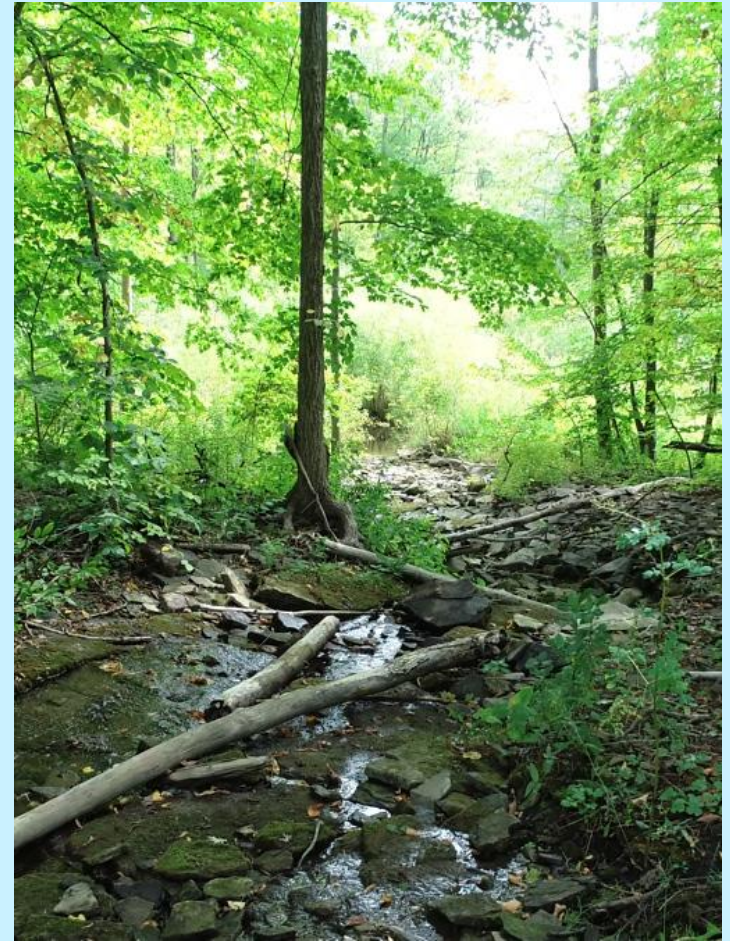


How Second Creek Got Its Groove Back: 10 Years of Holistic Restoration at the Terra Cotta Conservation Area

Paul Villard, GEO Morphix Ltd.
Mark Hendry, Credit Valley Conservation



Latornell Conservation Symposium • November 19 -21, 2019

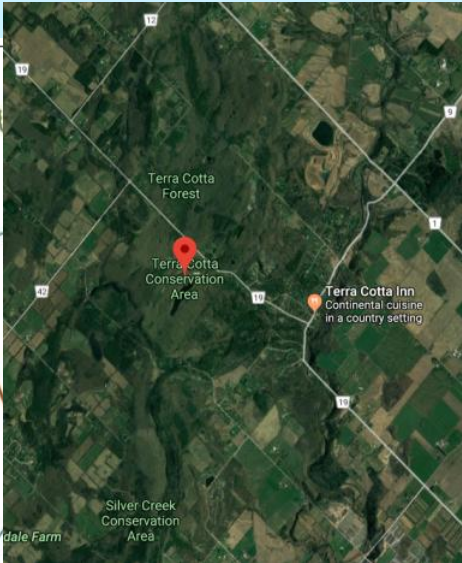
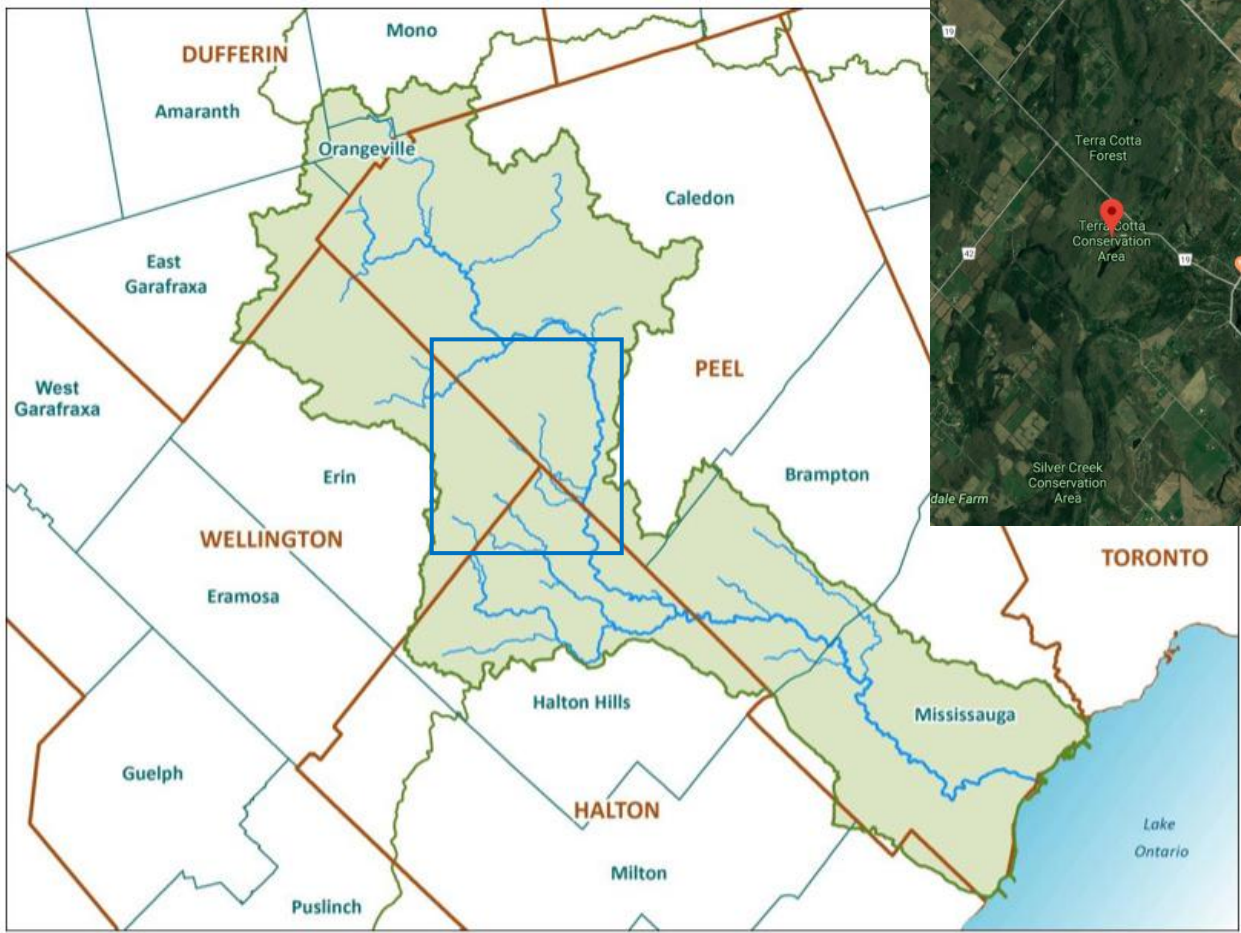


Part 1

History and Geographic Context



The Credit River Watershed



Terra Cotta Conservation Area (TCCA)

- Development of the property for recreation began in 1949
- CVC began acquiring land for TCCA in 1958
- Camping and swimming pool on-site
- Brook Trout likely present historically
- 2007 Ontario Streams report contained several recommendations regarding pond mitigation
- 2008 Terra Cotta/Silver Creek Complex Management Plan largely echoed these recommendations



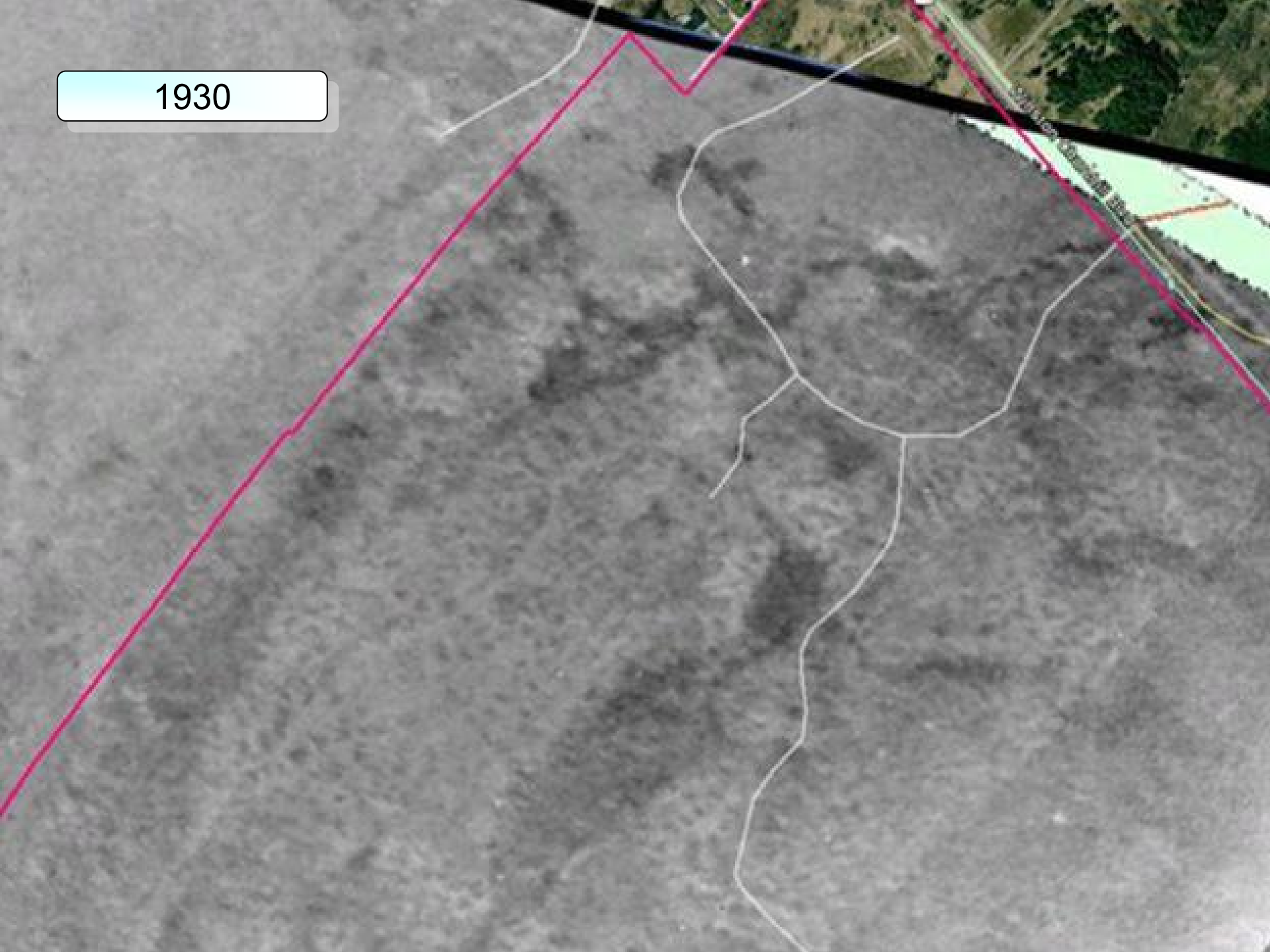


Muskrat Pond

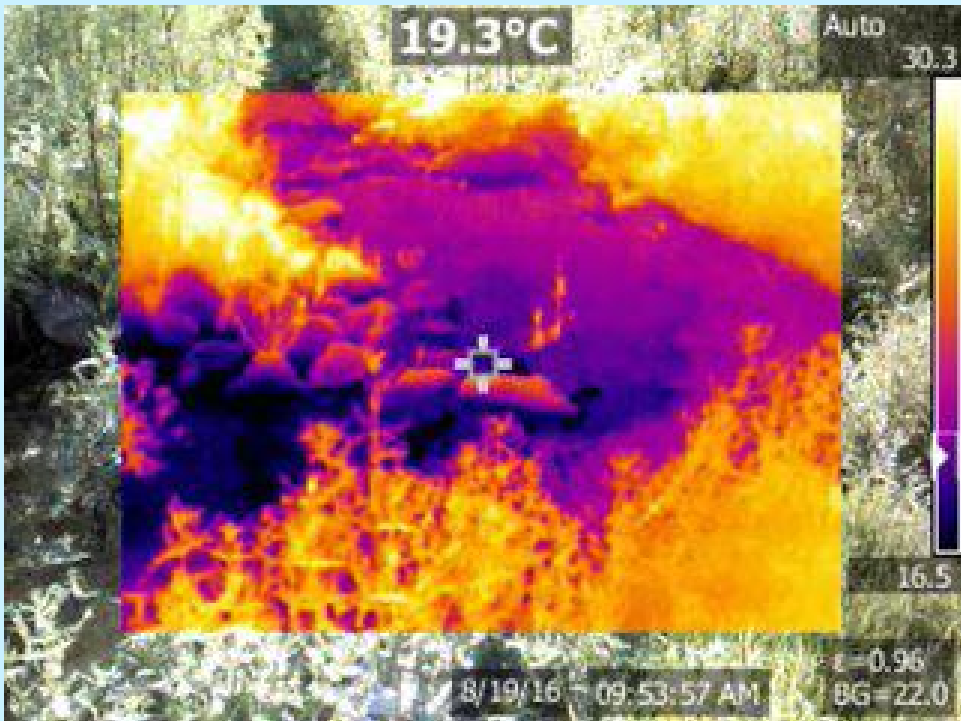
Spring Pond

Wolf Lake

1930







Part 2

A 10-Year Restoration Plan



Restoration Objectives for TCCA

- Improve water quality and reduce thermal impacts
- Increase fish passage for native fish species while maintaining a barrier for non-native fish species
- Maintain recreational fishing opportunities
- Limit impact to natural heritage system – wetlands and forest cover
- Maintain a balance of ecological niches
- Do not increase downstream erosion
- Limit impact to trail system and other amenities
- Assure works are aesthetically appealing



Phase 1 – Wolf Lake Bypass

- Goals
 - Mitigate impacts of online pond
 - Maintain Wolf Lake
- Construction Period
 - 2010
- Planning Ecology Considerations
 - Offset protection and stone sizing
 - ESC
 - Timing window
 - Restoration



Phase 1 – Wolf Lake Bypass

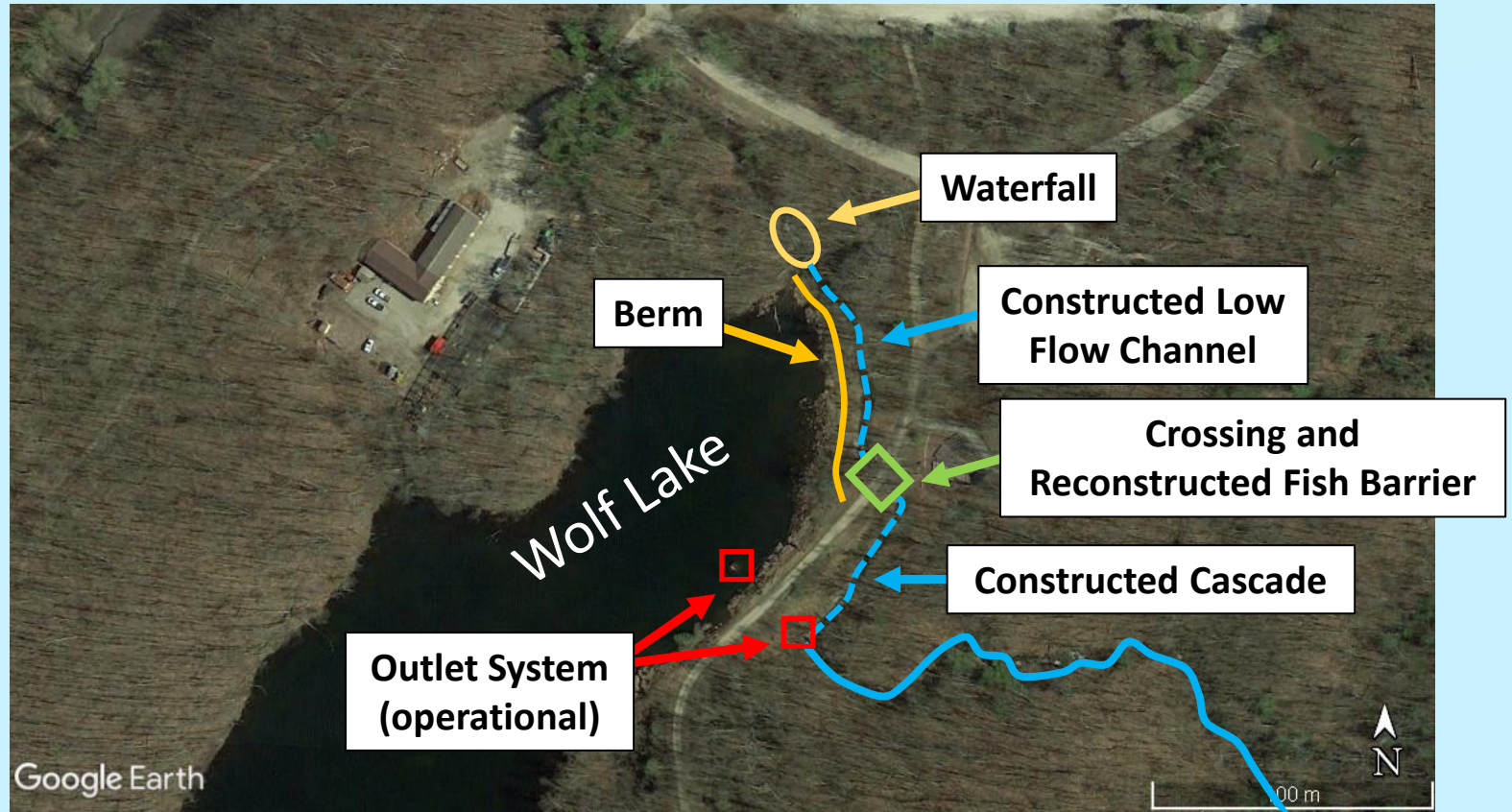
- Many conflicting management ‘asks’
 - Continued “maintenance” of lake levels, water quality, and retain lake fishing opportunities
 - Do not impact trails or other amenities
 - Do not impact waterfall/environmental features
 - Reconnect river system for sediment transport and mitigate thermal impacts from pond
 - Remove some fish barriers, but isolate stocked fish from native species
 - Do not increase hazards
- Most difficult phase for balancing goals



2005 – Pre-Construction



2018 – Post-Construction



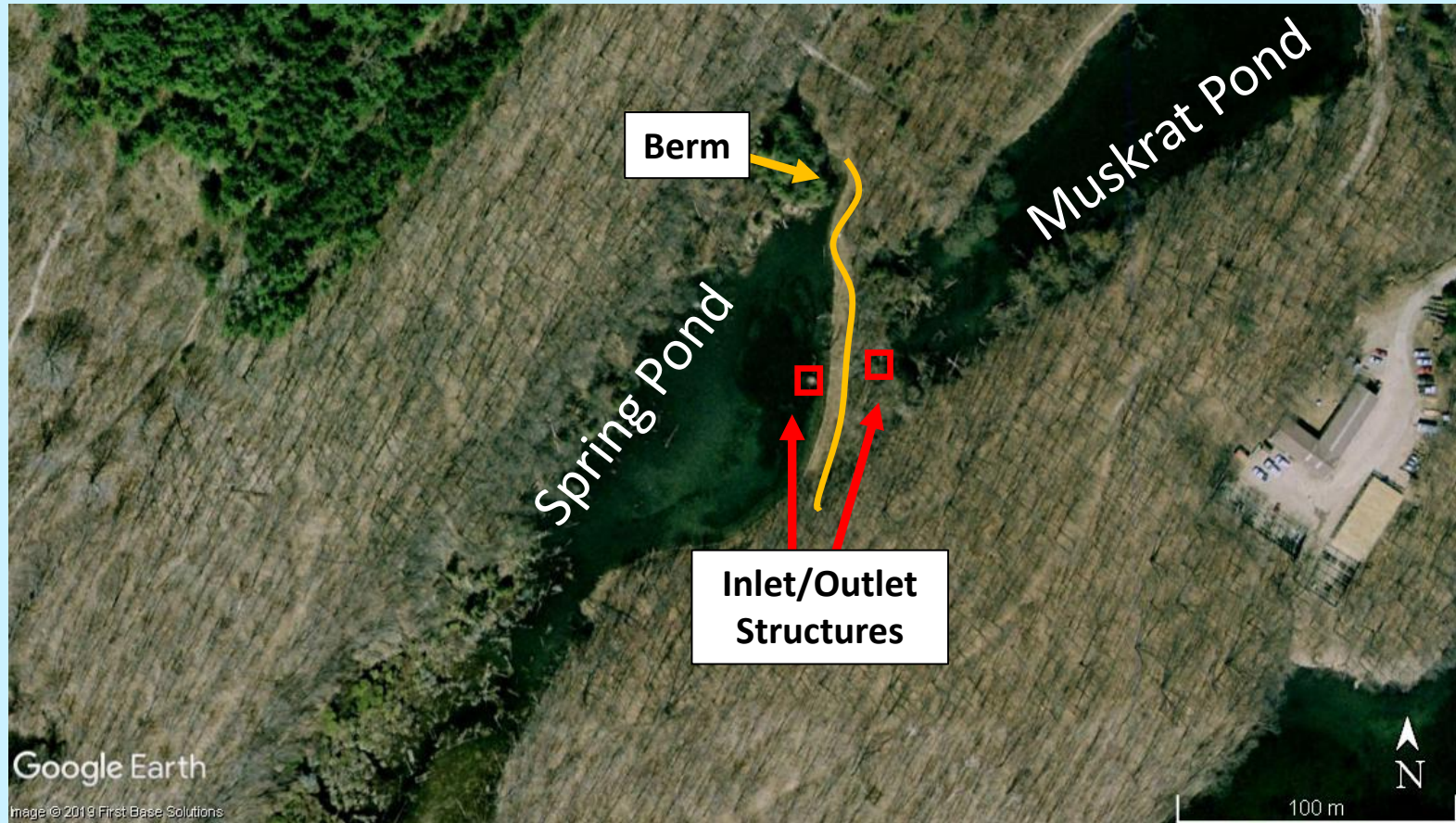


Phase 2 – Spring Pond Decommissioning

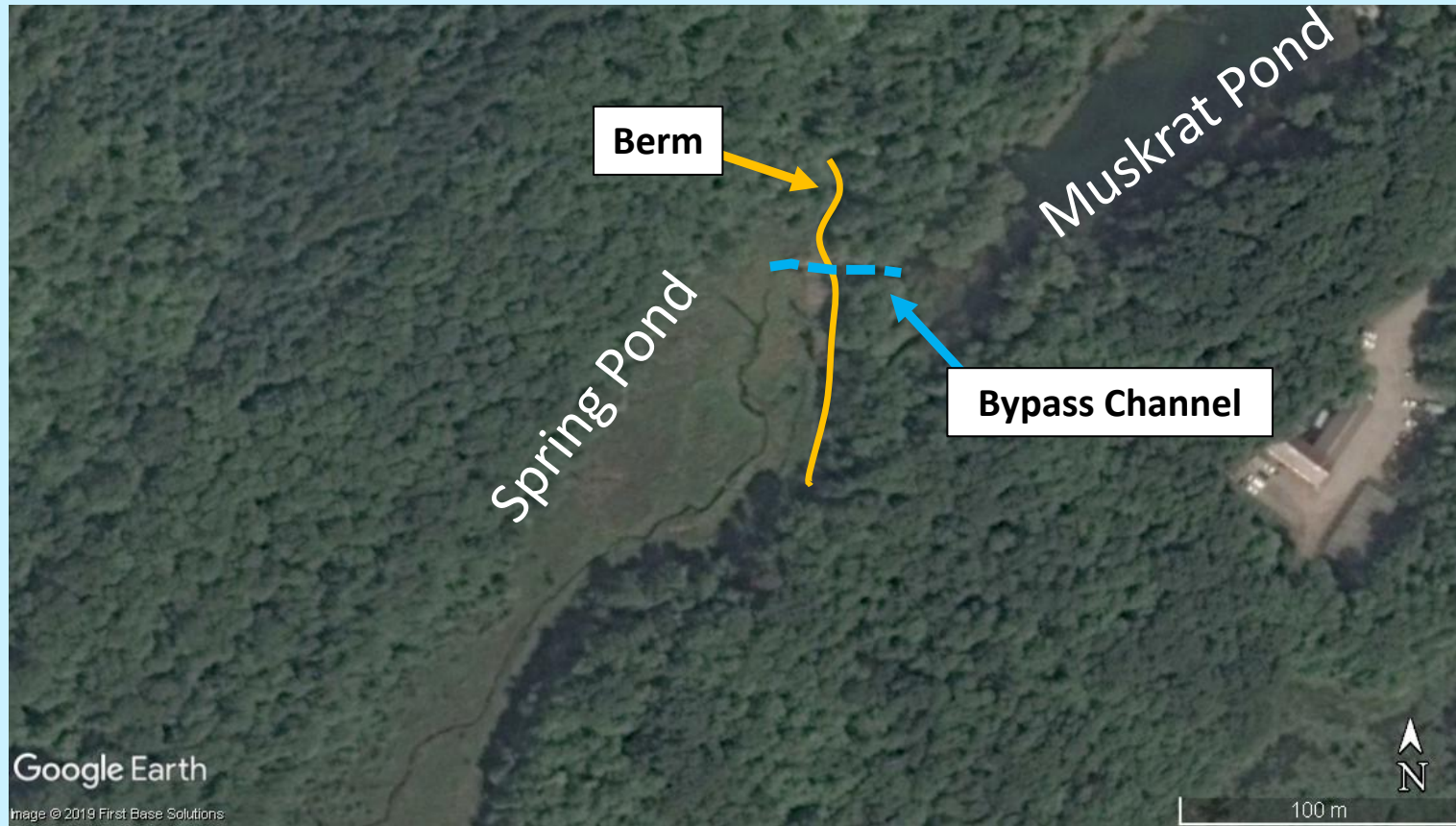
- Goals
 - Mitigate impact of online pond
 - Recreate stream and maintain wetland
- Construction Period
 - 2011
- Planning Ecology Considerations
 - Active and passive restoration
 - Less invasive, less expensive, avoid springs



2005 – Pre-Construction



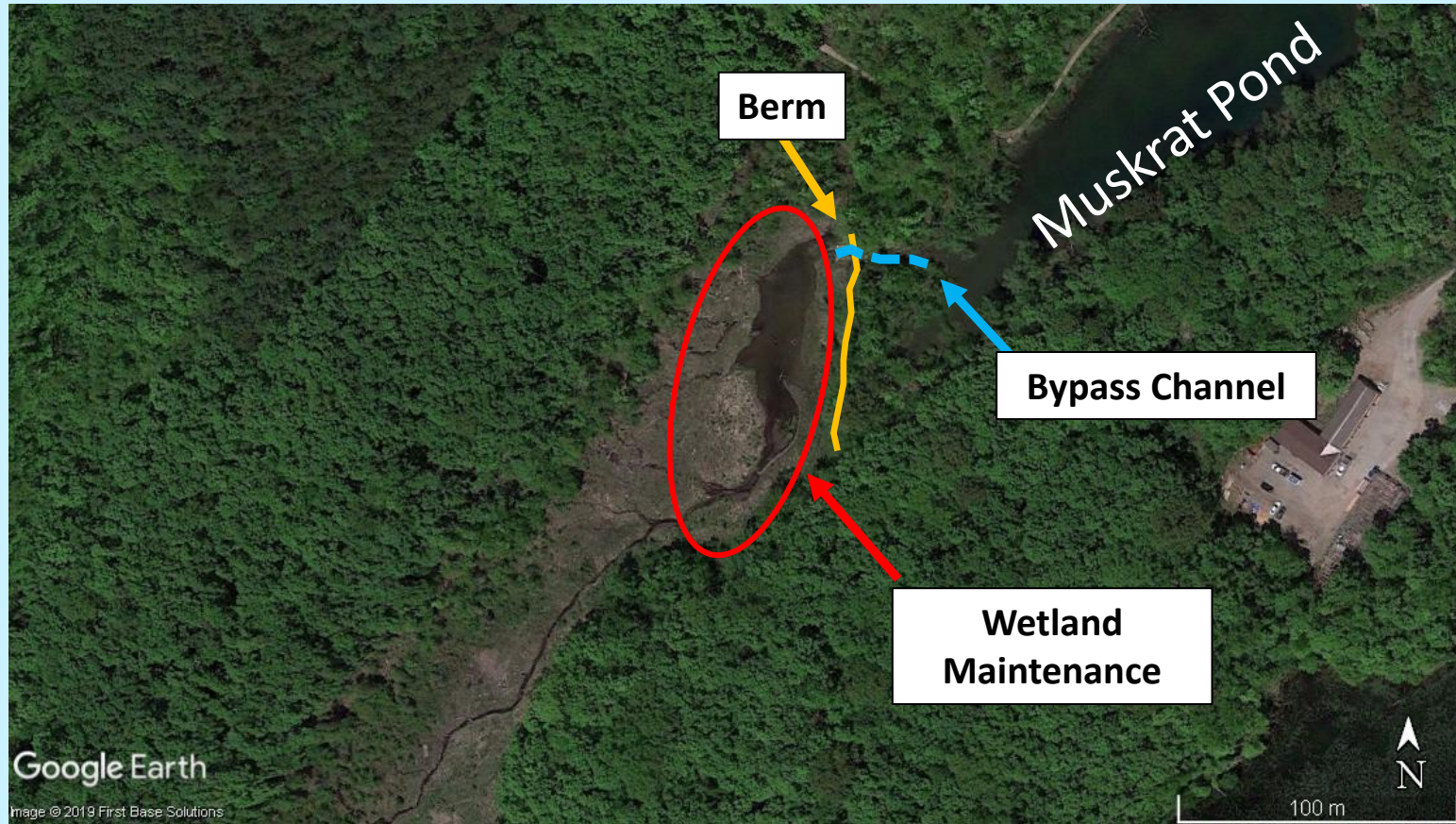
2012 – Passive Restoration



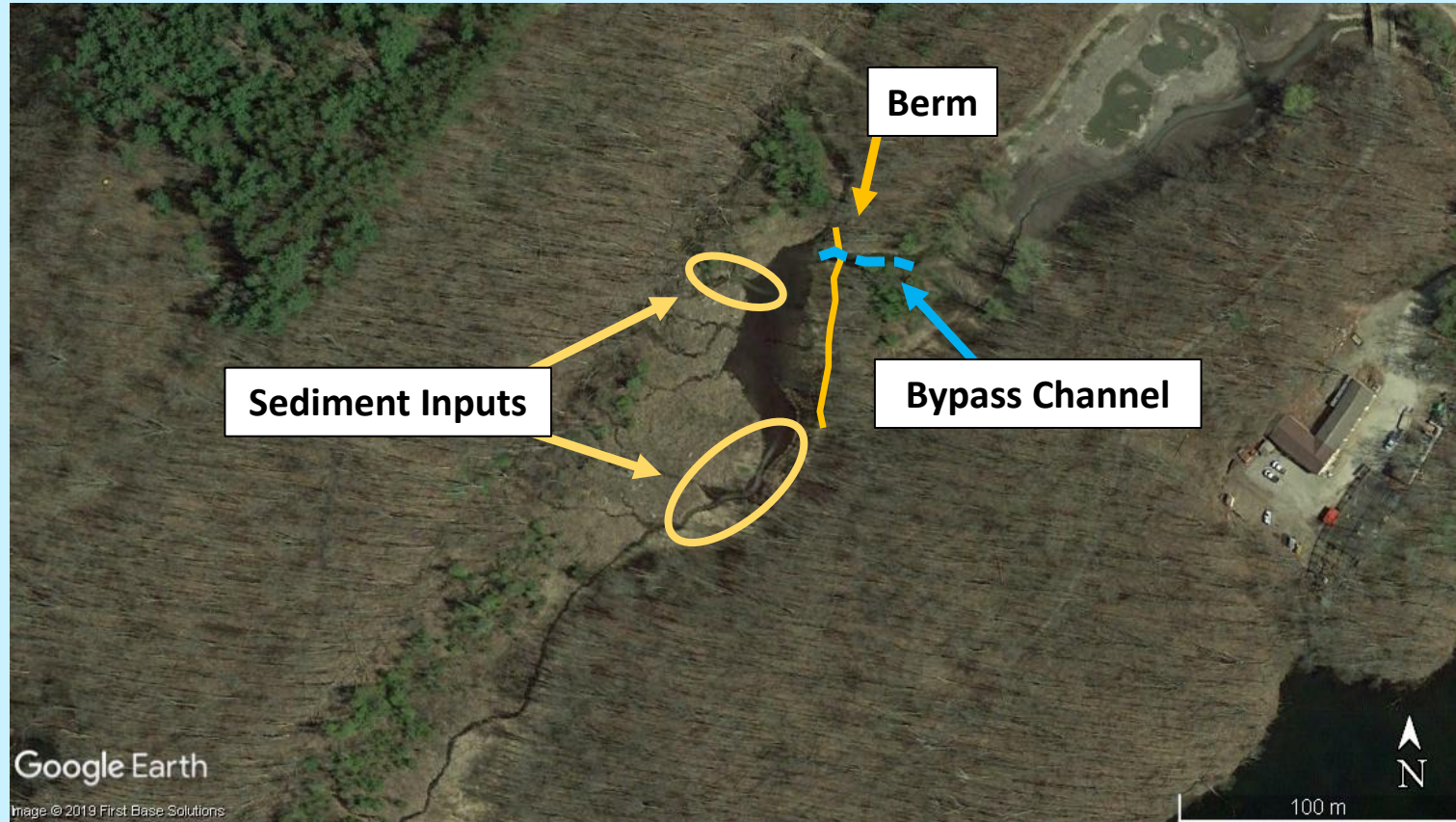
Spring Pond Cascade Construction

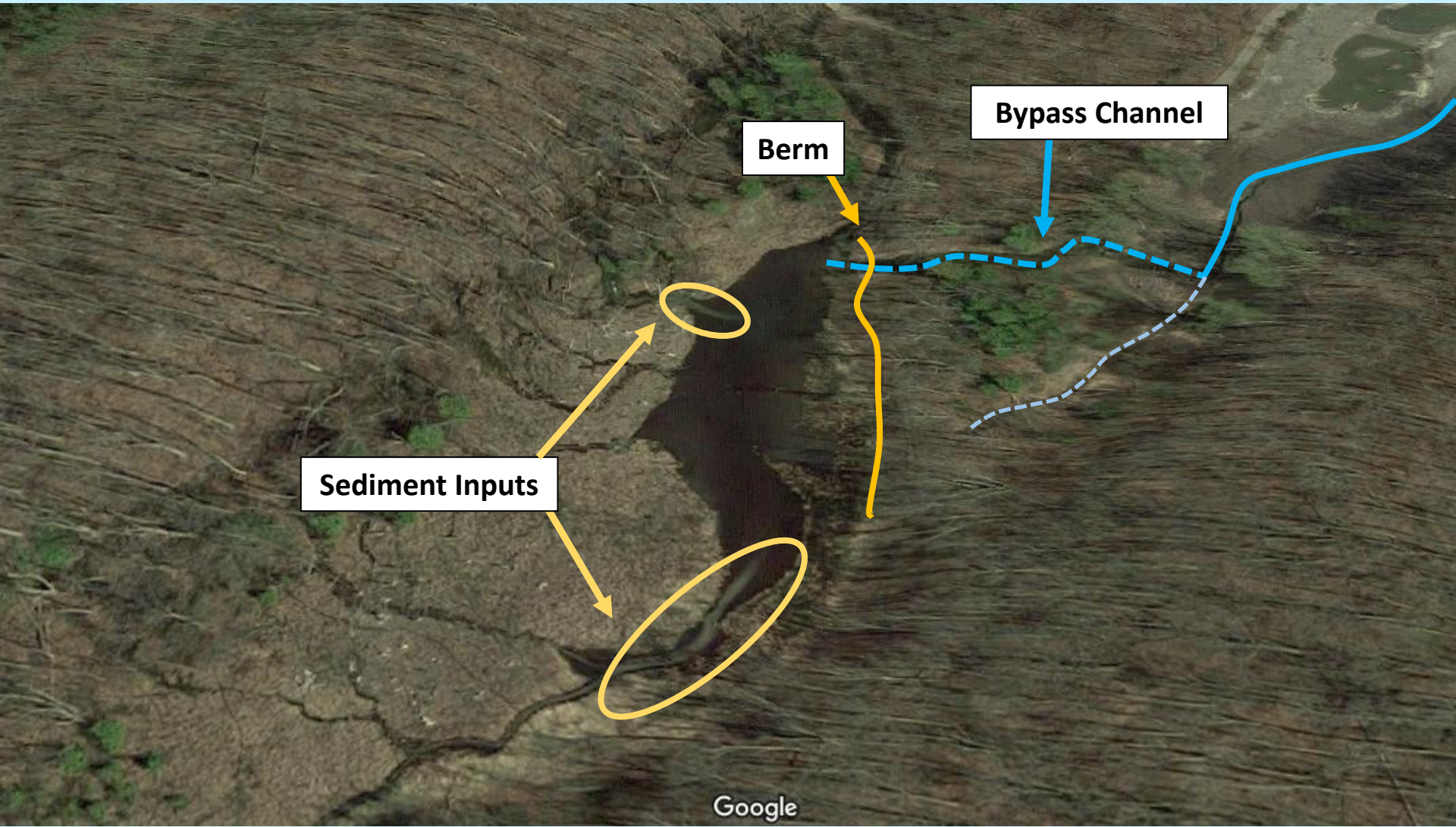


2015 – Post-Construction



2018 – Post-Construction



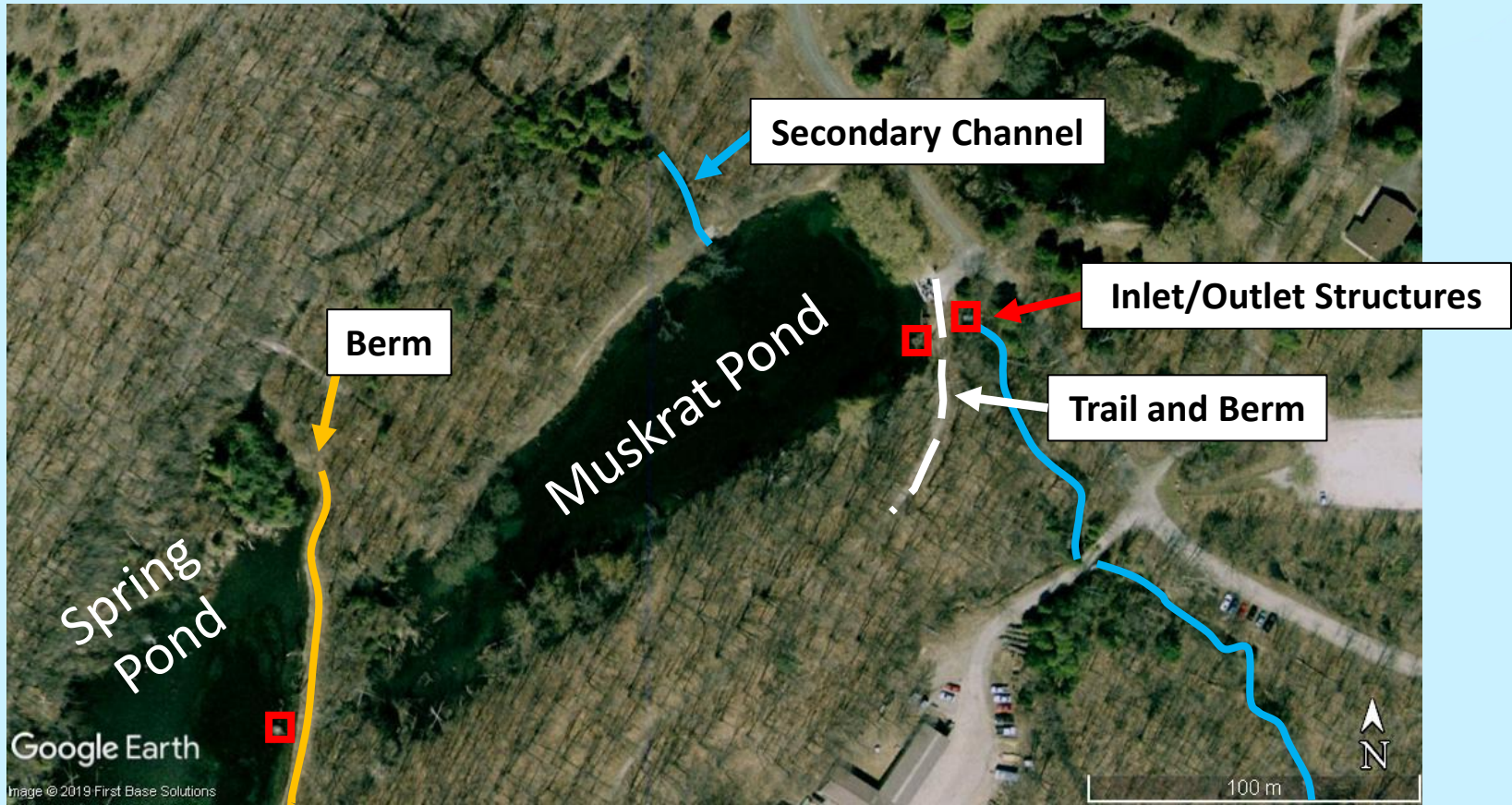


Phase 3 – Muskrat Pond Decommissioning

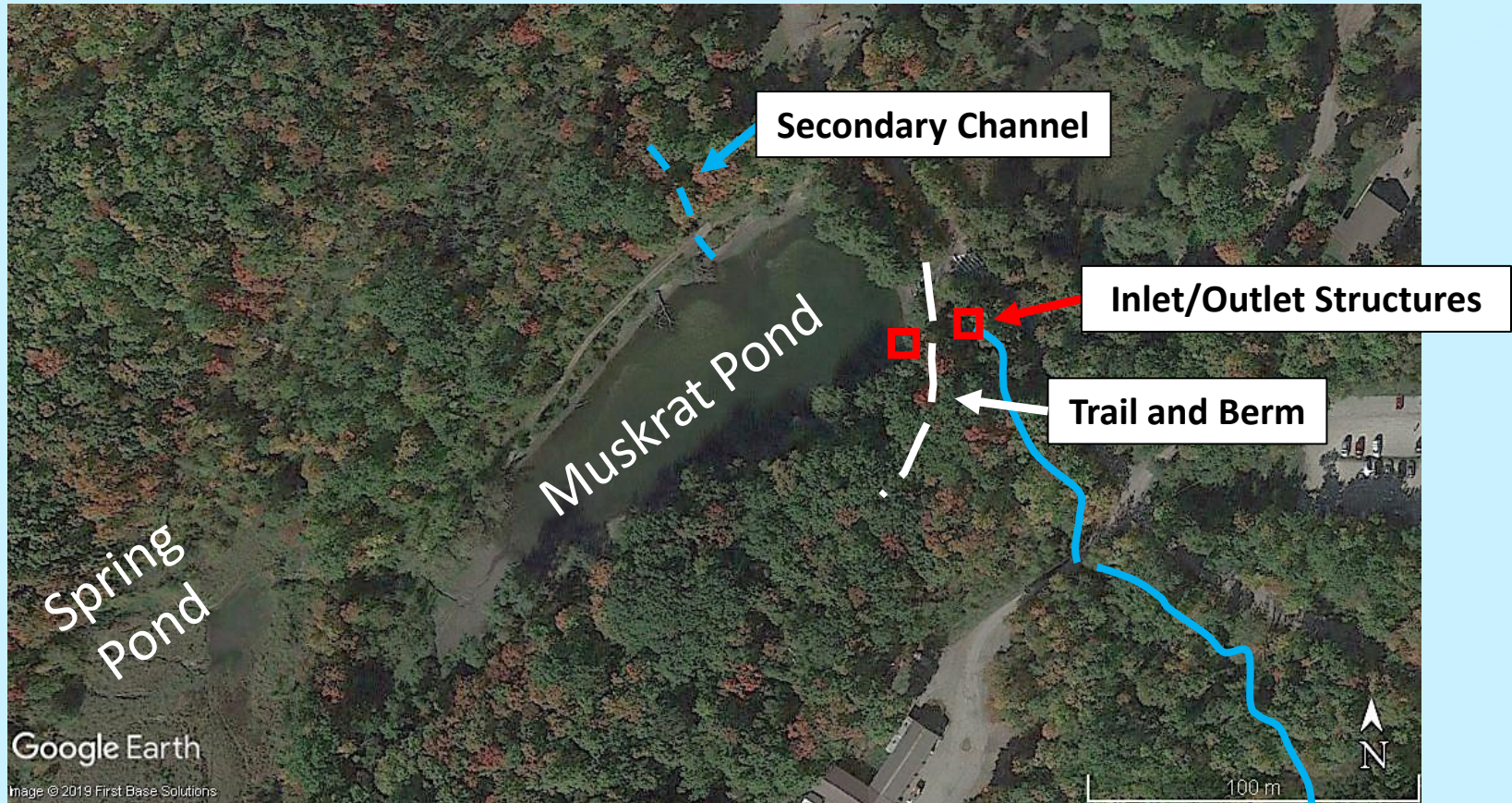
- Goals
 - Mitigate impact of online pond
 - Improve wetland habitat and maintain deep wetland features
 - Aesthetic considerations
 - Maintain vehicular passage (bridge)
- Construction period
 - 2018
- Planning ecology considerations
 - Construction methodology
 - Impacts to hydrology of other wetlands
 - Wetland design
 - Local aquatic and terrestrial species
 - Restoration



2005 – Pre-Construction



2016 – Pre-Construction

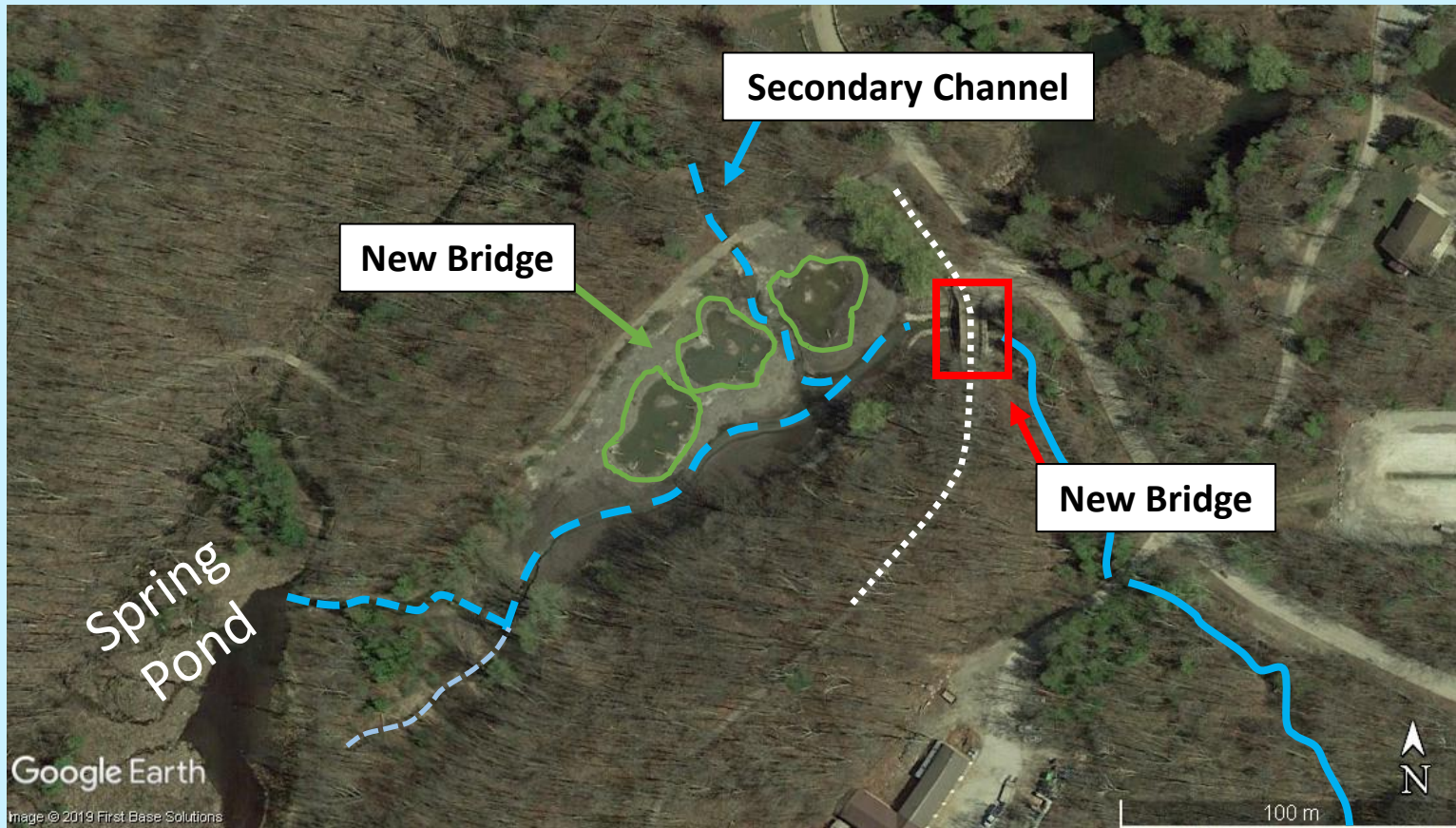


2017 – During Construction





2018 – Post-Construction





Google



Muskrat Pond

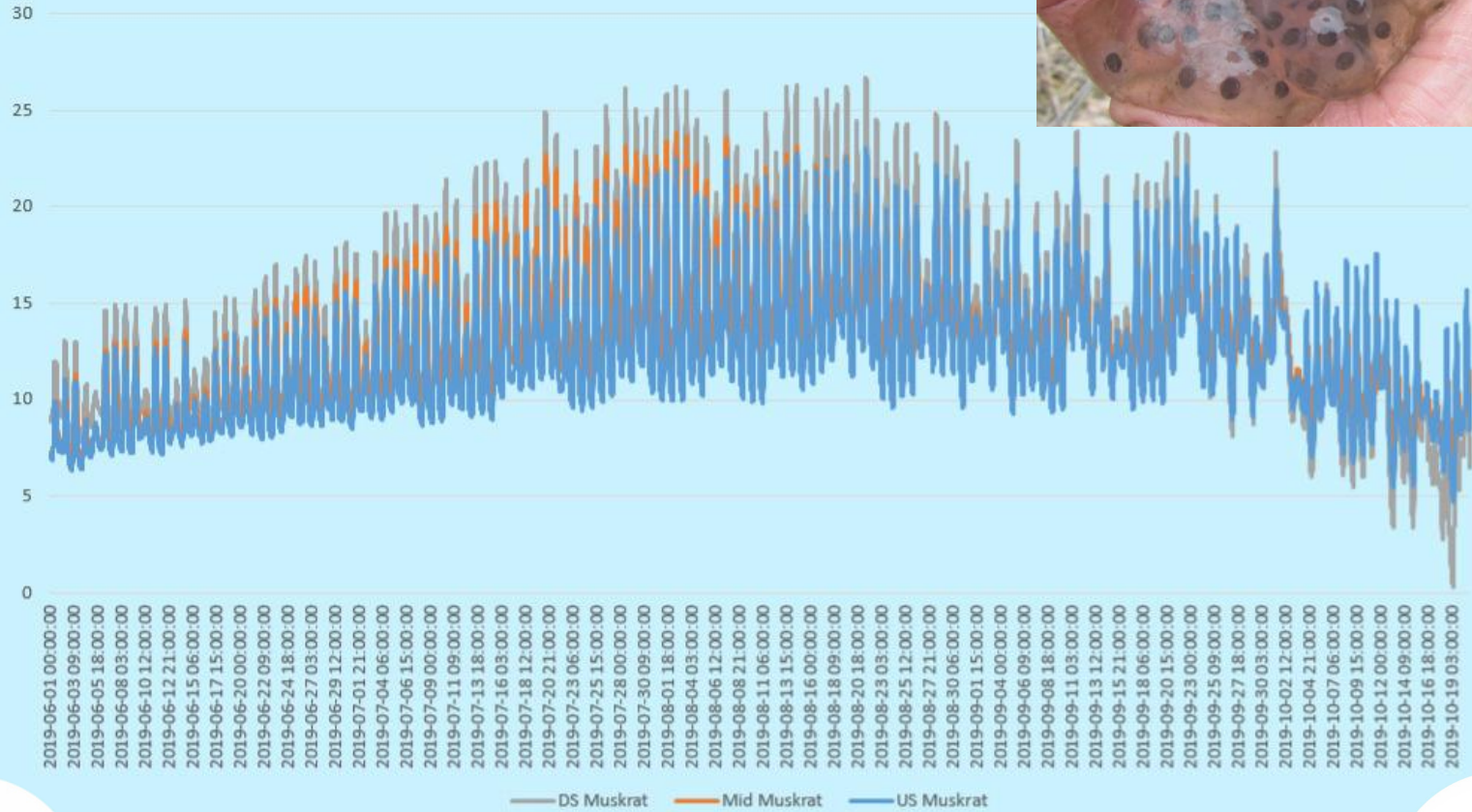


Part 3

Monitoring



Monitoring



Takeaways

- Sequencing allowed resources and staff time to be mustered to address restoration in more manageable chunks – finish one phase, regroup, adjust design, find additional resources, get buy-in, construct
- Sober review before next phase:
 - What worked, what didn't?
 - What bits of the system do we need to bolster?
 - Designs for each pond changed/revised over the history of the project
- Each section tailored to address very local design requirements
- It allows successes to be used to market future phases
- Money/resources initially limited for monitoring



Project Partners and Supporters

- CVC
- MNRF
- Ontario Streams
- Ontario Federation of Anglers and Hunters
- Ducks Unlimited Canada
- Hydro One
- WECI
- COA
- Sequoia Wetland Compensation Fund
- Lake Ontario Water Keeper
- OCEF
- *Geomorphic Solutions (The Sernas Group), GHD, GEO Morphix Ltd., RM Construction*



Thank you.

