

BRBC Policy and Legislation Committee
Spring Workshop

Gravel Pit Impacts on Watershed Resilience - The Science
April 13, 2021



Summary

The BRBC Policy and Legislation spring workshop about *Gravel Pit Impacts on Watershed Resilience – the Science* was well attended by about 60 participants. On behalf of the BRBC Board of Directors, Judy Stewart welcomed everyone to the TEAMS call, and explained that the workshop would introduce participants to current scientific evidence about the impacts of gravel pits on watershed resilience. Judy reminded everyone that the previous workshop about approval processes set the stage for discussing the impacts of gravel pit operations on water bodies and groundwater systems from a scientific perspective.

Participants were invited to listen to the presentations by representatives from the federal Department of Fisheries and Oceans, then Dr. Jon Fennell, and finally Dr. Harvey Locke. Participants could ask their questions through chat, and the presenters would answer questions following their presentations, and then at the end of the workshop in a panel discussion.

First up were a trio of experts from the Department of Fisheries and Oceans, Raymond Jolicoeur, Lee-Ann Smith & Brandi Mogge who presented an “*Overview of the Fisheries Act, Species at Risk Act, DFO’s Organization and Regulatory Review Process.*” Raymond gave a brief overview of five significant changes to the *Fisheries Act* since 2019 that restore protections for fish and fish habitat; enhance marine protection and habitat restoration; improve management of projects; preserve independent inshore fisheries; and strengthen Indigenous role in project reviews, monitoring and policy development. He explained that harmful alteration or disruption of fish habitat (HADD) includes disruption and removal of the riparian zone adjacent to fish

bearing waters. Section 38, that introduces a duty to notify DFO emergency line and take corrective measures if you release deleterious substances that may harm fish or fish habitat was reviewed. In Alberta, the notification contact information is: Alberta Fish and Fish Habitat Protection Program, Fisheries and Oceans Canada, 867 Lakeshore Rd, Burlington ON L7S 1A1
Telephone: 1-855-852-8320 **Email:** FisheriesProtection@dfo-mpo.gc.ca

Participants were directed to the federal webpage: “Projects Near Water”: <https://dfo-mpo.gc.ca/pnw-ppe/index-eng.html> that has been set up to provide general information to Canadians about the new *Fisheries Act* provisions that protect fish and fish habitat. You can also find out how to request a project review or authorization. On the website, DFO makes clear that if a project is taking place in or near water, the operator is responsible for:

- understanding the impacts the project will likely have on fish and fish habitat
- taking measures to avoid and mitigate impacts to fish and fish habitat
- requesting an authorization from the Minister and abiding by the conditions of the authorization when it is not possible to avoid and mitigate project impacts on fish and fish habitat
- ensuring compliance with all statutory instruments, including federal and provincial legislation.

Raymond explained that DFO also administers the *Species at Risk Act* (SARA) for projects near water, and there are process maps that DFO uses to review applications. Lee Ann then went through the one-window review process for projects near water that may harm fish or fish habitat or habitat for species at risk or involve the *Aquatic Invasive Species Regulations*. Lee Ann stressed that the new processes and forms were designed to streamline the system for project proponents. All of the information presented about how to apply to have a project reviewed through the federal triage and assessment center is on the federal ‘Projects Near Water’ webpage and proponents were advised to submit ‘complete forms’ because otherwise they slow down the process. One glitch in the current system is that it only functions with Internet Explorer and this problem is being addressed. Brandi Mogge then fielded several questions from the audience and later participated in the panel discussion providing clarification on a number of important issues raised by participants.

Dr. Jon Fennell presented on “*The physics and chemistry of gravel mining: what you need to know before agreeing with such developments.*” Jon suggested that decision-makers need to take a precautionary approach to approving gravel operations near water bodies. Jon introduced a possible methodology for reviewing applications that would take a step-wise approach, and would use aggregate setbacks to address ecosystem sensitivity and associated risks to society when impacted floodplains and natural infrastructure become unable to function properly.

Jon explained that floodplains are dynamic systems. When working below the water table, there are a number of risks to society associated with extracting gravel from these erosion hazard areas. Gravel extraction may flatten the water table in the vicinity of operations which could impact water quantity. Operations may also introduce metals and trace elements into water bodies: these contaminants can become mobilized because ‘turbidity can travel.’ There are also

thermal effects and significant water quality changes associated with gravel extraction below the water table.

Operations above the water table in floodplains are also problematic, because water tables under floodplains also fluctuate. He explained that ‘the mapped 1:100 flood hazard area of today is not the 1:100 flood hazard area of tomorrow.’

The physical removal of gravel and the changes to water chemistry affect the natural filtration system, and this affects water quality because chemicals from operations and gravel washing may be flushed into water bodies by rain and during snowmelt. Jon explained that dewatering activities have a radius of influence and can capture surface water as a result, pulling water back from the stream or removing the physical structures so that water never gets to the water body. Dewatering, and associated groundwater and stream capture denies water to aquatic systems that rely on base flow contributions to function and survive.

Jon further explained that the impacts of pit operations on the interactions between groundwater and surface water are not well understood, and suggested that more studies of specific pits are required. He stressed that climate change is introducing extreme weather conditions into our watersheds, such as higher magnitude floods in the spring and early summer followed by an increased frequency of drought. The structural integrity of floodplains needs to be protected because it is more financially feasible to maintain them than to attempt to restore them after gravel is removed.

Dr. Harvey Locke’s talk, entitled “Gravels are the structure of life: intact gravel bed river floodplains are the ecological nexus of their landscapes for a wide range of species” finished off the workshop. Harvey talked about the Bow River as an example of a gravel bed river that is a living organism that extends from valley wall to valley wall throughout the system. The Bow River and associated riparian areas and all the flora, fauna and energy, nutrients and matter that exist in the system both above and below the surface act as a giant sponge. The gravels are essential components. In the spring, the sponge becomes fully saturated and slowly releases water throughout the summer and fall. Trees and other vegetation follow the water table and nutrients below the surface and make the extent of the sponge visible at the surface. Harvey explained that the water table can also well up to surface water bodies and this becomes visible when nutrients are deposited at the surface from groundwater springs and seeps.

Harvey said that dams are an example of human interaction in gravel bed rivers that cut off vital ecological flows. Once a dam is removed, the river will attempt to slowly restore itself over time. Gravel extraction is another example that affects the river’s health at a geomorphological level.

The biophysical characteristics of gravel bed river floodplains are similar around the world. The gravel bed can be mapped on a longitudinal, lateral, vertical and temporal basis. Harvey explained that protecting the riparian landscape associated with gravel bed rivers is critical to system integrity and sustainability.

The three talks were followed by a short panel discussion where questions from the chatroom were discussed by Harvey and Brandi. Unfortunately, Jon had to leave early. All three presenters agreed to answer questions and submit written responses to the BRBC Executive Director for distribution. The DFO representatives and Jon agreed to share their presentation materials with participants if requested and interested folks should contact Mike Murray who will connect them to the speakers.

