BC FoodWeb

Peer-reviewed research

RESEARCH SUMMARY

Moo-ve over: Reducing negative effects of livestock grazing near streams in cutblocks

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Production Type
- Cattle

Practice Benefit(s)
- Time and cost savings
- Maintaining or increasing biodiversity

Research Location
- Okanagan Valley, BC

KEY TAKEAWAYS

- After timber harvesting, **livestock grazing** in riparian areas within cutblocks can have **negative effects** on aquatic and riparian ecosystems, such as reduced plant cover and fewer plant species.
- **Logging debris** are a readily available resource that can be placed to **prevent** livestock from grazing in riparian areas post-harvest.

Key Term:
- *Riparian: a transition zone between aquatic and dry, upland habitats; relating to the banks or wetlands surrounding a river or stream.*

Figure 1. Black angus cows grazing near log barriers in the study site. Photo by Clayton Bradley.

HOW CAN THIS RESEARCH BE USED?

- Timber licensees in British Columbia can use the timber pricing **appraisal system** to **offset the costs** of installing log barriers (logging debris) to protect sensitive riparian areas, and discourage livestock from grazing in riparian areas within cutblocks.
- Installing log barriers is best done at the time of harvest when suitable tree debris is available.

WHY WAS THIS RESEARCH DONE?

In this study, we looked at how logging debris can be used to block cattle from grazing near waterways and reduce the negative effects on plant biodiversity.

RESEARCH SUMMARY

Riparian zones are important ecosystems that provide multiple benefits including moderating stream temperatures, providing shade for fish and the aquatic ecosystem, filtering pollutants, trapping sediment, and providing food for wildlife, fish, and other aquatic organisms.

In areas with an overlapping forest and grazing tenure, livestock are more likely to graze in riparian zones in cutblocks due to easy access and readily available forage and water. However, livestock grazing in these areas can have negative effects on both ecology and drinking water, including reduced plant cover, fewer plant species, soil compaction, changes in the ability of the land to hold and release water, the destruction of aquatic habitats, and increased water-borne diseases through manure runoff.

Various management practices, such as fencing, herding on horseback, and rotational grazing are used to reduce the potential negative effects, but most practices are costly in time and/or money. Another known practice that is relatively inexpensive is using logging debris, such as logs and stumps, as a physical barrier to deter cattle.

WHAT WAS THE OUTCOME?

Despite the variation in results, this two-year study demonstrates that even within a short time-frame, positive effects of using logging debris as barriers start to appear. The logs placed over small streams influenced how livestock moved within cutblocks as they grazed, which generally resulted in reduced trampling and increased plant cover. The logs might also lead to an increase in species richness and plant litter accumulation, which helps to regulate soil temperature and moisture.

Figure 2. For the set-up, eight logs were laid on top of the stream in a criss-cross pattern. Photos by Clayton Bradley.

RESEARCH SUMMARY

Log barriers led to:

- Less cattle trampling in **3/4** sites
- More plant cover in **3/4** sites
- More plant litter in **2/4** sites
- More plant species in **2/4** sites
- Less bare soil in **1/4** sites
- No effect on manure

WHAT'S NEXT?

Application of our findings can lead to better riparian health and stream functioning in areas where livestock graze near timber-harvested banks. It is important to note that the barriers are only required until the trees grow back and shade out the forage, reducing the attractiveness of the area to livestock.

The responses of the variables (cattle trampling, manure, plant cover, biomass, and species richness) differed across sites, possibly due to the study's short duration and low grazing intensity. Future research should test the effects over a longer timeframe and at a higher grazing intensity, take into account site-level differences in forage quality and quantity (impacts livestock behaviour), and should monitor shifts in plant species composition at the community level.

HOW WAS THE RESEARCH DONE?

The study took place southeast of Vernon, British Columbia. The four sites chosen for the study were all recently harvested, between 2005-2011, and included streams. Post-harvest, the sites were used for livestock grazing based on schedules determined by range use plans.

At each site, we set up two areas where logs were placed, and two areas that were left untouched, known as the "control". Each area was 30 m long. We used an excavator to place logs found on the site into four crisscrossed X's at equal distances along the stream, creating enclosed diamond-shaped areas (Figure 3).

Along the streams, we measured plant species richness (the number of different plant species), plant cover, plant biomass, plant litter, bare soil, trample (represented by hoof marks), and manure in the summer of 2016, before grazing, and in the fall of 2016 and 2017, after grazing.

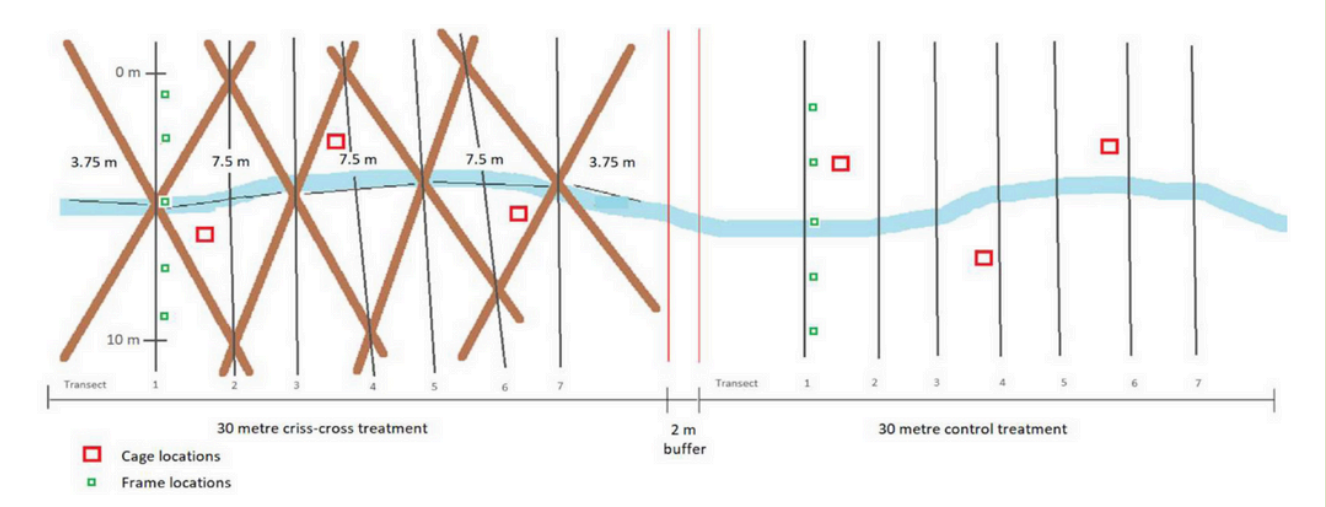

Figure 3. Experimental design showing one replicate of the log area and control area within a site. Green squares show an example of sampling locations along a transect. Sampling was done along all seven transects. Red squares show the location of plant biomass collection.

ABOUT THIS BRIEF

This brief is based on the following scientific journal article:

Bradley, C. A., Akin-Fajiye, M, Gardner, W. C., & Fraser, L. H. (2022). Debris barriers reduce the effects of livestock grazing along streams after timber harvest. *Rangeland Ecology & Management*, 81, 1-8. https://doi.org/10.1016/j.rama.2021.11.002

Want to learn more?

For questions regarding this research, contact Clayton Bradley at clayton.bradley@gov.bc.ca

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