
# RAILWAYS AND FISH:

# HOW TO PROTECT AND ENHANCE FISH HABITAT VALUES AT STREAM CROSSINGS THROUGH PROJECT DESIGN AND CONSTRUCTION

Rail Environment Conference
November 2016

# AGENDA

- Objective
- Background
- Benefits of Fish-Friendly Design
- Example Projects
- Key Messages
- Questions

# OBJECTIVE OF PRESENTATION

To show that:

- *Environmental protection, restoration and enhancement can be included in a cost-effective manner while achieving design standards for track and crossing operational safety and performance; and*
- *Functional and practical design elements can meaningfully benefit fish and fish habitat and also achieve and advance project objectives*

# BACKGROUND: WHAT'S SO SPECIAL ABOUT FISH?

- In Canada, fish and fish habitat are protected by federal, provincial and in some cases regional governments
  - Primary protection stems from the *Fisheries Act*, administered by Fisheries and Oceans Canada
  - *Species at Risk Act*
- Important component of aquatic and terrestrial ecosystem health
- Food, cultural and ceremonial importance to First Nations
- Commercial and recreational value

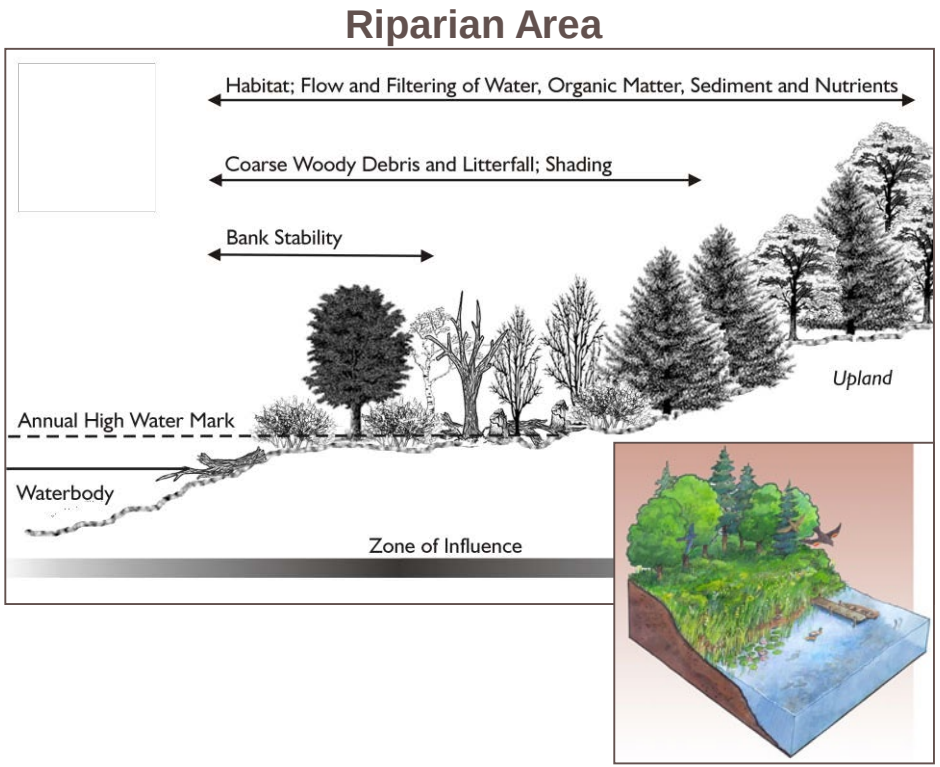
# BACKGROUND: ROUTINE MAINTENANCE ACTIVITIES

Work in or around water conducted by railways commonly includes:

- Erosion protection
- Bridge upgrades
- Culvert upgrades
- Bedload removal

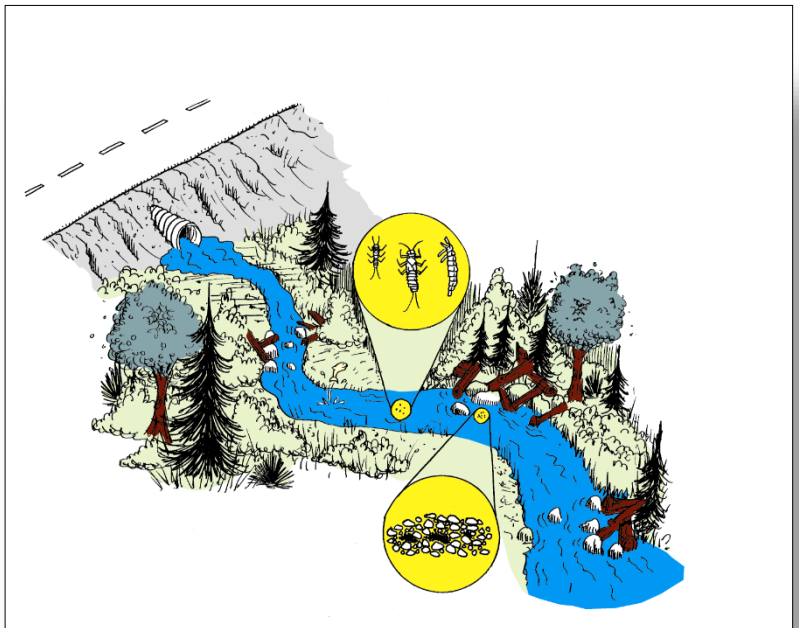
# BACKGROUND: POTENTIAL IMPACTS ON FISH AND HABITAT

- Sedimentation
- Benthic smothering
- Loss of channel depth
- Obstruction or barrier to migration
- Reduced instream features, such as large wood and boulders
- Physical harm to fish
- Channel bed and bank erosion
- Bank hardening (armouring)
- Loss or degradation of riparian areas



# BACKGROUND: FISH HABITAT 101

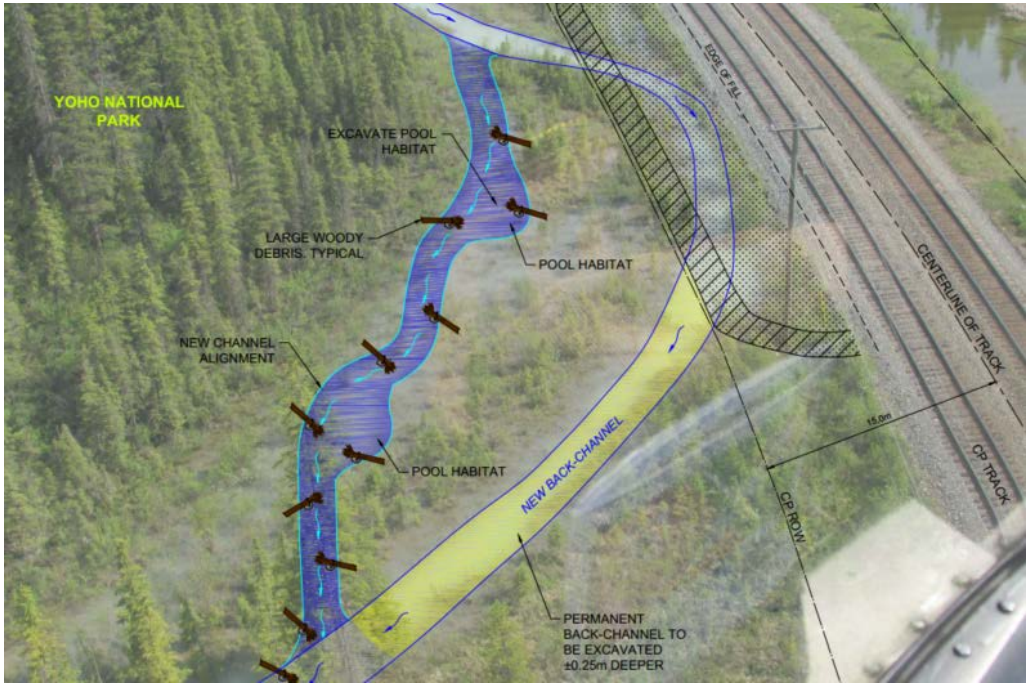
- Generally consists of aquatic and terrestrial components that contributes to the life history of fish species
- High value habitats include:
  - Depth and structural complexity
  - Spawning areas with unconsolidated gravels
  - Clean water
  - Variable channel morphology
  - Strong riparian integrity



# EXAMPLE SITES

- Bank erosion protection
- Flood protection
- Culvert upgrades

# BANK EROSION PROTECTION – OTTERTAIL RIVER



# BANK EROSION PROTECTION – OTTERTAIL RIVER


# BANK EROSION PROTECTION – SOUTH THOMPSON RIVER

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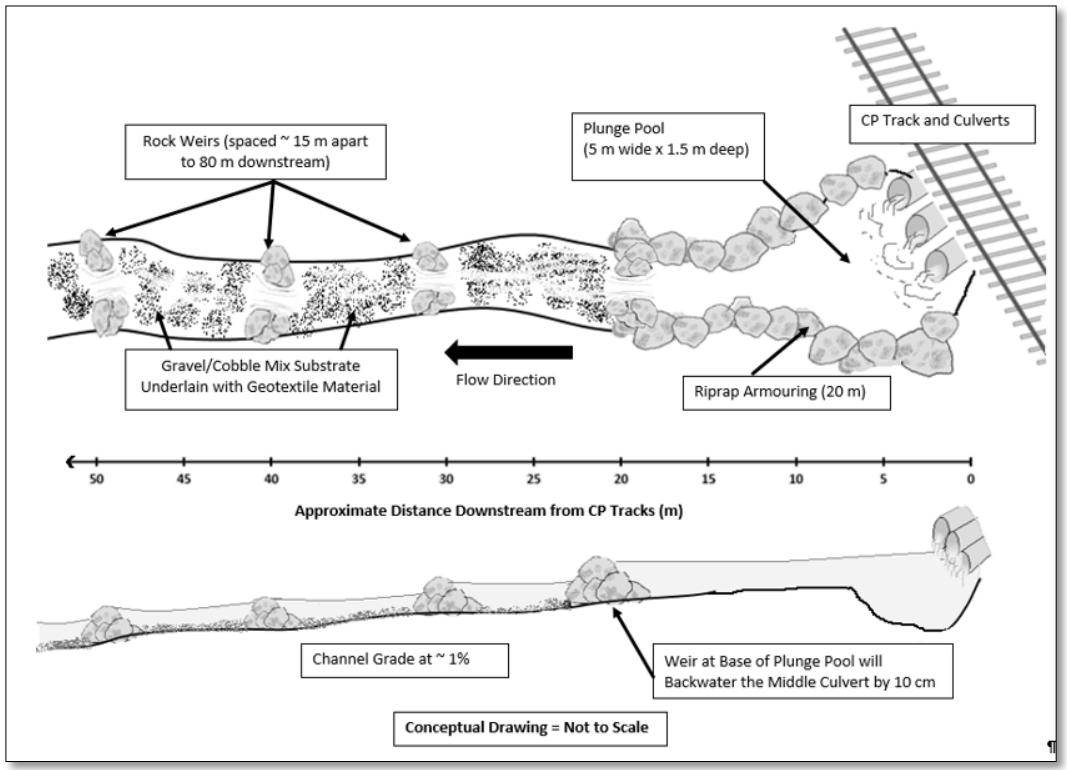
# BANK EROSION PROTECTION – SHUSWAP LAKE

# CULVERT UPGRADES – NED'S CREEK



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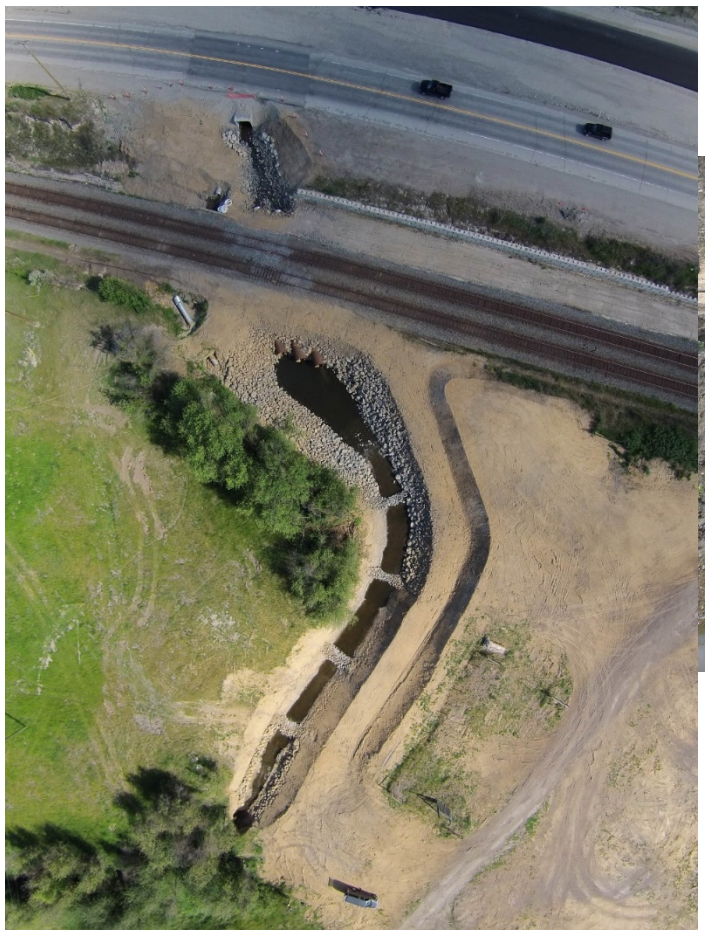

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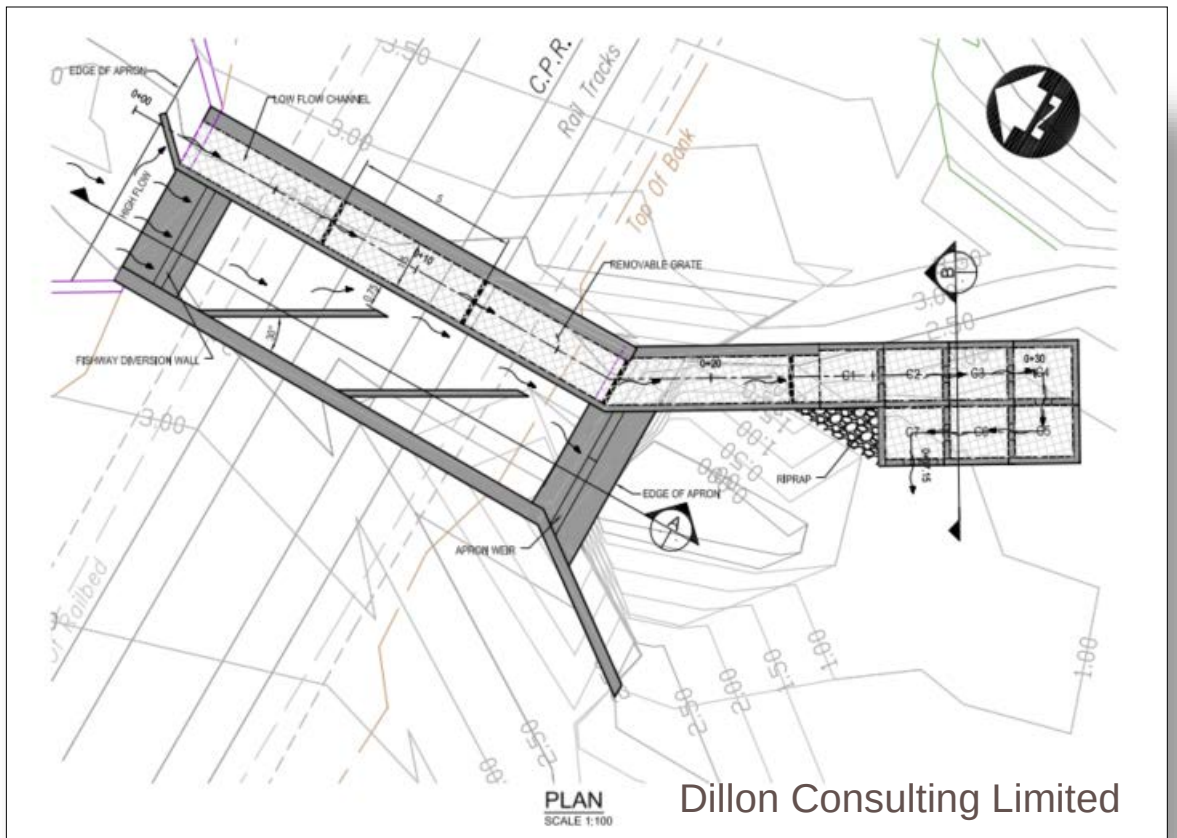



# CULVERT UPGRADES – WHONNOCK CREEK


# BENEFITS OF FISH-FRIENDLY DESIGN

**Ideally instream work should be designed to achieve railway objectives at the same time provide value to fish (and their habitat) and achieve a net benefit to fisheries productivity**

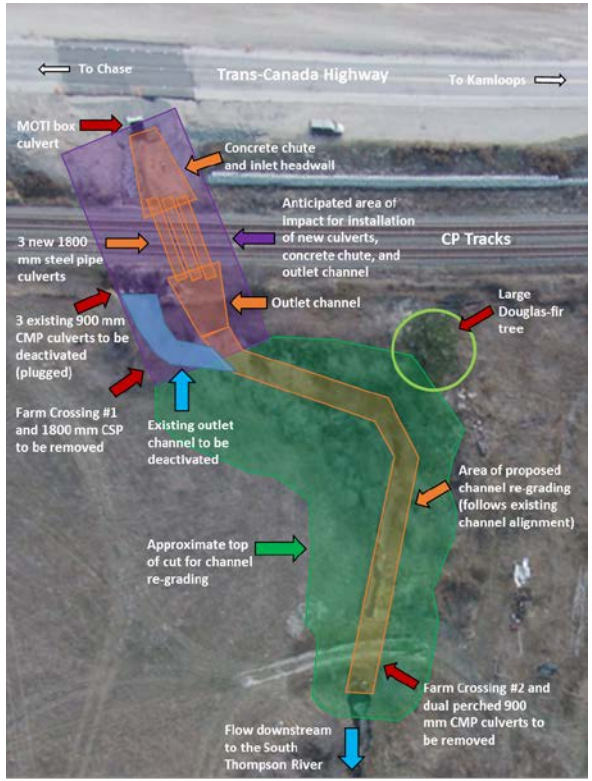
Benefits to railway include:

- Reduced erosion potential by lowering stream velocities;
- Reduced maintenance requirements
- Improved social license
- Simplified regulatory processes (restorative mitigation vs. offsetting)
- Reduced or streamlined project timelines

# KEY MESSAGES

**Healthy, stable aquatic habitat at stream crossings often results in lower maintenance requirements for railways**

- Add channel-spanning rock weirs (Newbury or bendway) to reduce water velocity and scour potential
- Excavate pool habitat downstream of culverts and weirs
- Place large wood and boulders in new habitat areas to increase roughness
- Plant trees and shrubs within the riparian area to improve bank stability and support fish life processes
- Ensure fish access over the long term



# QUESTIONS?