A Project Approach to Wetland Planning, Construction and Monitoring

ESAA Regulatory Forum 2016

Mark Svenson, P.Biol
Provincial Transportation Environmental Coordinator
Alberta Transportation
Government of Alberta
Ministry of Transportation

• **Vision**
  • Alberta Transportation will be a centre of excellence for transportation in North America.

• **Mission**
  • To provide a safe, innovative and sustainable world-class transportation system that supports Alberta’s economy and quality of life.
Wetland Facts...

• A wetland is land saturated with water long enough to promote wetland processes as indicated by:
  – Poorly drained soils,
  – Hydrophytic (water tolerant) vegetation,
  – Biological activity adapted to the wet environment.

• Approx 20% of Alberta’s surface is covered by wetlands
  – More than 90% of these are peatlands (bogs and fens) found in the boreal forest.
Wetland Losses

• Wetlands have been subject to loss and degradation since the late 1800s
  – Urban expansion
  – Forestry
  – Oil and gas exploration and development
  – Mining
  – Agricultural activities

• Approximately 67% of wetlands in the White Area have been lost
  – Up to 85% in some areas
Wetland Mitigation Hierarchy

- Avoid
- Minimize
- Replace
Twinning of Highway 63

WETLANDS WORK...

...we work for wetlands!

New York & Long Island Field Offices,
U.S. Fish & Wildlife Service
http://nyfo.fws.gov
Highway 63 History

• 2006 the Government of Alberta announced the Twinning of 240 km between Atmore and Fort McMurray.
• 2012 the Government of Alberta accelerated the twinning to be complete by the fall of 2016.
The Eco System

- The southern leg of the project area is in the Alberta White Zone.
  - Farthest northeast extent of agricultural activities
- The majority of the project is in the Boreal Forest (Alberta Green Zone).
Alberta Water Act

- Construction of Highway 63 is predominantly within the boreal forest in Alberta, which characteristically has abundant wetlands.
- Efforts were made to minimize wetland impacts.

Map of Highway 63 construction within the boreal forest in Alberta.
Construction Facts...

- Hundreds of thousands of tonnes of soil are used for highway construction each year.

- Approximately 64 million tonnes of earth, 3.7M tonnes of gravel and 1.2M tonnes of ACP used on the twinning of Highway 63.
Old Design Standard

LIMIT OF DISTURBED AREA
(20 m TYP)

DEPTCH = 10 m
ESTIMATED QUANTITY = 230,000 m$^3$

HAUL RD
PROP. RAW BDY

3,000
+000
+000
Old Design Standard

Source: Google Earth
New Design Standard
New Design Standard
Why?

• Why is AT doing this?
  – The right thing to do.
  – In-lieu fee payment = $$$$$
    • Went up 260% from a year ago

• Where economically feasible (and available); rehabilitation, creation, or enhancement of wetlands is being incorporated into project implementation.

• Any wetland area not related to compensation requirements for the project will be included in the bank as credits for use on other/future projects within the same watershed.
Alberta Transportations Wetland Creation Program for Highway 63
Wetland Loss and Compensation Plan

- Wetland Loss and Compensation Plan was developed by Alberta Environment and Sustainable Resource Development and Alberta Transportation.
Implementation

• Use of the design guide or typical in all tender packages.
• Allowing for field fit and creativity.
• As built drawings.
Post Construction Monitoring

• Three years of monitoring commitment.
• Year one is the first full growing season following construction.
• Early and late summer monitoring events.
Comparison

• 1960s vs 2007 vs New Design vs Natural
Post-Construction Monitoring

- Hydrological Function
- Vegetation
  - Species richness
  - Exotic species
  - Wetland indicators
- Water
  - Multiple parameters
- Wildlife
  - Observational
  - Sound recorders
- Fish
- Aquatic invertebrates
- Soils
Measures of Progress

Questions we have asked

• Has a borrow pit reached hydrological equilibrium? What are the water sources (groundwater, runoff)?
• How are water levels changing over time?
• Is water quality being affected by external sources? Is water quality changing over time?
• How does borrow pit water quality compare to that of the reference wetlands?
• Are borrow pit vegetation communities functionally comparable to reference wetlands?
• How is vegetation changing over time?
• How do wildlife observations at the borrow pit compare to those at the reference wetlands?
• Do borrow pits support wetland-dependent wildlife species?
• Is a diverse community of aquatic invertebrates supported? Are communities comparable to the reference wetlands?
What are we really trying to answer?

- Are our created wetlands providing value similar to natural wetlands or on a trajectory to do so?
Measures of Progress

• **Goals**
  • Assess how the facilities are progressing
  • Graduate facilities from the monitoring program
  • Provide a metric for assessing comparative value
  • Program improvements
    • Including more targeted wetland monitoring in the future.
  • Shorten the process
  • Standardize the process

• **This all feeds into the Alberta Transportation Wetland Habitat Compensation Program**
  • Allows us to deposit surplus areas in the bank for future projects.
Measures of Progress Tool

• Developed in consultation with Alberta Environment and Parks.

• It provides a simple method of assessing the trajectory of each facility.

• Once a trajectory is established the comparative value can be ranked.
Measures of Progress Tool

• **After the first analysis**
  • Water Quality, Vegetation, Aquatic Invertebrates, Wildlife Usage
  • Shortens the time required to monitor
  • Provides basis for a value assignment
  • Provides the background for banked credits to be used on future projects

• **Ultimately ensures Alberta Transportation meets commitments to regulators**
Conclusion

- 70+ facilities have been constructed over the last 5 years.
- Completed 3 years of monitoring.
- With the last monitoring event we graduated 3 facilities from the program.
Questions?
Site Location Plan
Campsite Road Wetlands

- Constructed in 2004
- Project did not impact wetlands
- Accepted as compensation for three projects