

Design and construction of side-channel fish habitat on the Bow River as offset for serious harm

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Following the June 2013 flood, *Fisheries Act* authorizations were issued to the City of Calgary by Fisheries and Oceans Canada (DFO) with the provision that habitat loss during mitigation works would be compensated for at a later date. In 2016, as compensation, a 1-kilometer long side channel to the Bow River was designed by a multidisciplinary team of hydrotechnical engineers, geomorphologists, landscape architects, and fisheries biologists to maximize aquatic and riparian value of the site while following existing natural geomorphology.

To maximize the aquatic and riparian value of the site, we developed a carefully considered solution that included meander bends and riffle sequences in accordance with observed natural conditions, engineered large woody debris habitat features, vegetated islands, ephemeral channels, and varying diverse microhabitats including wetlands, terraces, and overflow routes. These features were designed based on literature-supported preferred habitats and habitat suitability indices of resident sport and non-sport fish. The channel is also designed to provide varying levels of functional habitat during low flow and flood events on the Bow River. The channel was constructed in the spring and summer 2017 and was recognized by DFO as having created 85,000 wildlife habitat units (WHU's).

This presentation describes the regulatory process, innovative designs, and construction of a side channel that maximizes the habitat complexity of sport fish in the Bow River.

Biography

Matt Wood is a hydrotechnical engineer with 12 years' experience in providing hydrotechnical and river engineering assessment and design services in Canada. Matt has led projects for both public and private sectors; and, is experienced in working with a wide variety of clients to address: flood risk and mitigation; in-stream construction; natural systems restoration; regulatory approvals, and, environmental planning and policy items. Mr. Wood's specialty is the design and construction of flood protection, diversion, and bank armouring, channel restoration and fish habitat projects.

James Bigelow is a hydrotechnical engineer with six years of experience in the consulting industry providing engineering services to projects throughout western Canada. He is experienced in assessing flood hazard and channel migration risks to both urban and rural infrastructure; developing and analyzing detailed 1-D and 2-D hydraulic models; riverbank stabilization and bioengineering protection techniques and fish habitat areas in municipal and mountain environments with sensitive environmental constraints. In all of his projects, he strives to identify and incorporate the natural tendencies of the river to provide high-quality and resilient solutions to his clients.

Lacey Aucoin is a Qualified Aquatic Environment Specialist (QAES) that specializes in regulatory planning as it relates to urban infrastructure design and construction near water. Lacey plays an important role in project planning by working closely with design teams and regulatory agencies, and maintains the timely coordination of permits for construction. She is an integral part of the design team's success by evaluating potential effects to fish habitat, developing mitigation strategies to support regulatory applications for construction near water, and communicating environmental considerations to the design team for project planning.

Paul Harper is a Senior Fisheries Biologist, with 15 years' experience specializing in habitat management, fish passage, and habitat restoration and compensation. Paul has training in bioengineering and river restoration project planning and monitoring and has been involved in fisheries enhancement works on numerous watercourses in southern Alberta. Paul has lead the aquatics components for flood restoration projects in southern Alberta, including the restoration of stream channels and the repair and protection of infrastructure including developing measures to protect westslope cutthroat trout habitat. He applies his experience as a regulator with DFO and his knowledge of fish habitat requirements to regulatory applications, planning works around water, and designing restoration options for projects around aquatic ecosystems.