Incorporating Wetland Knowledge into Road Developments

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Wetland BMP Workshop
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Ducks Unlimited Canada
Conserving Canada's Wetlands

RESCUE OUR WETLANDS
Water – Wildlife – You

Outline

Wetland Classification Systems

Wetlands & Roads

Previous Activities

Current & Future Initiatives

Forest Inventory and Wetlands

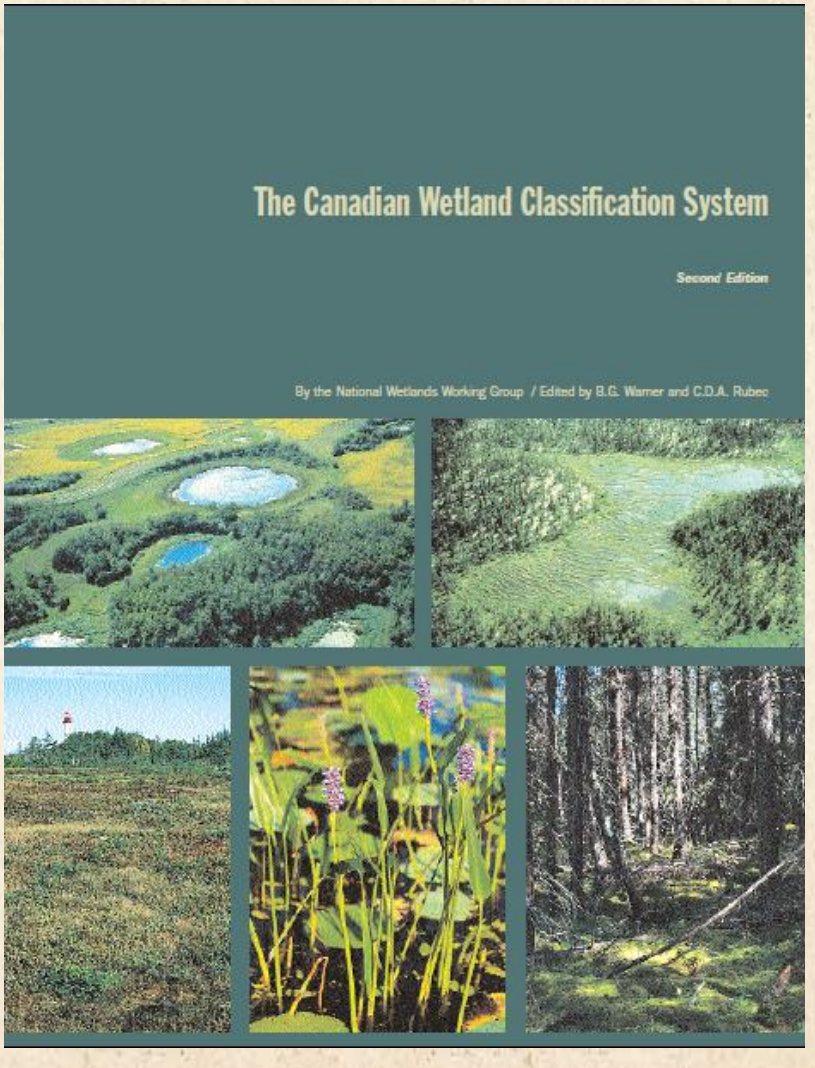
- Largely focused on the “productive land base”
- Some of the productive land base was/is wetland such as black spruce swamp
- Features without merchantable timber were typically described as muskeg, string bog etc.
- Creates significant difficulty in determining the type of mapped wetlands

Wetland Classification and Inventory

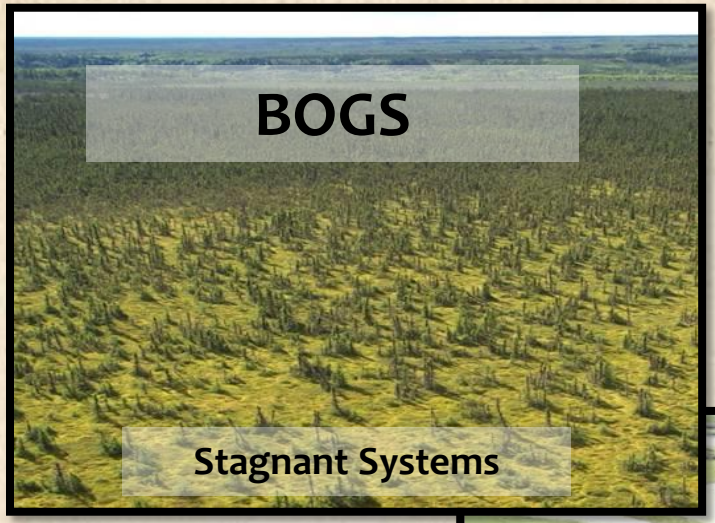
- Historically no universally adopted wetland classification and mapping system in Canada
- Wide variation of landscapes
- Three primary systems have been used including the Stuart and Kantrud system (1971), the Cowardin etal system (1979), and the Canadian Wetland Classification System (1997).
- Challenging to map wetlands.

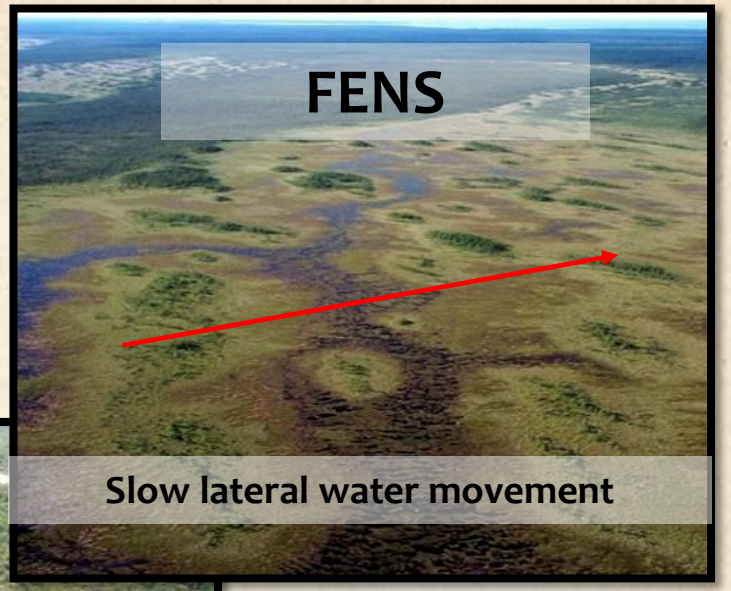
Canadian Wetland Classification System

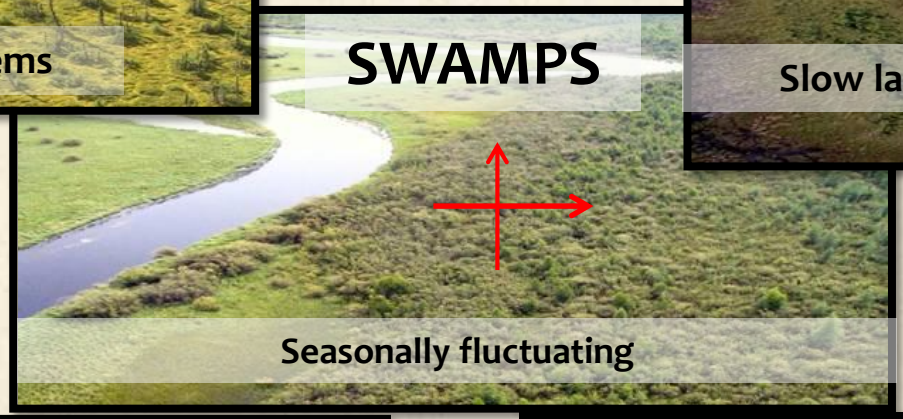
- Increasingly the CWCA has become the basis for wetland classification systems
- Five main wetland classes – bogs, fens, swamps, marsh and shallow open water (forms and sub forms)
- Benefit: wider suite of ecological characteristics and inferences can be made

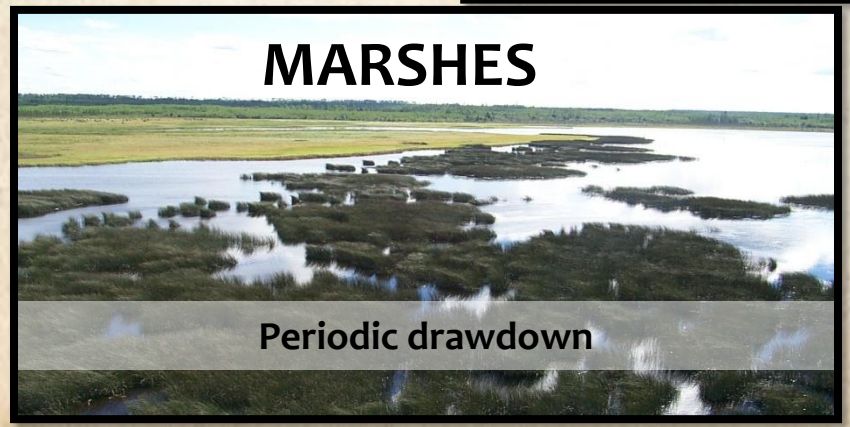


Not all Wetlands are the Same









Roads and other linear features may impact wetland hydrology

This road was built across a treed fen with slow lateral water flow and is damming the water that is slowly moving across the landscape

Wetlands may Impact Roads

- Road Settlement

- Sinking Culverts

Photo Credit - FPInnovations

Wetlands may Impact Roads

- Flooding

Photo Credit - FPInnovations

- Rutting

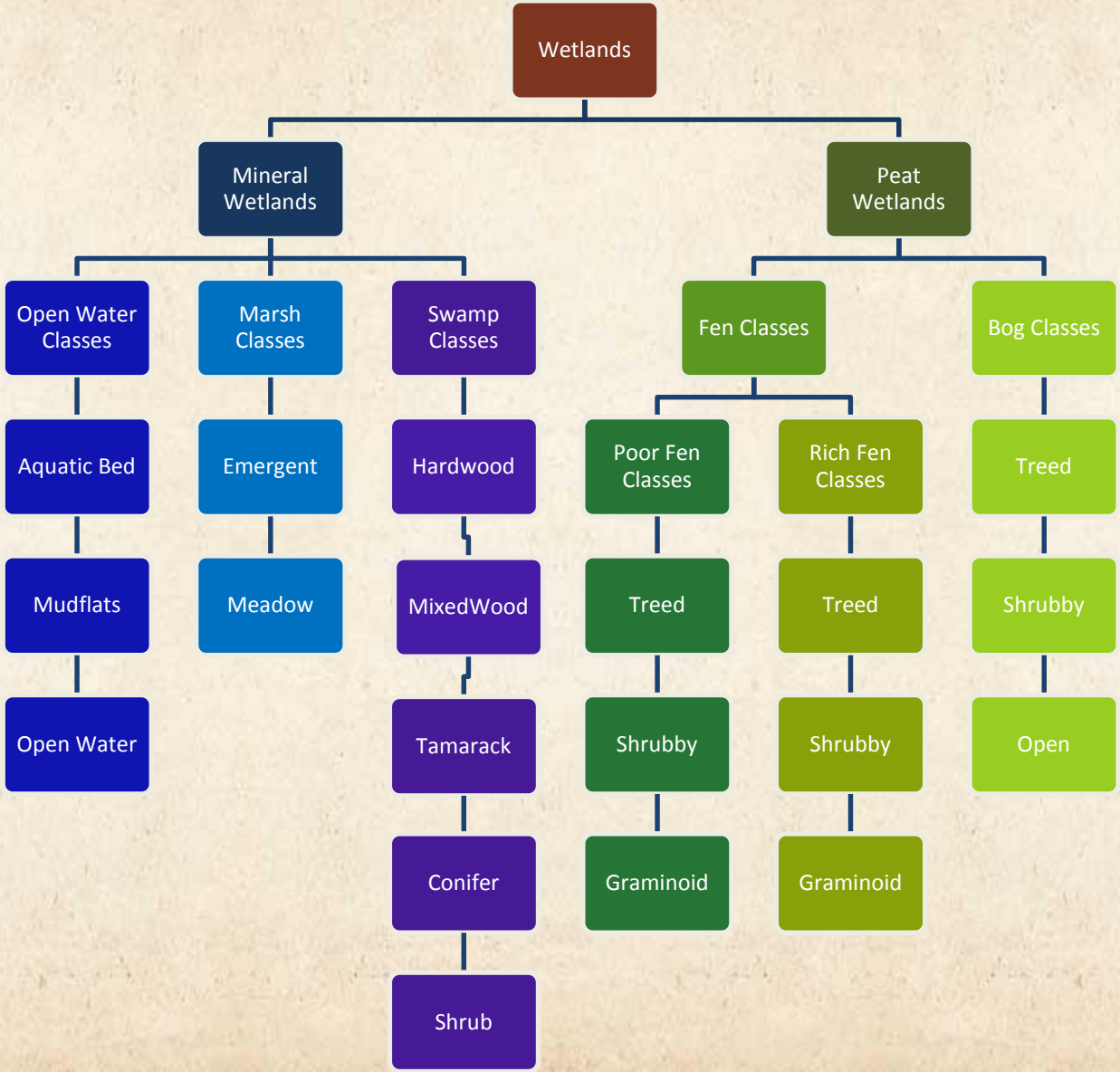
Wetlands and Safety

Using knowledge of wetlands as a decision support tool

- Understanding wetland function and their location can be a helpful planning tool to avoid wetlands where possible

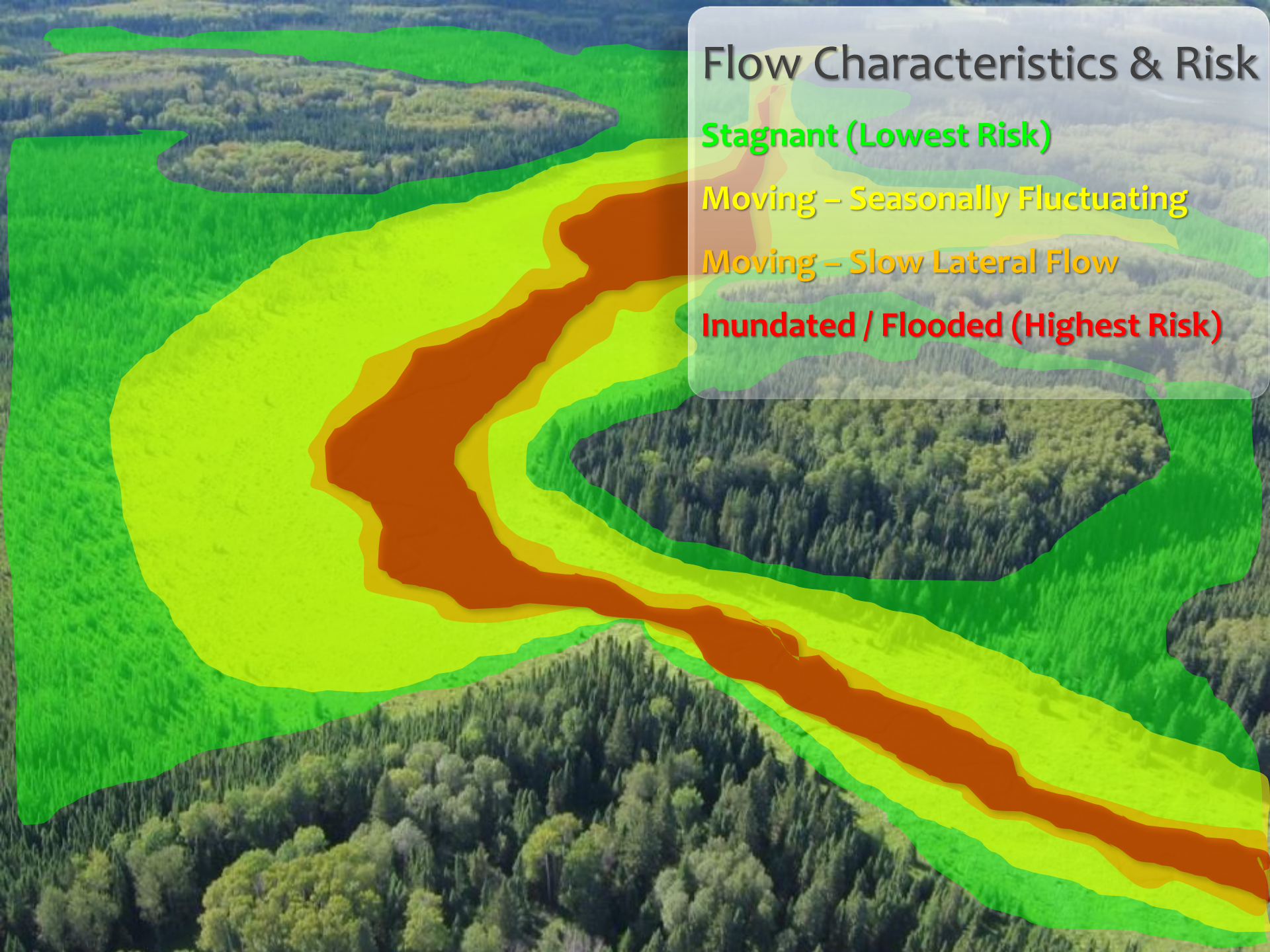
- Where avoidance is not possible – incorporate wetland knowledge into practices to minimize and mitigate impacts

DUC Enhanced Wetland Classification



Flow Characteristics of Wetlands

1 Stagnant	2 Moving	3 Inundated/ Flooded*
Treed Bog Shrubby Bog Open Bog Conifer Swamp* Treed Poor Fen	**Moving – Slow Lateral** Treed Rich Fen Shrubby Rich Fen Graminoid Rich Fen Shrubby Poor Fen Graminoid Poor Fen **Moving – Seasonally Fluctuating** Mixedwood Swamp Hardwood Swamp Shrub Swamp Tamarack Swamp	Emergent Marsh Meadow Marsh Open Water Aquatic Bed *can have significant water level fluctuations

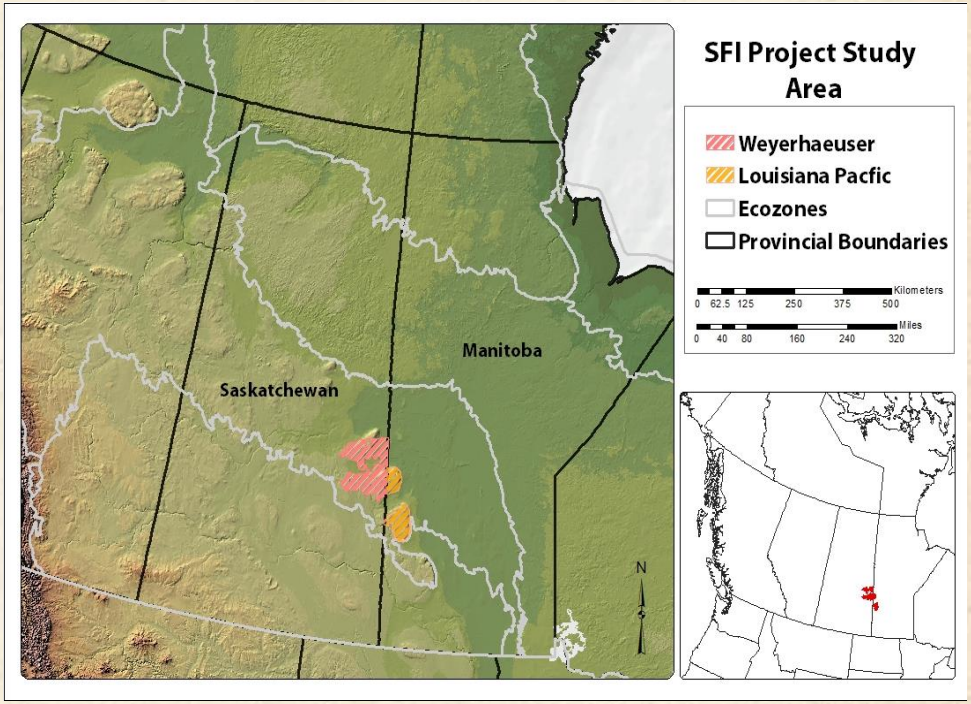

Flow Characteristics & Risk
Stagnant (Lowest Risk)
Moving – Seasonally Fluctuating
Moving – Slow Lateral Flow
Inundated / Flooded (Highest Risk)

SFI Conservation Grant

Road Best Management Practices Project 2010 -2012

SFI Road Best Management Practices Project

- Use knowledge of wetlands to inform road planning and construction
- Collaborate with expertise of forestry professionals who plan and build roads
- Field trials to test enhanced crossing techniques
- Monitor effectiveness
- Provide recommendations



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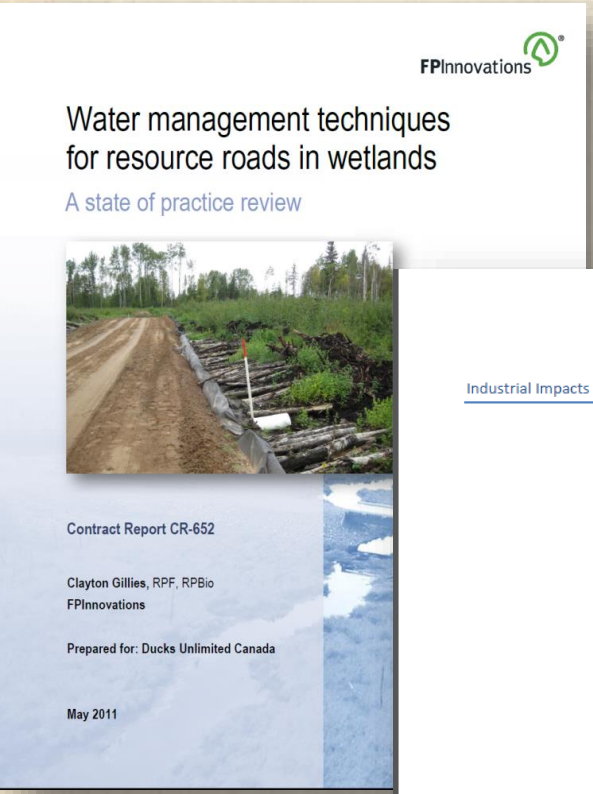
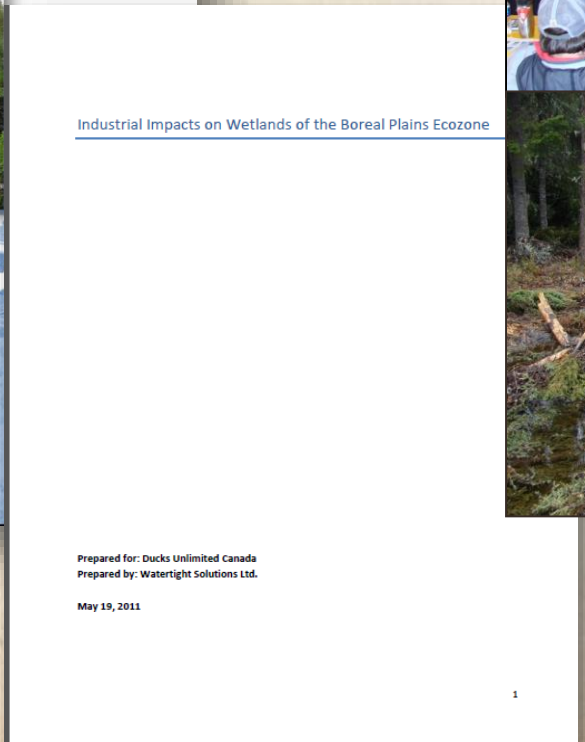
LP
BUILDING PRODUCTS

Use of Expert Knowledge

- Evaluation of literature and existing practices





- Wetlands/Roads Workshops

Wetland Crossing Designs

- After internal research workshops and group field trips, we worked with FPI to develop proposed crossing practices to match wetland water movement

- **Objective was to allow for water movement under the road surface the entire length of the wetland crossing**

- Three designs
  - stagnant systems
  - slow lateral movement
  - Seasonally fluctuating

Field Trials

Six crossing sites selected

- Shrub Swamps (x2)
  - Seasonally fluctuating
- Treed Fen (x2)
  - Slow lateral movement
- Conifer Swamp (x2)
  - Stagnant systems

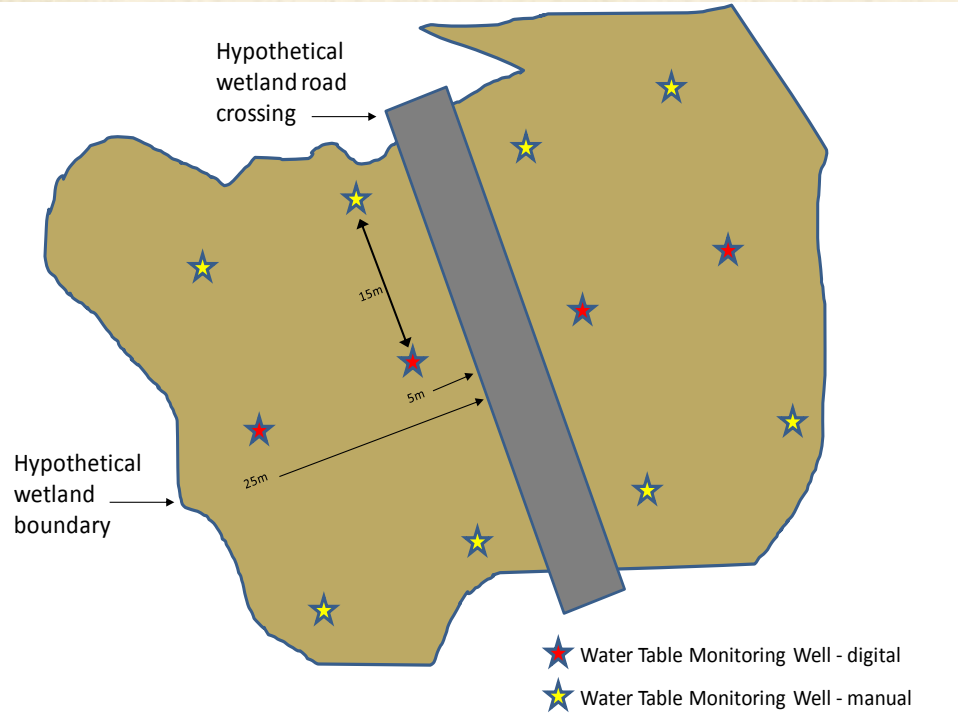
Shrub Swamp Crossing

Constructed – Fall 2011

Conifer Swamp Crossing – Sept 2012

Photo Credit – Spruce Products Ltd

Effectiveness Monitoring



Monitoring Results

Water Movement

- Crossings did not significantly impede water flow (based on the 2 years of monitoring)

- Differences in water levels U/S vs. D/S documented but water dissipated fairly quickly close to the crossing side resulting in minimal water level differences

Water Quality

- Water chemistry changes were detected immediately adjacent to the crossings indicating the influence of sediment deposition resulting from erosion of road material

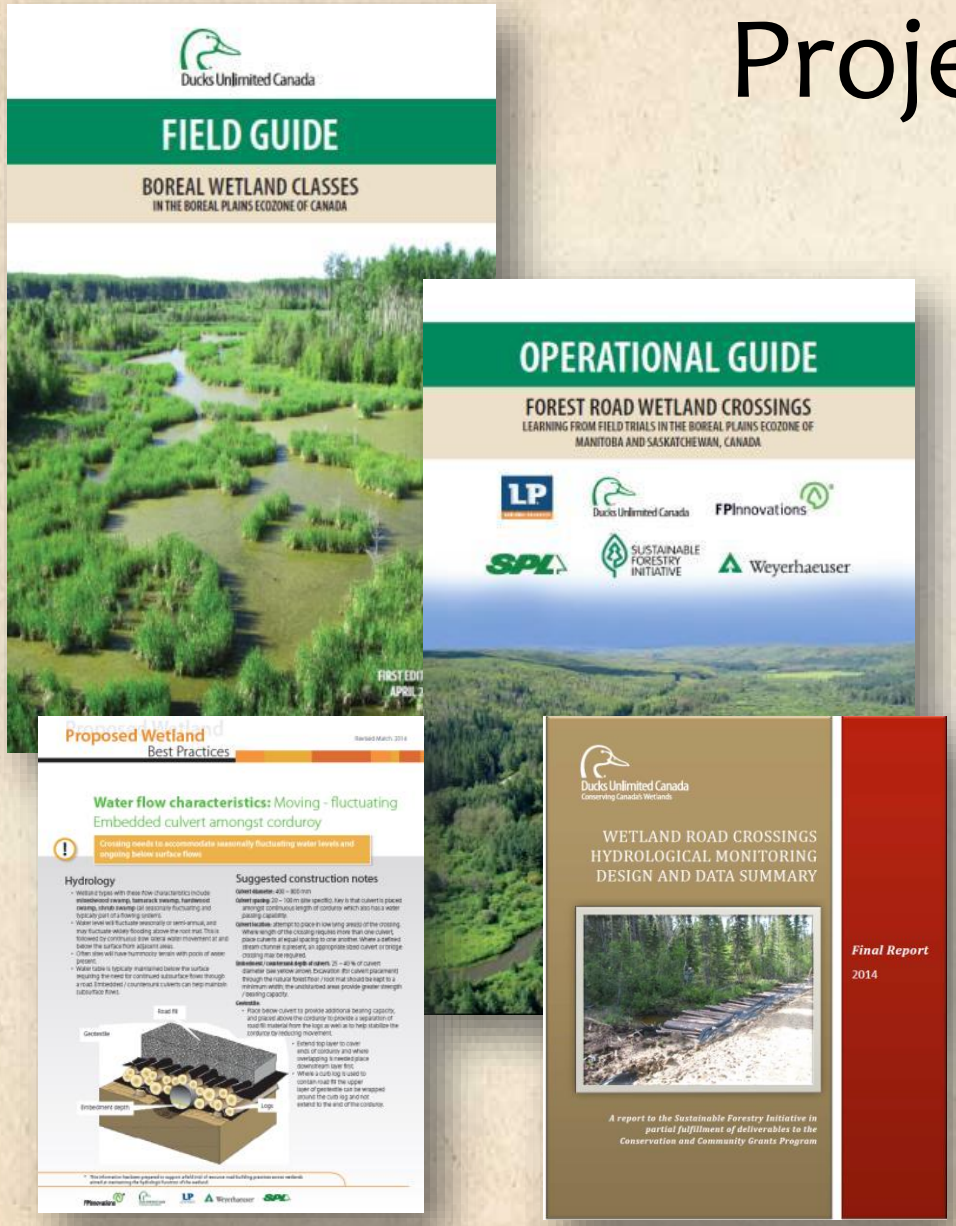
- Indicates proper erosion protection measures needed to capture eroded material and reduce changes in water chemistry

Operational Observations

No reported operational issues 3 years post installation

- crossings as built working well
- crossings are the driest part of the road
- can access these roads sooner after wet weather

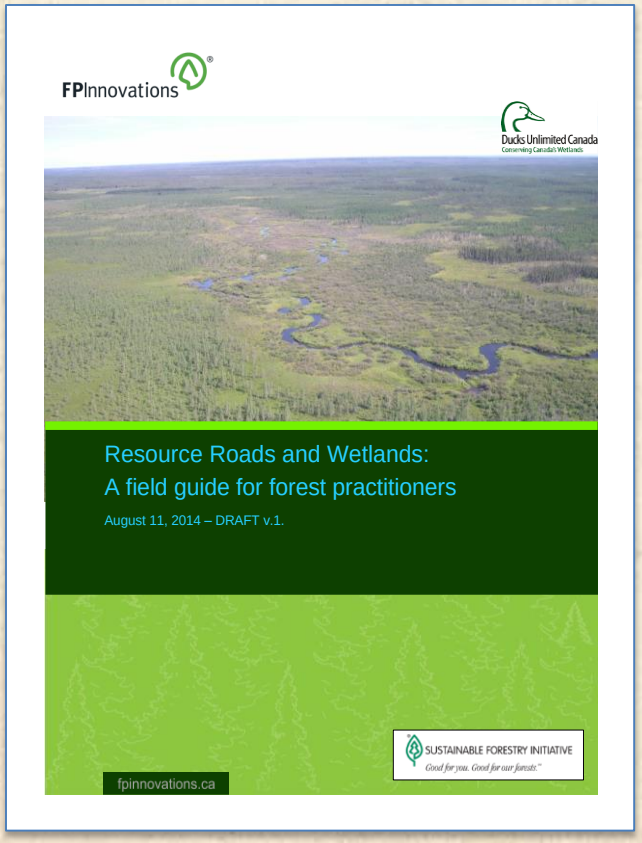
Project Deliverables



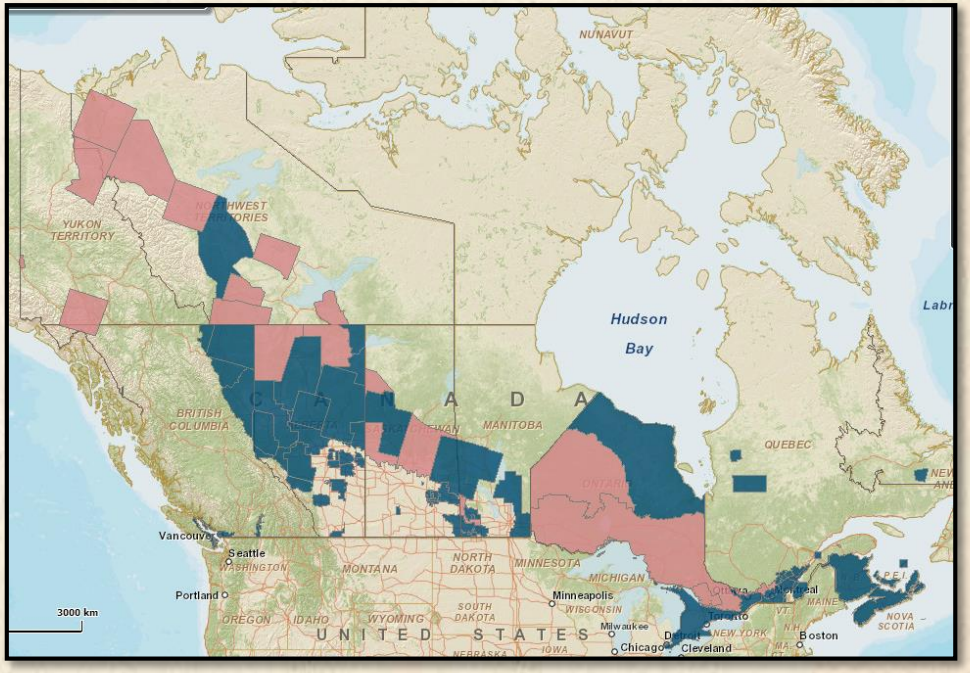
- Wetland Field and Operational Guides
- Construction schematics
- Monitoring report

Current and Ongoing Work

National Resource Roads and Wetland Crossing Handbook



Canadian Wetland Inventory



Going Forward

Reclamation/Restoration

Understanding wetland type and flow characteristics can provide guidance

Winter Road Planning

Wetlands and Roads
Achieving common goals

- Maintain wetland hydrology
- Maintain habitat for waterfowl and other wetland dependent wildlife

- Improve road performance
- Reduce maintenance costs

- Improve road safety
- Reduce reclamation costs

Questions?

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