

BOARD OF FORESTRY AND FIRE PROTECTION

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RE: Feller-Buncher Use in Watercourse and Lake Protection Zones

Director Porter,

The potential use of feller-buncher heavy equipment in Watercourse and Lake Protection Zones (WLPZs), particularly to facilitate fuels management is an issue that has been recognized for several years; perhaps most notably after the 2007 Angora Fire, where it was observed that streamside zones may have had a “wicking” effect that increased the rate of spread of the fire. The use of heavy equipment in WLPZs has been on the annual list of priorities for the Forest Practice Committee (FPC) for some time, and during the September 25, 2018 FPC meeting, Board staff presented a report outlining its research on the impact and use of feller bunchers in streamcourse zones..

The Board staff report summarizes the current Forest Practice Rules regarding the use of heavy equipment in WLPZs, and recognizes that Registered Professional Foresters may offer explanation and justification for in-lieu practices, or may propose an alternative method in Timber Harvest Plans, that would allow for the use of feller-bunchers in WLPZs. The staff report also presented the results of a literature search that itemizes “best management practices” that, when implemented, are generally recognized to minimize the potential impacts to the beneficial uses of water and the beneficial function of riparian zones. These are itemized below.

The Board has also been informed by various efforts to implement the use of feller bunchers in WLPZs in the field, notably a long-term study on Blodgett Forest initiated in the summer of 2018. The initial results are favorable with respect to negligible impacts on the streamcourse areas, as further detailed below.

In light of the efforts to achieve the State’s fuel treatment goals, the Board has found that feller-bunchers can be a useful tool to treat streamside zones with minimal impact, particularly when the outlined best management practices are employed. Recent wildfire activity throughout the state’s forested landscapes indicates that the general policy of minimizing timber harvest and fuel treatment within WLPZs may require reevaluation; minimizing such activity may be resulting in an increase in fuel loading and may subsequently be increasing the capacity of the receptive fuel bed to carry fire in these areas. Feller-bunchers can achieve a variety of management objectives within WLPZs with minimal environmental impact

Therefore, the Board would like to encourage consideration of greater utilization of feller-bunchers in WLPZs. In weighing various methods for promoting appropriate feller-buncher use within WLPZs, the Board has determined that a change in forest practice regulations is not necessary at this time. As the Watercourse and Lake Protection Rules require the protection of the beneficial uses of water and riparian function, it is incumbent

upon the RPF to provide effective in-lieu or alternative site-specific practices when proposing the use of feller-bunchers in WLPZs. At the same time, the Board would like the Department full consideration of proposals to operate feller-bunchers in WLPZs, not only in light of the standards of the rules, but also of the potential benefit to modification of fuels in these zones.

In this regard, the Board does find that non-regulatory guidance may be useful to Plan preparers and reviewers. The development of guidelines for feller-buncher operations may aid in the preparation and approval of harvest plans, given that all site-specific impact evaluation is duly performed as required by the Forest Practice Act and Rules.

The Board has found that the use of the following BMPs may minimize or eliminate any impacts of operations within WLPZs:

1. **Employing directional felling.** This practice reduces residual stand damage and facilitates log transport.¹² The use of “zero-swing” machinery also enables feller-bunchers to operate in tighter stand conditions.³
2. **Enter WLPZs at a 90-degree angle and limit to one (1) pass (ingress and egress) perpendicular to watercourses, where available.** Limiting these passes reduces compaction. Although, Floch found that multiple passes don’t necessarily result in additional compaction (up to 7 passes).⁴
3. **Equipment exclusion on areas that are unnecessarily steep, inherently unstable, or where saturated conditions are present.** Areas with a high risk of mass wasting or where saturated clay soils are present should be avoided.⁵
4. **Placing bedding (slash) on the equipment pathway to reduce soil compaction.** Curran found that using a “random” network of roads and using slash bedding helps to reduce soil compaction and movement impacts.⁵ A planning process to use a random network of roads with only single stand entries reduces total soil effects. Additionally, slash packing after operations are finished can act as a safeguard against further soil movement.
5. **Using tracked feller-bunchers as they exert less pressure on soil, or alternatively using high-flotation rubber tire designs.** Point loads are negligible with these designs, resulting in an insignificant effect on soil compaction when combined with slash padding.⁶
6. **Preventing residual stand damage.** Stand damage can be prevented by limiting the number of turns necessary to exit the harvest area, using the smallest equipment appropriate for the job, and delimiting trees prior to removal.⁷

To substantiate this request from the Board, we have drawn on the Board’s Effectiveness Monitoring Committee (EMC) project titled “EMC-2017-006: Tradeoffs among riparian buffer zones, fire hazard, and species composition in the Sierra Nevada.” This project includes mechanical timber harvesting within WLPZs and is currently underway at Blodgett Forest Research Station in Georgetown, CA. The Board granted experimental

¹ Ledoux, Chris B. "Mechanized Systems for Harvesting Eastern Hardwoods." USDA Forest Service, September 2010. doi:10.2737/nrs-gtr-69.

² Abdullah E. Akay, Mustafa Yilmaz, and Fatih Tonguc. "Impact of Mechanized Harvesting Machines on Forest Ecosystem: Residual Stand Damage." Journal of Applied Sciences 6, no. 11 (2006): 2414-419. doi:10.3923/jas.2006.2414.2419.

³ Verry, Elon S., James W. Hornbeck, and Charles Andrew Dolloff. Riparian Management in Forests of the Continental Eastern United States. Boca Raton, FL: Lewis Publishers, 2000. https://www.nrs.fs.fed.us/pubs/jrnl/1999/nc_1999_mattson_001.pdf.

⁴ Floch, Rick F. Shovel Logging and Soil Compaction: A Case Study. Master’s thesis, Oregon State University, 1988. <https://ir.library.oregonstate.edu/concern/defaults/w9505519n>.

⁵ Curran, Mike. "Harvesting Systems and Strategies to Reduce Soil and Regeneration Impacts (and Costs)." FERIC Special Report, no. SR-133 (1999): 75-111. [https://www.for.gov.bc.ca/ftp/rsi/external/publish/Soil Disturbance/Course development/Publications/HARVESTING STRATEGIES 1999.pdf](https://www.for.gov.bc.ca/ftp/rsi/external/publish/Soil%20Disturbance/Course%20development/Publications/HARVESTING%20STRATEGIES%201999.pdf).

⁶ "Forestry Equipment Chassis Configurations." USDA - US Forest Service. Accessed February 22, 2019. <https://www.fs.fed.us/forestmanagement/equipment-catalog/chassis-config.shtml>.

⁷ "Limit Residual Stand Damage and Maintain Your Reputation." Construction.papemachinery.com. June 19, 2017. Accessed February 22, 2019. <https://construction.papemachinery.com/blog/limit-residual-stand-damage-and-maintain-your-reputation>.

designation until 2032 to allow the project to further investigate the impacts of feller-bunchers in the WLPZ. Attached below you will find images of the work conducted at Blodgett within Class II WLPZs, including treated and untreated WLPZ areas (Figure 1). Preliminary data from the primary investigator, Dr. Rob York, has not yet detected significant sedimentation in watercourses after feller-buncher use when BMPs are followed. The long-term goal of the study is to inform decision-making related to fuel treatments in WLPZs and the inclusion of an adaptive management framework when considering the use of feller-bunchers in WLPZs. The use of an adaptive management framework would not preclude the use of feller-bunchers in WLPZs while the study is still being conducted; more widespread use would increase opportunities to monitor and better quantify environmental impacts relative to fire hazard reduction benefits.

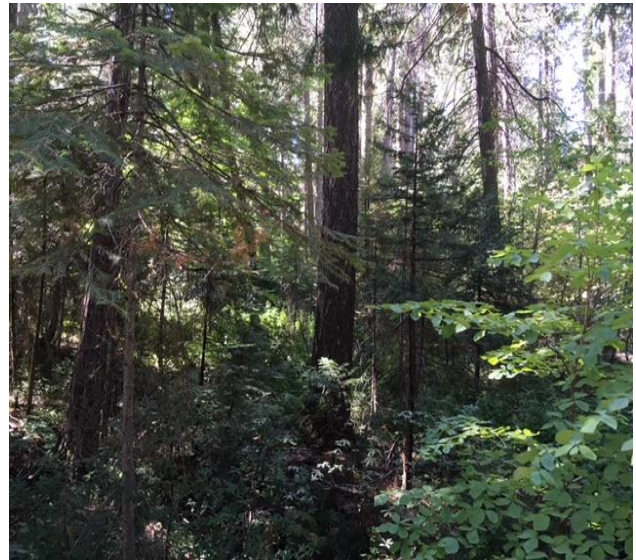


Figure 1. Treated (Left) vs. untreated (Right) WLPZ at Blodgett Forest Research Station

We hope that upon completion, this project will provide valuable insight and help to further shape regulations regarding heavy equipment in WLPZs. Ultimately, it is the Board’s goal to stay current on effective management strategies, especially those that allow for more efficient harvest with small or negligible impacts. In the face of increasingly devastating wildfires, the Board finds it appropriate to approach the Department with direction to more widely accept the use of feller-bunchers within WLPZs, provided that BMPs are followed. The utilization of feller-bunchers in WLPZs may serve the dual purpose of increasing the pace and scale of fuel reduction while combatting the rising costs associated with timber harvest. The Board looks forward to further reviewing this matter in the near future and hearing comments from review team personnel, RPFs, Licensed Timber Operators, and landowner communities regarding the expedited review and increased use of feller-bunchers for forest management activities in California.

Sincerely,

J. Keith Gillless, Ph.D.

Chairman

Board of Forestry and Fire Protection