



# Alternative Wetland Compensation Strategy Churchbridge Wetland Restoration

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SMA Environmental Forum – October 17-18, 2018, Saskatoon, SK



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# Outline

## › Wetlands

- What are wetlands?
- How do wetlands benefit the environment?
- Protection of wetlands in Saskatchewan

## › Wetland compensation requirements for the Rocanville expansion

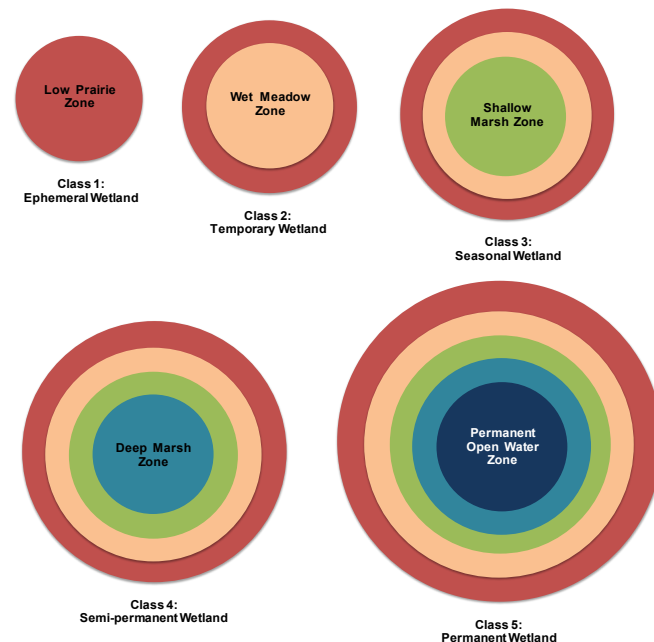
## › Churchbridge Restoration Project

- Overview
- Objectives
- Design
- Construction
- Environmental monitoring
- Challenges
- Next Steps



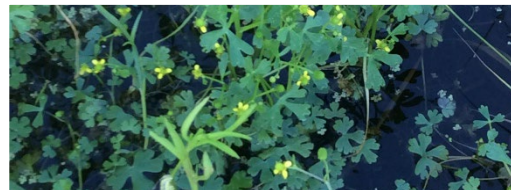
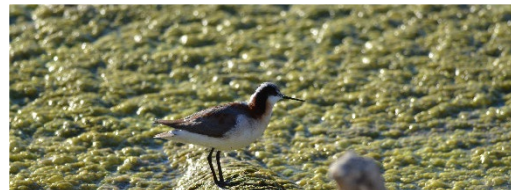
# What are Wetlands?

- › Distinct ecosystems inundated by water, either temporarily or permanently
- › Poorly drained (hydric) soils and vegetation / biological activity adapted to a wet environment
- › Many classes of wetlands, varying degrees of water permanence (many do not hold water all year)
- › Stewart and Kantrud (1971) wetland classification system is often used in southern SK
- › Classes are based on distinct zones of vegetation assemblages, directly correlated to water permanence



# How do Wetlands Benefit the Environment?

- › Provide essential habitat for a wide range of plant and animal life
- › Filter silt and sediment from water
- › Reduce nutrient levels of water
- › Reduce flooding



# Protection of Wetlands in Saskatchewan

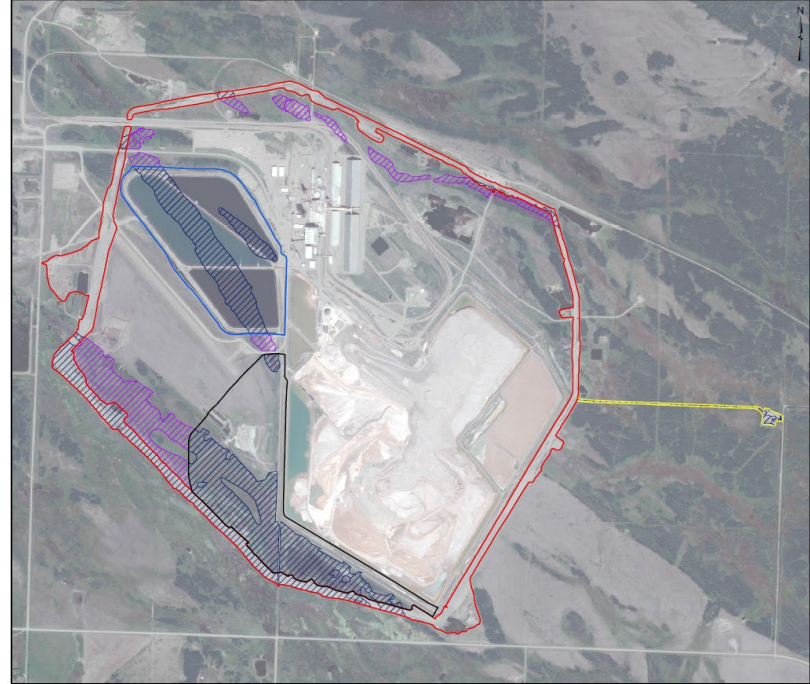
- › Protected under a combination of federal and provincial legislation, including:
  - *The Environmental Management and Protection Act, 2010*
  - *The Water Security Agency Act*
  - *The Environmental Assessment Act*
  - *The Wildlife Act, 1998*
  - *The Wildlife Habitat Protection Act*
  - *Species at Risk Act*
  - *Migratory Birds Convention Act, 1994*
- › Where impacts to wetlands cannot be avoided, proponents are required to compensate for the loss of wetland habitat





# Wetland Compensation Requirements Rocanville Expansion

- › Expanding site footprints or development of greenfield sites can result in loss of wetland habitat
- › Nutrien committed to compensation of impacted wetlands
- › 123 ha of total wetland habitat impacted at the Rocanville and Scissors Creek sites
- › 2011 surface water retention pond (19 ha)
- › 2013 borrow pit remediation (42 ha)
- › The projects have been subject to reviews under *The Environmental Assessment Act*



# Wetland Compensation Requirements

## Rocanville Expansion

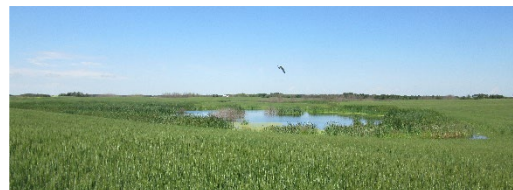
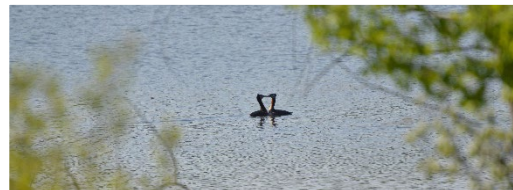
- › 62 ha of outstanding wetland compensation commitments
- › Three wetland compensation options identified to fulfill the remaining compensation:
  - 1) **Wetland restoration on land owned by Nutrien near Churchbridge, SK (preferred option)**
  - 2) Wetland restoration at the Scissors Creek mine site
  - 3) Wetland compensation through Ducks Unlimited Canada





# Churchbridge Restoration Project: Overview

- › Nutrien-owned Churchbridge land includes 38 quarter sections
- › Located 41 km southeast of Yorkton, SK
- › Land is leased to farmers for use as cropland and hayland
- › Aerial imagery showed many wetlands had been drained for agriculture
- › Significant opportunity for wetland restoration



# Churchbridge Restoration Project: Overview

- › Land contains 140 impacted wetlands & 92 ha potential restorable wetland area
- › Construction of earthen berms at specific locations to restore pre-existing wetlands
- › Nutrien is working with MOE to obtain approval, which requires
  - Proof of success through multi-year monitoring and maintenance
  - Perpetual conservation easements



# Objectives

- › Primary objectives:
  - Compensating for wetlands within the same watershed & in close proximity to where wetlands were lost
  - Wetlands of similar type to those that were lost
- › The Churchbridge Project is:
  - Within the same watershed as the lost wetlands (Assiniboine River)
  - Within 60 km of the lost wetlands
- › Expected to result in wetlands of a similar type:
  - Shallow, temporary wetlands with some semi-permanent wetlands



# Design

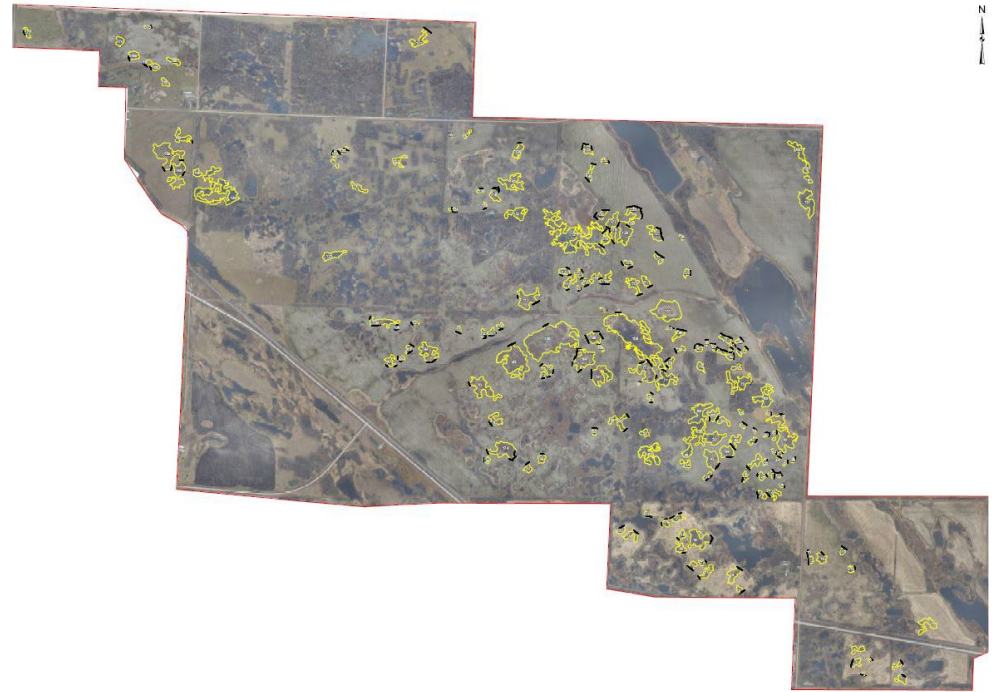
- › Analysis of LiDAR and historical imagery identified previously drained wetland depressions & wetland drainage pathways
- › Earthen berms were used to close drainage pathways and restore historical wetlands
- › Berm elevation and length for each impacted wetland were estimated using LiDAR





# Design

- › Berms consist of compacted till material from a nearby borrow source
- › Berm height of 0.4 m, 5(H):1(V), and 3H:1(V) downstream side slopes
- › Designs were revised upon consultation with farmers to improve the ability of them to cultivate the land
- › The design included a contingency of approximately 30% (18.7 ha) to account for some failure



## Construction: Fall 2017

- › SNC-Lavalin conducted construction management, and retained Acadia to conduct the earthworks
  - Avoided the general bird nesting season
- › Berm construction conducted from October to December 2017
- › An Aquatic Habitat Protection Permit (AHPP) was obtained for construction
- › Surficial organics and topsoil were stripped from the berm footprint & windrowed near each berm





# Construction: Fall 2017

- › Material spread onto the berm locations using a scraper
- › Graded by a dozer in 200 mm lifts
- › Compaction achieved for each lift through track compaction (dozer) & wheel compaction (scrapers)
- › Dozer performed a final grade, trimmed side slopes
- › Topsoil was placed back on the till berm & shaped at a thickness of 150 mm
- › QA/QC included RTK GPS, proctor, nuclear densometer testing, & laboratory analyses



## Construction: Spring 2018



Wetland after spring melt



Wooden laths

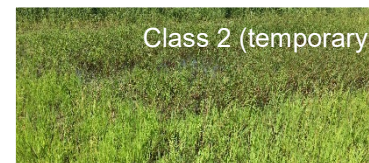
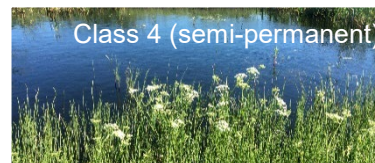


Seeding

- › Wooden laths were installed around the perimeter of the wetlands plus a buffer
- › Permanent delineators will be installed in the fall of 2018 post-harvest
- › Berms were seeded with a native grass blend

# Environmental Monitoring: Summer 2018

- › Wetland monitoring conducted in July 2018
- › A subsample of restored and unaltered (reference) wetlands were classified & delineated
- › Vegetation inventories were collected to assess restoration progress
- › Incidental wildlife observations were recorded





# Environmental Monitoring: Summer 2018

- › Restored wetlands, included:
  - Temporary (Class 2)
  - Seasonal (Class 3)
  - Semi-permanent (Class 4)
- › Wetlands that supported some native vegetation prior to construction were more established and diverse:
  - Provided habitat for native plants, amphibians, mammals, reptiles, and breeding birds
- › Smaller wetlands that had been subjected to frequent cultivation in previous years showed less established wetland vegetation



Class 4 (semi-permanent)



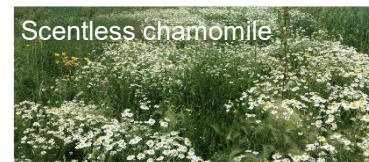
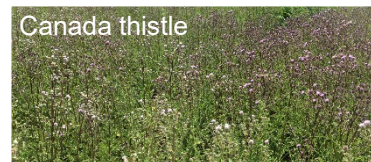
Class 3 (seasonal)



Waterfowl nest

# Challenges

- › Balancing land use between cultivated land (monoculture) and biologically diverse wetland ecosystems
- › Growth of noxious and nuisance weeds
- › Berms placed between interconnected wetlands have affected drainage
- › Establishment of wetland vegetation on small unconnected and previously cultivated wetlands
- › Public opposition – wetlands can affect farmers' ability to farm the land



## Next Steps

- › Continued weed management
- › Additional seeding of berms & buffer zones
- › Potential adjustment of berms
- › Continued environmental monitoring & reporting to MOE
- › Continued engagement with the land lessee's & RMs





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