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

Director Porter,

During the August 21, 2018 and September 25, 2018 Forest Practice Committee meetings, the Board discussed the use of feller-bunchers within Watercourse and Lake Protection Zones (WLPZs). The discussion was initiated by a comment submitted by private landowners who were concerned by the challenges associated with the review of Timber Harvest Plans that propose the use of feller-bunchers within WLPZs. Existing regulations related to Watercourse and Lake Protection (Article 6 of Subchapters 4, 5, and 6, Chapter 4, of Title 14 of the California Code of Regulations, beginning with sections §§ 916, 9136, and 956) are intended to "…ensure that timber operations do not potentially cause significant adverse site-specific and cumulative impacts to the beneficial uses of water, native, aquatic, and riparian-associated species, and the beneficial functions of riparian zone." Feller-bunchers can be a useful tool with minimal impacts in WLPZs and existing Best Management Practices (BMPs) often identify feller-bunchers as ideal equipment for operations within a WLPZ. However, the Registered Professional Foresters (RPF) community has expressed that Plans, as defined in 14 CCR § 895.1, which propose the use of feller-bunchers within WLPZs are very difficult to get through the review and approval process due to review team views on heavy equipment operations within the WLPZ. 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 harvest 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; the Board would like to reiterate its support for their utilization in WLPZs, provided that BMPs are properly followed.

The Board has considered various methods for promoting appropriate feller-buncher use within WLPZs and has determined that regulatory efforts to expand the use of feller-bunchers are not required at this time. However, 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 dully performed as required by the Forest Practice Act and Regulations.

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.[1][2] The use of "zero-swing" machinery also enables feller-bunchers to operate in tighter stand conditions.[3]

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

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, multiple passes may not 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.** 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 delimbing 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 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.

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[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.
[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.

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 Gilless, Ph.D.
Chairman
Board of Forestry and Fire Protection