



**Niverville Lagoon – Decommissioning Project
Environmental Act License No. 2712**

Report on 2017 Activities

Prepared by Native Plant Solutions, January 2018



This annual report provides an update on the progress of the project to decommission the wastewater treatment lagoon located on SW 30-7-4EPM in the Town of Niverville, as required by the conditions for decommissioning under Environment Act License No. 2712.

Graduate Student Research

In 2017, Nicholson Jeke (PhD student at the University of Manitoba) continued monitoring cattail biomass yield and nutrient accumulation in the dry and wetland cells (see Figures 1- 3). Cattail was harvested once or twice per season to evaluate the effect of repeated harvesting on biomass yield and nutrient phytoextraction. Monitoring of the dry cell ended in the summer of 2017 when the cell was tilled in preparation of native plant establishment as part of the next phase of the project (see Niverville Lagoon Site Plan). Biomass and nutrient uptake data collected in the dry cell for 5 years (2013-2017) will provide firm conclusions on the effectiveness of cattail to clean up end-of-life municipal lagoons.

Partial licence removal on Environmental Act Licence #2712

Following partial licence removal on the former secondary (i.e., dry phytoremediation) cell, the Town of Niverville has been progressing towards developing this area as a community space. Please see the section on the ‘Niverville Lagoon Site Plan’ as to the progress that has been made in 2017.

In an effort to continue to work towards full licence removal on the former treatment lagoon site, both the Town of Niverville and researchers from the University of Manitoba continued to collect water samples from the holding cell (see Figure 4). The data will support a Notice of Alteration request, which Niverville plans on submitting in 2018 to the Province of Manitoba, for a second partial licence removal of the holding cell.

Communication Activities

In 2017, Nicholson prepared four manuscripts for peer-reviewed journals (see reference list). This past year Nicholson also prepared an article for Canadian Reclamation magazine on the Niverville project, focusing on the University of Manitoba research, for publish in its Spring 2018 magazine issue. Two previous articles (Spring 2015, Fall 2016) were published in Canadian Reclamation magazine on the Niverville project. In addition to written communication materials, Nicholson also gave an oral presentation of his research at the annual conference of the Canadian Society for Bioengineering held in Winnipeg in August 2017.

Niverville Lagoon Site Plan

With licence removal from the decommissioned former dry cell, the Town of Niverville continues to proceed with preliminary steps to develop the former lagoon into an area that the residents of Niverville can enjoy. In August 2017, Niverville harvested and bailed the cattail in the former dry cell, in preparation for seeding this area with native grasses, trees and shrubs (see Figure 5). The cattail biomass currently remains on site, while Niverville explores alternative uses for this material, including as feed for livestock. In fall 2017, the Town disced the majority of the former dry cell (i.e., with the exception of the research plots), in preparation for the plan for landscaping. In consultation with an earth-moving company, the Town will be working to remove the southern and eastern banks of the former dry cell, and use this material to both encourage positive drainage within the area, as well as build a lookout hill into the wetland cell.

Funding

In 2017, the Town of Niverville was successful in acquiring funding, from the Lake Winnipeg Foundation, for the cost of installation of trees and shrubs to support the development of the former dry cell as a community area. The Town of Niverville continues to explore other funding opportunities to provide support for the wetland bioremediation research and site development as an interpretive area.

Activities Planned for 2018

In 2018, monitoring of biomass and water quality will continue in the wetland cell during the 2018 growing season. Nicholson will have his final committee meeting in May 2018, with a target for defense of his PhD in July 2018.

The Town of Niverville, Native Plant Solutions and The University of Manitoba plan on arranging a meeting with representatives from the Province in 2018, to provide an update on research progress made since dry cell decommissioning in December 2015, and as the final results of the research of N. Jeke and F. Zvomuya are compiled. This discussion will help to support the goal of full site decommissioning, by engaging Provincial representatives as part of the discussion to ensure decommissioning targets are met.

Finally, the Town of Niverville will continue site development on the former dry cell area no longer under Environmental Licence. Plans for 2018, pending funding availability and appropriate site conditions, include landscaping of the former dry cell with native grasses, trees, shrubs and a walking path. In addition, the Town will look to work towards the submission of a Notice of Alteration request for licence removal on the holding cell.

If you have questions regarding project activities in 2017 please do not hesitate to contact:

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References

- N. Jeke. In review.** Flooding Depth and Timing Effects on Phosphorus Release from Flooded Biosolids in an End-of-Life Municipal Lagoon.
- N. Jeke. In review.** Nitrogen and Phosphorus uptake by Cattail (*Typha latifolia*) during In situ Wetland Phytoremediation of Biosolids in an End-of-Life Municipal Lagoon.
- N. Jeke. In review.** In situ Measurement of Nutrient and Trace Element Availability using PRS-probes and Uptake by cattail during Wetland-based Phytoremediation of Municipal Biosolids.
- N. Jeke. In prep.** Terrestrial phytoremediation of municipal biosolids in an end-of-life lagoon using cattail.



Figure 1. Regrowth of cattail in a harvested plot in the secondary cell, June 2017 (Photo courtesy of N. Jeke).



Figure 2. Plot harvested in the secondary cell, July 2017.



Figure 3. Survey transect in the wetland cell (Photo courtesy of N. Jeke).

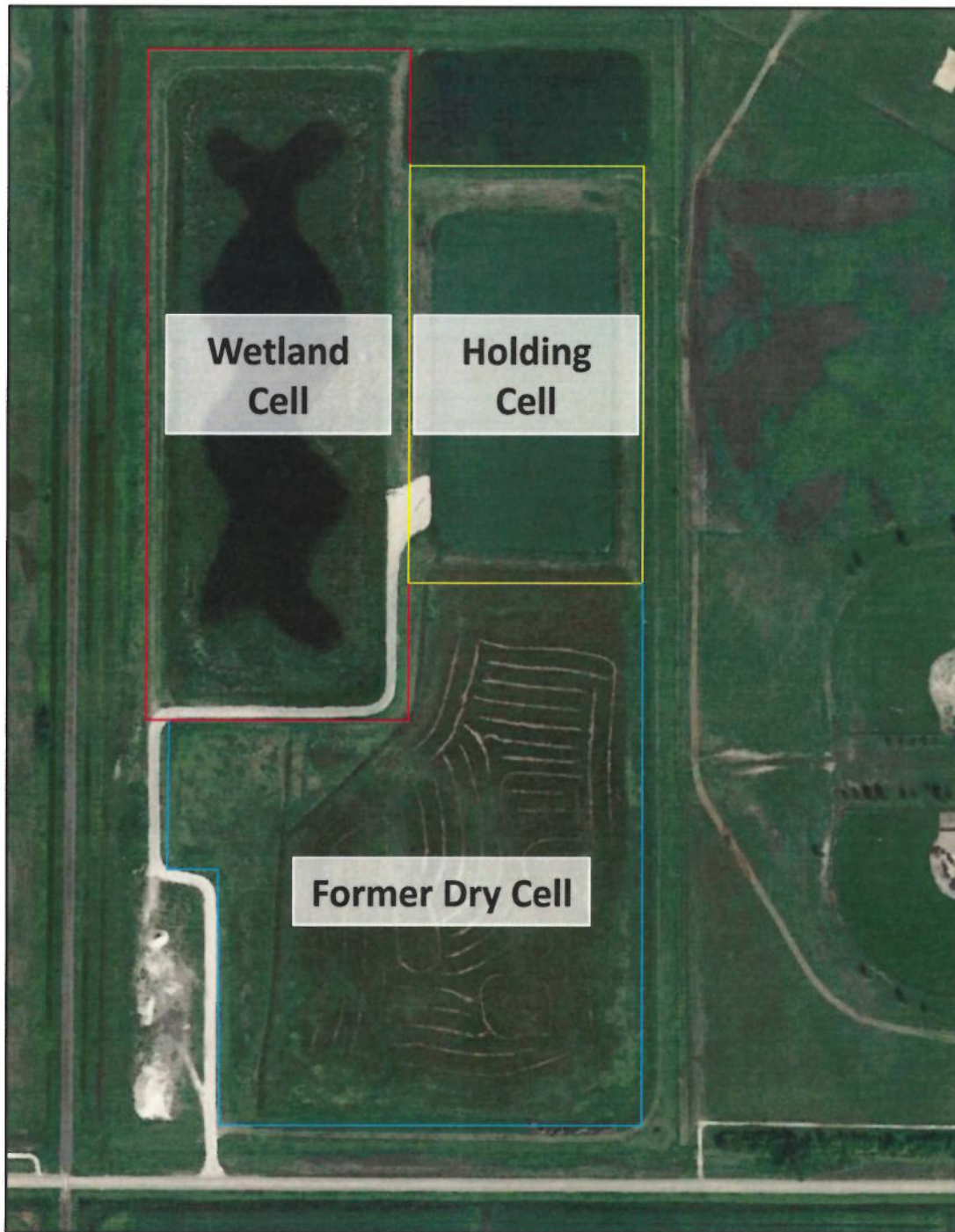


Figure 4. Aerial view of the Niverville Lagoon decommissioning project, including the former dry cell (licence removal December 2015), wetland cell (currently under licence) and holding cell (currently under licence, with tentative notice of alteration submission in 2018). Image courtesy of Google Earth (Imagery date: 2015).



Figure 5. Cattail harvesting conducted on the former dry cell in August 2017, in preparation for landscaping in 2018.