

# BEST RIPARIAN MANAGEMENT PRACTICES LEADING TO GOOD OUTCOMES FOR SMALL STREAMS

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# FREP

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## INTRODUCTION

More than 2300 riparian monitoring assessments have been completed by the Forest and Range Evaluation Program (FREP) over the past 11 years. This data indicates that smaller-sized streams are not faring as well after harvest compared to larger streams where retention is mandatory (FREP Extension Notes #17, #39, #40). To more effectively communicate this information and increase awareness of the importance of small streams, the FREP team conducted three workshops (coast, north interior, south interior), delivered a webinar in cooperation with the BC Association of Forest Professionals, and held 14 face-to-face meetings with licensees and British Columbia Timber Sales (BCTS) staff in different regions across the province. The principal objectives of these outreach efforts were to discuss the state of small streams in BC and explore potential best management strategies for harvesting in riparian areas.

During the face-to-face meetings with licensees and BCTS, discussions focused on improving the FREP monitoring protocol, better communicating the results, and identifying practices that result in good outcomes. Recent changes to the FREP protocol were shared<sup>1</sup> and opportunities to advance the FREP program through improved communication and reporting were discussed. Specific results were reviewed and compared with other licensees and/or BCTS operating in the same areas.

The key focus of this article is to share the proven best practices that have been suggested by licensees with the best results to help inform future riparian management around small streams.

## COMMON PRACTICES IDENTIFIED BY LICENSEES WITH THE BEST POST-HARVEST SMALL STREAM OUTCOMES

Although different regions may have unique challenges that require specific strategies to minimize impacts from harvesting, there were many common practices around small streams that led to good outcomes. The data shows that ultimately, the avoidance of streams is one of the best practices, and planning cutblocks between streams or retaining wildlife tree patches or other retention around in-block reaches results in a lower number of impacts compared to those exposed to riparian logging (FREP Extension Note #40). Other top strategies are provided below as communicated by licensees and BCTS staff across the province.

These approaches were sorted into five main categories: Training and Communication, Planning and Layout, Harvesting, Roads, and Post-Harvest Monitoring. Not all bullets within each category will apply in every circumstance; however, implementing a combination of these methods has been shown to lead to superior results.

### Training and Communication

- Provide operator training for falling and yarding in or near riparian areas to minimize disturbance. Training in soil-erosion mitigation measures, wind-firming techniques, and road deactivation has also proven useful.
- Conduct an annual pre-work meeting to discuss standard riparian practices with operators and contractors, and hold additional on-site discussions when high-risk sites are identified.

<sup>1</sup> For updated field cards and guide, see: <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program/frep-monitoring-protocols/fish-riparian>.

### **FREP Mission:**

Collect and communicate the best available natural resource monitoring information to inform decision making, improve resource management outcomes and provide evidence of government's commitment to environmental sustainability. <http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/integrated-resource-monitoring/forest-range-evaluation-program>



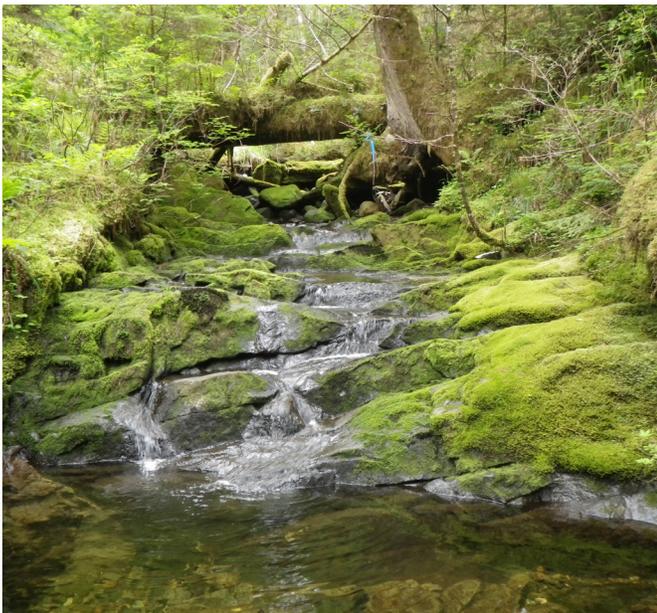
- Include more specific wording on site plans and maps – “fall and yard away where practical” often gets overlooked.
- Communication regarding the importance of working conscientiously around streams should come from senior management and extend to all parties involved, including equipment operators.
- Engage with FREP staff to share strategies and visit sample sites to identify practices that are leading to impacts; provide feedback to planners and operators.

### Key Message:

Ongoing communication with operational staff is essential. Ensuring that operators have the knowledge and skills for working effectively in riparian areas produces the best results.

## Planning and Layout

- Review watershed maps and other information before planning a block near a stream to identify any sensitive landscape features (e.g., alluvial fans), upstream factors (e.g., logging, landslides), or downstream priorities (e.g., water licenses, fish, or sensitive species) that may affect decision making. Develop a flow chart with the above categories and potential riparian prescriptions for each.
- Walk the ground as a group of functional teams (harvesting, silviculture, etc.) to account for all site-specific factors, and prescribe practices that will be effective for both logging and post-logging activities. Consider soils, windthrow hazard, terrain, and timber type when writing prescriptions.



- Buffer flowing or open-water non-classified drainages (NCDs) that are connected to streams by prescribing a machine-free zone and harvesting only the merchantable timber around them.
- Stratify S6 streams based on channel width and/or importance to downstream reaches, then assign variable retention strategies to each stratum.
- Employ experienced layout crews with knowledge of sensitive landscape features.

### Key Message:

Streams vary in resiliency and importance to downstream reaches. Variable buffer widths based on stream and site characteristics are an effective way of protecting more sensitive S6 reaches (i.e., >1 m in channel width, directly connected to fish habitat, flowing perennially, containing habitat for species at risk, or located in erodible soils), while allowing for a greater degree of harvest in lower-risk areas.

## Harvesting

- Consider winter harvesting in wetter areas or on otherwise sensitive soils.
- Provide equipment operators with geo-referenced e-maps for iPads or smart phones to help locate streams and fisheries-sensitive areas. Tie ribbons at the stream centreline and/or at the edge of riparian buffers. Fallers can leave high stumps in riparian areas to help others identify streams.
- Utilize only experienced operators trained in falling and yarding away and minimizing disturbance when harvesting near streams.
- Leave smaller trees and non-merchantable timber standing when cutting in riparian management areas.
- Supervisors should monitor harvesting operations to provide immediate feedback to operators.

### Key Message:

Consider suitable timing and harvesting methods to reduce disturbance while maintaining as much riparian vegetation as possible. Monitor operations and provide feedback for continuous improvement.

## Roads

- Protect water quality by carefully designing, maintaining and deactivating roads to limit the transfer of fine sediment to streams.

- Consider factors such as existing upstream crossings and soil erodibility when making decisions for road placement near streams.
- Evaluate and improve existing crossings when obtaining tenure for old roads to ensure structures are functioning and appropriate for logging traffic and potential increases in discharge resulting from new harvest activity.
- Use LiDAR or other imagery to identify original stream channels and upgrade older road crossings to re-establish connectivity where past practices may have isolated reaches.
- Monitor after construction and deactivation to ensure any erodible fill and cut slopes have been managed so they do not contribute sediment to streams.

### Key Message:

Consider stream connectivity and the transfer of fine sediment from existing and new road crossings throughout all stages of harvesting, concluding with a post-deactivation assurance check.

### Post-Harvest Monitoring

- Attend an end-of-season field day to review sites that were FREP-assessed or conduct a self-review of a selection of reaches using the FREP protocol. Invite layout and equipment operators to review sites with both good and poor outcomes.
- Combine riparian effectiveness assessments with other post-harvest checks to routinely self-monitor around streams.
- Complete before-and-after assessments at a selection of sites to evaluate specific logging impacts and identify factors to consider for future practices.
- Use results provided in FREP reports for continuous improvement in planning and operational procedures.
- Continue to engage with FREP staff to share information on strategies that work best.

### Key Message:

At a minimum, a general knowledge of forestry-related impacts to streams is important in order to identify when improvements could be made. Understanding the FREP evaluation will help licensees and BCTS staff to self-monitor and target specific practices where needed.

## SPECIFIC BEST PRACTICES

During the face-to-face discussions with licensees and BCTS staff, targeted solutions to specific challenges were also suggested, including:

- Creating range barriers and stable ford crossings in areas where cattle roam;
- Seeking information from water purveyors, where available, to identify sources of drinking water which will determine cutblock placement and retention around upstream tributaries;
- Using tethered equipment on steeper ground;
- Establishing yarding corridors where yarding across a stream cannot be avoided;
- Implementing measures similar to objectives for Fisheries Sensitive Watersheds in areas with highly erodible soils, such as limiting equivalent clearcut area (ECA) within a watershed and increasing retention in the riparian management area;
- Using performance-based requirements for contracting layout rather than a standard request for quote to select workers that are knowledgeable and experienced in applying meaningful variable retention strategies; and
- Paying hourly or day wages so there is no incentive to skip details or apply “cookie cutter” approaches to retention.

## CONCLUSION

Overall, the 2017 FREP small streams outreach to forest professionals was well received. Upon review of all the comments and results of the past 11 years of assessment data, it was apparent that forest companies with the best results were those that implemented a combination of the best practices outlined in this document. Especially important was the delivery of clear messaging from management to planning, layout and harvesting staff, with follow-up monitoring and feedback both during and after harvesting.

All groups involved in the outreach discussions expressed a desire to be more informed about FREP activities. In response, district stewardship evaluation officers or Resource Practices Branch (RPB) staff will connect with licensees and BCTS on an annual (or more frequent) basis to discuss their specific results and/or extend an invitation to attend a field assessment in their area.

## ACKNOWLEDGEMENTS

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