

Railways and Fish - How to Protect and Enhance Fish Habitat Values at Stream Crossings through Project Design

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Railway corridors in North America are commonly aligned alongside or across creeks, streams, rivers, lakes and wetlands. These waterbodies are home to a variety of species of fish which have a multitude of life history requirements. Many of these fish species are protected by environmental legislation and are important to the public for recreational or commercial fishing and by Aboriginal communities for their food, social and ceremonial values. If railway expansion and maintenance activities in and about these waterbodies are not undertaken with due care and caution they can cause potentially harmful impacts to fish and their habitat. The outcome may be regulatory non-compliance and a suite of related consequences for the proponent. Importantly, with appropriate consideration at the design phase, these instream activities may provide the following benefits:

- Reduced erosion potential by lowering stream velocities;
- Reduced maintenance requirements;
- Increased ecological capacity;
- Improved social license;
- Reduced or streamlined project timelines; and
- Simplified regulatory processes.

This presentation draws on over 30 years of collective experience by the presenters related to designing constructing and monitoring rail crossing improvements and managing effects on fish and their habitats. This experience includes working closely with railway structures engineers, maintenance of way workers and water resource, structural and geotechnical engineers, as well as various stakeholders and First Nations to incorporate functional and practical design elements that meaningfully benefit fish and fish habitat and also often further project objectives.

Building in fish and habitat considerations requires engagement of environmental practitioners during the design process and active participation in project team activities. There are a variety of fish habitat and fish access factors that should be assessed and addressed as part of project design activities, including preserving, restoring or creating fish passage, incorporating fish habitat features (e.g., holding, rearing and spawning habitats), riparian restoration and stabilization and velocity and grade controls. Project examples will be used from Canadian Pacific's operations and maintenance program within western Canada over the past several years. Three key classes of instream work will be discussed, including:

- Bank erosion protection;
- Flood protection and / or stream realignment;
 - Beaver management; and

- Culvert/bridge replacement.

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. Our intention is to provide the audience with innovative ideas and concepts related to incorporating ecological stewardship and conservation design considerations into instream work projects while, at the same time, achieving and often advancing project objectives.