarry. The pond is located on the Walker Aggregates Duntroon Pit property at the UTM coordinates 17T 560217E, 4915590N (Attachment A, Figure 1). The created wetland is known replaces the Millar Pond and is now referred to as the Miller Pond. The new Millar Pond was created in 2019 which was in compensation for the removal of the original Millar Pond (herby referred to as “the pond”).

The pond was originally dug by the original landowner (the Millar family) to provide a water source to pastured livestock. The pond was located within the proposed extraction area for the Duntroon Quarry. In 2007 and 2008, Stantec completed an ecological survey of the pond which included amphibian breeding surveys, Ecological Land Classification (ELC), and botanical survey (Stantec 2009). Based on the results, the pond was determined to provide ecological function to the local ecosystem. It was found that the pond supported a diverse and abundant anuran population including the presence of breeding spring peepers (*Pseudacris crucifer*), chorus frogs (*Pseudacris triseriata*), green frogs (*Lithobates clamitans*) and gray treefrogs (*Hyla versocolor*).

Following an integrated resource management approach, Walker Aggregates proposed to remove the pond and replicate and enhance the ecological function outside of the area of high-quality accessible bedrock resource. Walker Aggregates took considerable care to relocate the functions of the pond to the new location described above.

Ecological monitoring, including wetland monitoring, is a component of the Walker Aggregates Duntroon Expansion Quarry Adaptive Management Plan (AMP; Stantec and Hims Geoenvironmental 2013). The Long Term Trend Ecological Monitoring (LTTEM) program was developed to supplement the information from the Long Term Trend Water Monitoring (LTTWM) program with information about the health and functioning of the natural heritage features in the vicinity of the Expansion Quarry.

The focus of the wetland component of the LTTEM program is on amphibian vernal breeding pools and ensuring hydroperiods are suitable for continued hydrophytic plant growth in the surrounding wetland zones. Wetland water level monitoring is conducted as part of the LTTEM program. Long term trends in these wetland features and their functions are considered and interpreted with reference to long term climatic trends.

The LTTEM includes two components: vegetation monitoring and wildlife monitoring. Wildlife monitoring in wetlands is focused on amphibians (Anura: frogs and toads and Urodela: salamanders). Amphibians are excellent indicators of the health of the wetland area and water regime trends that could be affecting wetland function. As documented in the AMP, wetland monitoring (vegetation and wildlife) is to be conducted annually for three years in Phase I to establish an ecological baseline, and every five years thereafter until

rehabilitation is complete. The ecological baseline data collection for the LLTEM was initiated in 2018 and was completed after the 2020 monitoring year.

To monitor the success of the Millar Pond relocation, Walker Aggregates began conducting amphibian breeding monitoring at the Millar Pond in 2021. The results of the 2021 monitoring are provided in this memo.

POND DESCRIPTION AND HABITAT

The location of the Millar Pond is immediately north of the original pond (Attachment A, Figure 1). The Millar Pond was created to mimic the hydrology of the original pond, so that in some years it will dry out. This will ensure that fish populations, which can negatively impact amphibian breeding success through predation of eggs and young, do not become established.

The Millar Pond was visited on September 29, 2020. The Millar Pond riparian area provides a diversity of native trees, shrubs, and herbaceous plants including emergent aquatic plants which provide egg-attachment sites for breeding anurans. Features including large woody debris, root wads, herbaceous ground cover, boulders and cobble nearby the pond provide microhabitat for use as cover objects, foraging habitat, thermoregulation habitat and potential hibernacula for terrestrial hibernating anurans or salamanders. Deciduous leaf litter and in-water large woody debris provide allochthonous inputs which support the Millar Pond aquatic food web. Substrates in the Millar Pond consist of muck and detritus, which replicate any overwintering habitat for amphibians (i.e., green frogs) that the original pond may have provided.

Canopy cover over the Millar Pond was estimated to be 60%. Photographs of the Millar Pond and original pond are provided in Attachment B.

METHODS: MILLAR POND AMPHIBIAN MONITORING 2021

Amphibian breeding call monitoring followed the methodology in the Bird Studies Canada (BSC) Marsh Monitoring Program (MMP) for Surveying Amphibians (BSC 2009). Monitoring involves surveying breeding amphibians over a three-month period in the spring, starting in April and ending in June. Surveys are conducted in appropriate weather for the target breeding group (i.e., early-spring breeders, mid-spring breeders and late-spring breeders).

The Millar Pond breeding amphibian call monitoring program was conducted with automatic recording units (ARU's). Walker Aggregates secured two ARU's to trees nearby the Millar Pond on April 15, 2021. The ARU's were programmed to record every day through the monitoring period for three hours, starting at sunset. The ARU's recorded data until June 11, 2021.

Breeding call data were analyzed at desktop per the methodology in the MMP. The Millar Pond breeding amphibian data was surveyed three times, a minimum of 15 days apart. Per the MMP, if possible, survey dates should fall within these windows: Survey 1 April 15 – 30, Survey 2 May 15 – 30, Survey 3 June 15 – 30. The MMP also delineates minimum air temperatures during each survey with Survey 1 at 5°C, Survey 2 at 10°C and Survey 3 at 17°C. Wind speed during surveys should be a Beaufort Scale 3 or less.

The ARU data were analyzed for breeding amphibian calls on recording days May 2, May 22, and June 10, 2020. Dates were selected through an analysis of weather conditions archived from the Environment Canada and Climate Change online weather database (Government of Canada 2021). Considerations were made for an appropriate spread between analysis dates, ideal weather conditions (light winds, no precipitation, seasonal temperatures) and background noise.

Reference: Walker Aggregates Duntroon Pit, 2021 Millar Pond Amphibian Breeding Monitoring Results

Each analysis included listening for three minutes for all calling amphibians. Call levels were described using values of 1, 2, or 3. Level 1 indicates that individuals could be counted, and calls were not simultaneous. Level 2 denotes those calls are distinguishable but with some simultaneous calling. Level 3 indicates a full chorus where calls are continuous and overlapping.

RESULTS: MILLAR POND AMPHIBIAN MONITORING 2021

The amphibian breeding call surveys were completed within the MMP guidelines. Survey 1 was completed on May 2, two days after the suggested survey window and Survey 3 was completed on June 10, five days earlier than the suggested survey window. Parameters on both days (air temperature, wind speed) were suitable for the target breeding group (early-spring and late-spring calling amphibian species). Conducting the survey in suitable conditions for the target species is more important than completing the survey in the suggested survey window (BSC 2009). June 11, 2021 was the last day the data was recorded in the monitoring season because the ARU batteries died in the field which was identified after the monitoring period was over. Survey date, time and weather are provided in **Table 1**.

Table 1: Weather Conditions during Breeding Call Surveys at the Walker Aggregates Duntroon Millar Pond

Survey Round	Survey Date	Time	WEATHER		
			Survey Air Temperature °C	Total Daily Precipitation (mm)	Beaufort Wind Scale
Survey 1	5/2/2021	21:30	11	0	2
Survey 2	5/22/2021	22:00	24	0	1
Survey 3	6/10/2021	22:15	22	0	1

In total, from all surveys, three species were identified calling either from within the Millar Pond or in close vicinity to the Millar Pond. Spring Peeper was the most detected species with observations from Surveys 1 and 2, which reflects the species ability to breed in a variety of habitats and its long breeding period from April to June (CHS 2022a). The highest call counts and amphibian diversity was observed during Survey 2, which recorded the Spring Peeper, American Toad and Gray Treefrog. American Toad is a habitat generalist and can breed in a variety of permanent or temporary aquatic features and can be found in a range of terrestrial habitats outside the breeding season (CHS 2022b). Habitat within the Millar Pond is likely suitable for the Gray Tree Frog which is not to be permanent or ephemeral wetlands with open canopy in proximity to forest (CHS 2022c). No species were recorded in Survey 3. Species and call counts for the Millar Pond are shown in **Table 2**.

Table 2: Amphibian Species and Call Counts Identified at the Millar Pond in 2021

Survey Round	Spring Peeper	American Toad	Gray Treefrog
Survey 1	1-3	-	-
Survey 2	2-6	1-2	1-2
Survey 3	-	-	-

Reference: Walker Aggregates Duntroon Pit, 2021 Millar Pond Amphibian Breeding Monitoring Results

Amphibians are using the recently created Millar Pond for breeding habitat. The amphibian community calling from within and nearby the Millar Pond was like the community observed from the original pond. Chorus Frog and Green Frog were not documented in the new Millar Pond, and American Toad was a species not documented in the original pond.

The original pond was well established and provided amphibian breeding habitat for decades. This long term presence on the landscape can result in site fidelity (an animal's tendency to return to a previously occupied place). As the new Millar Pond becomes established and used for breeding habitat by amphibians, site fidelity will increase, individual amphibians that begin life in the new Millar Pond will likely return there for breeding as adults.

CONCLUSION

The first year of amphibian breeding monitoring of the new Millar Pond was completed in 2021 by Walker Aggregates with the assistance of Stantec. Amphibian breeding call activity was recorded via ARU's and was analyzed by Stantec using the BSC MMP methodology. ARU recording data was analyzed in suitable weather for the target breeding group. Breeding amphibians were documented utilizing habitat in the Millar Pond and is anticipated to increase over time as the Millar Pond becomes established, Stantec predicts the pond will support a diversity and abundance of amphibians. Stantec recommends yearly amphibian breeding monitoring of the Millar Pond and adding Millar Pond monitoring to future LTTEM monitoring effort.

Stantec Consulting Ltd.

Eusebi, Daniel
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Dan Eusebi BES, MCIP, RPP
Senior Environmental Planner

Direct: 519-585-3452
Mobile: 519-827-7564
Fax: 519-836-2493
dan.eusebi@stantec.com

Attachments: A – Figure 1: Millar Pond
B – Photographic Record

REFERENCES

Bird Studies Canada [BSC]. 2009. Marsh Monitoring Program Participants Handbook for Surveying Amphibians. 2009 Edition. 13 pages. Published by Bird Studies Canada in cooperation with Environment Canada and the U.S. Environmental Protection Agency. February 2009.

Canadian Herpetological Society [CHS]. 2020a. Species Information. Amphibians and Reptiles of Canada. Spring Peeper *Pseudacris crucifer.* Online: http://canadianherpetology.ca/species/species_page.html?cname=Spring%20Peeper

Reference: Walker Aggregates Duntroon Pit, 2021 Millar Pond Amphibian Breeding Monitoring Results

Canadian Herpetological Society [CHS]. 2020b. Species Information. Amphibians and Reptiles of Canada. American Toad *Anaxyrus americanus*. Online: http://canadianherpetology.ca/species/species_page.html?cname=American%20Toad

Canadian Herpetological Society [CHS]. 2020c. Species Information. Amphibians and Reptiles of Canada. Gray Treefrog *Hyla versicolor*. Online: http://canadianherpetology.ca/species/species_page.html?cname=Gray%20Treefrog

Canadian Herpetological Society [CHS]. 2020d. Species Information. Amphibians and Reptiles of Canada. Western Chorus Frog *Pseudacris triseriata*. Online: http://canadianherpetology.ca/species/species_page.html?cname=Western%20Chorus%20Frog

Canadian Herpetological Society [CHS]. 2020e. Species Information. Amphibians and Reptiles of Canada. Green Frog *Lythobates clamitans.* Online: http://canadianherpetology.ca/species/species_page.html?cname=Green%20Frog

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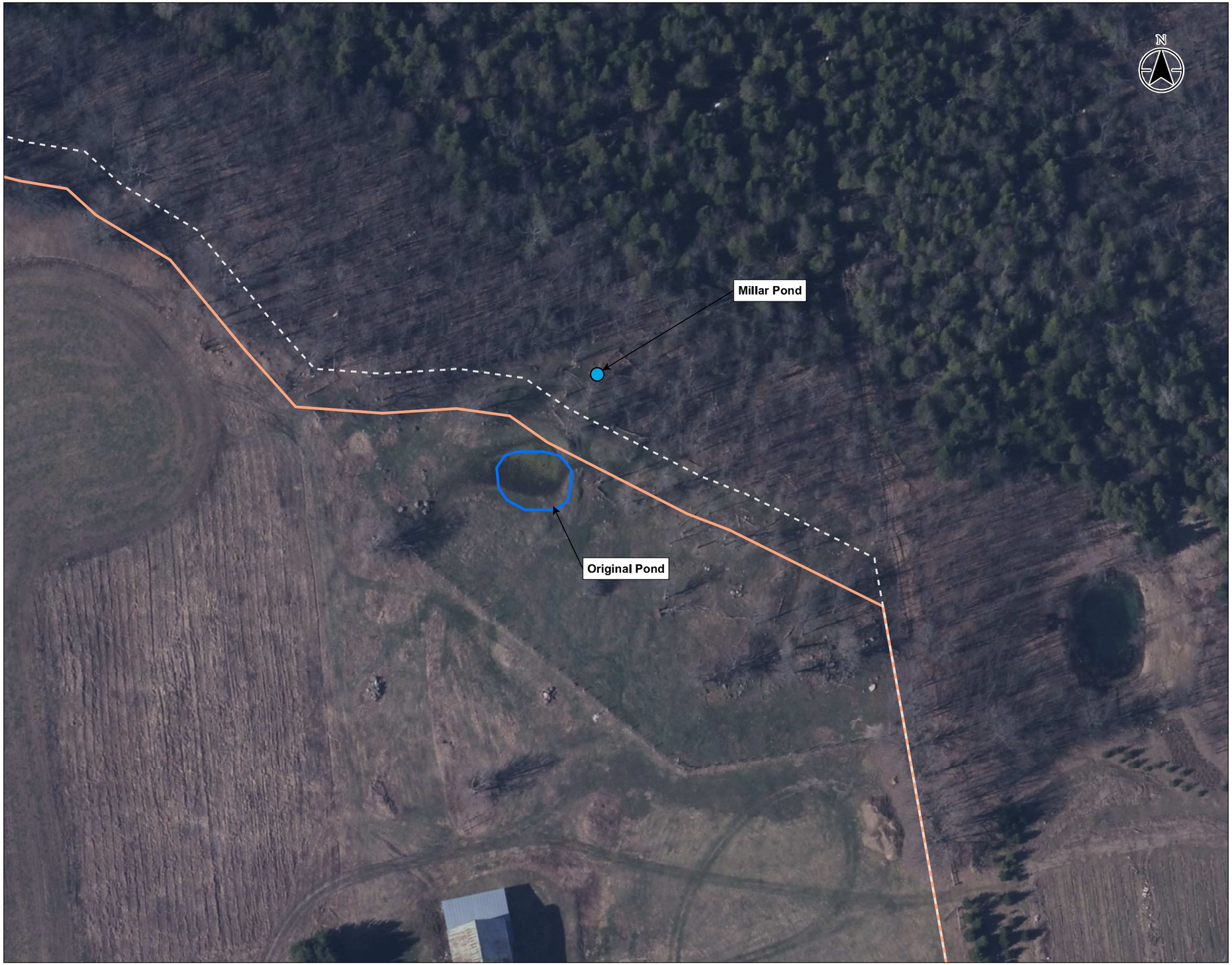
Attachment A

Figure 1: Millar Pond



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Legend

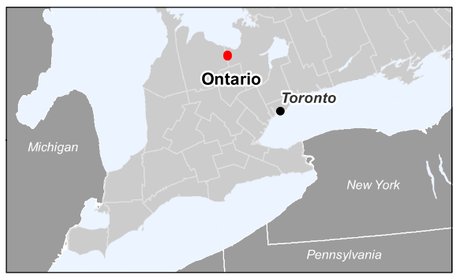
- Millar Pond
- Original Pond
- Limit of Extraction - Walker
- License Area Boundary

0 25 50 metres

1:1,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Orthoimagery © First Base Solutions, 2018. Imagery Date, 2016.



Project Location
DUNTROON

62602732
Prepared by DH on 2022-02-15

Client/Project
WALKER AGGREGATES INC.
DUNTROON QUARRY EXPANSION

Figure No.
1

Title
Millar Pond

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Attachment B

Photographic Record

Filepath:\\ca0004-ppfss04\01609\active\62602732\natural environment_annual amp monitoringrpts\2021\amphibian report - miller pond\attachment b\attb_62602732_millarpond_photo_record_20220211_me.docx

Photo 1: September 29, 2020. New Millar Pond. Showing large woody debris.

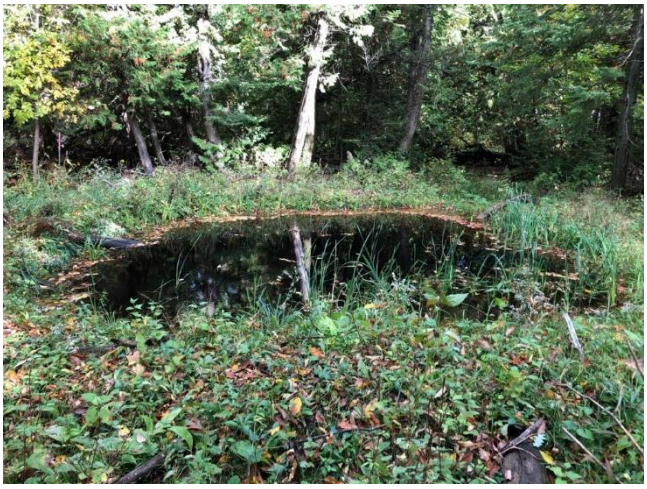

Photo 2: September 29, 2020. New Millar Pond. Emergent vegetation in nearshore zone.

Photo 3: September 29, 2020. New Millar Pond. Showing riparian area.

Photo 4: September 29, 2020. New Millar Pond. Showing riparian area.

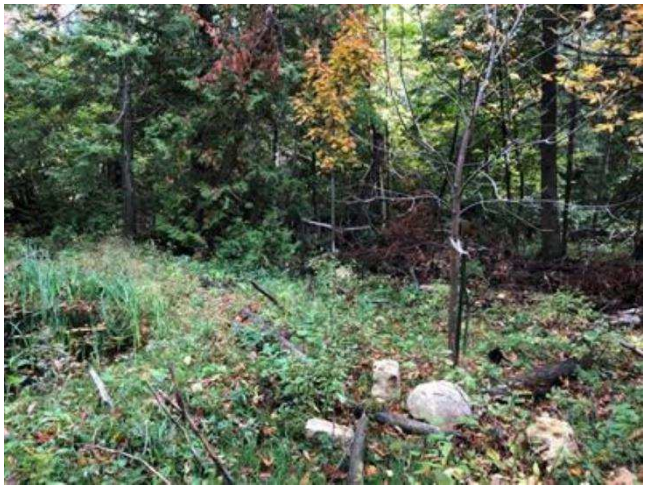

Photo 5: September 29, 2020. New Millar Pond. Ground cover in riparian area.

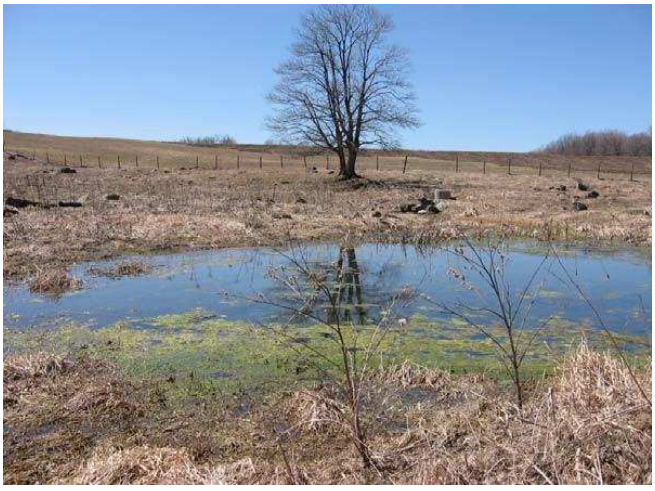

Photo 6: April, 2007. Original Millar Pond.

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Client/Project	February 2022
Walker Aggregates	62602732
Duntroon Pit, 2021 Millar Pond Amphibian Breeding Monitoring	
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