**Last Chance Mastication Project**

Stanislaus National Forest

Calaveras Ranger District

Hydrology Report

Zachary Croyle

District Hydrologist

November 2017

Signed: *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_11/15/2017\_\_

Zachary Croyle, District Hydrologist

**Introduction**

The Last Chance Mastication Project proposes to reduce fuels by treating 433 acres of mixed conifer and brush within the wildland urban interface near the communities of Forest Meadows, Sunrise Point, Darby Knob, and Hathaway Pines. Proposed treatments are intended to reduce fuels so firefighters have a strategic place to hold and slow down a wildfire before it reaches the communities. Treatment areas are within the footprint of the 2001 Darby Fire. Treatments would include mechanically masticating brush and trees less than 8 inches dbh on 300 acres and hand thinning and piling on the remaining areas where conditions are too rocky or steep (>35% slope) for mechanized equipment to operate; piled material would be subsequently burned. All masticated fuels would be shredded into lengths of 16 inches and below and would not exceed 12 inches in height. The project is of a kind that is categorically excluded (CE) from documentation in an EA or EIS under NEPA and is being conducted under CE category *Timber stand and/or wildlife habitat improvement activities that do not include the use of herbicides or do not require more than 1 mile of low standard road construction* [36 CFR 220.6(e)(6)].

**Affected Environment and Existing Condition**

The project area is located in the Stanislaus River basin within the Lower North Fork Stanislaus River HUC-6 subwatershed (180400100306). Designated beneficial uses of water in the Stanislaus River basin and its tributaries (sources to New Melones Reservoir) include: Municipal, domestic, and agricultural water use, hydroelectric power generation, contact and non-contact water recreation including canoeing and rafting, warm and cold freshwater habitat, and wildlife habitat (CRWQCB 2015). There are no 303(d) listed impaired waterbodies within the project analysis area. The Forest is responsible for ensuring that water will be drinkable after normal treatment (USDA 2017).

The Lower North Fork Stanislaus River HUC-6 subwatershed contains large portions of the communities of Arnold, Dorrington, Avery, and Hathaway Pines as well as much of Calaveras Big Trees State Park. Dams and water conveyances in the subwatershed include McKays Reservoir which is operated by the Northern California Power Agency (NCPA) and Utica Ditch which is operated by Utica Power Authority. The project area watershed overall is in generally good condition. The Watershed Condition Framework rated the condition of the Lower North Fork Stanislaus River HUC-6 as *Functioning at-Risk*. Negative factors influencing this rating were a high density of roads due to residential development, forest health, a regulated streamflow regime due to the numerous dams/ditches and the resultant effects on aquatic habitat and biota (STF 2011).

**Management Requirements**

The following management requirements incorporate required Best Management Practices (BMPs) as outlined in USDA (2011) and USDA (2012). These requirements would be incorporated into project design and implementation in order to ensure protection of water quality and beneficial uses. Management requirements would also ensure project compliance with the Forest Plan (USDA 2017) and the Sierra Nevada Forest Plan Amendment Aquatic Management Strategy and Riparian Conservation Objectives (USDA 2004).

***Riparian Conservation Areas***

* *Operate tracked masticator no closer than 15 feet from perennial, intermittent, and ephemeral stream channels and Special Aquatic Features1*
* *Avoid disturbance to obligate riparian vegetation (e.g., willow, alder, etc.)*

***Burn Piles***

* *Place burn piles a minimum of 50 feet away from perennial and intermittent streams and Special Aquatic Features and 25 feet from ephemeral streams.*
* *Locate piles outside of areas that may receive runoff from roads.*
* *Avoid disturbance to obligate riparian vegetation.*

***Servicing, Refueling, and Parking/Staging Areas***

* *Plan for appropriate equipment refueling and servicing sites during project planning and design.*
* *Allow temporary refueling and servicing only at approved locations, which are well away from water or riparian areas.*
* *Report spills and initiate appropriate clean-up action in accordance with applicable State and Federal laws, rules and regulations.*

***Soil Moisture Limitations***

* *During the wet season, coordinate with the soil scientist or hydrologist prior to mechanical mastication operations to determine if soils are dry enough to operate so as not to cause detrimental soil compaction and displacement.*

**1** Perennial streams flow year long. Intermittent streams flow during the wet season but dry by summer or fall. Ephemeral streams flow only during or shortly after rainfall or snowmelt. Special aquatic features (SAFs) include lakes, meadows, bogs, fens, wetlands, vernal pools and springs.

**Environmental Consequences**

The project is not expected to result in any adverse direct, indirect, or cumulative effects to water quality or beneficial uses. The proposed treatments types (mechanical mastication, hand thinning, pile burning) generally do not result in widespread soil disturbance that would appreciably increase surface erosion and runoff that could threaten water quality. Studies investigating potential effects of mechanical mastication on soil properties have shown that mechanical mastication does not typically result in significant increases in soil compaction and runoff; mechanical mastication can even potentially decrease surface erosion because it produces a mulch layer that increases soil ground cover (Moghaddas and Stephens 2008; Hatchett et al. 2206; York et al. 2015). A study in the Lake Tahoe basin found that pile burning had a minimal effect on water quality downslope from pile burning areas (Hubbert et al. 2015). Hand thinning of vegetation involves the thinning of trees and brush using hand tools (e.g., chainsaws) and does not result in increased erosion and runoff. Management requirements that incorporate BMPs have been integrated into project design and will be implemented during project implementation to ensure water quality and beneficial uses are protected. Ongoing monitoring has shown that BMPs are effective in protecting water quality (STF 2007-2014; USDA 2009).

**References**

[CRWQCB] California Regional Water Quality Control Board, Central Valley Region

2015. The water quality control plan (basin plan) for the California Regional Water Quality Control Board, Central Valley Region: The Sacramento River Basin and the San Joaquin River Basin. 4th ed., rev. Sacramento, CA. 131 pp.

Hatchett B, Hogan M, Grismer M. 2006. Mechanical mastication thins Lake Tahoe forest with few adverse impacts. Calif Agriculture 60(2):77-82.

Hubbert K, Busse M, Overby S, Shestak C, Gerrard R. 2015. Pile burning effects on soil water repellency, infiltration, and downslope water chemistry in the Lake Tahoe basin. Fire Ecology 11(2):100-117.

Moghaddas EEY, Stephens SL. 2008. Mechanized fuel treatment effects on soil compaction in Sierra Nevada mixed-conifer stands. Forest Ecology and Management 255(8-9):3098-3106.

Stanislaus National Forest. 2007 - 2014. Water quality best management practices evaluation program, report of BMPEP monitoring. Unpublished document. On file with: USDA Forest Service, Stanislaus National Forest, Resource Management Program Area, 19777 Greenley Road, Sonora, CA 95370.

[STF] Stanislaus National Forest. 2011. Watershed Condition Assessment- Project Record. On file with: USDA Forest Service, Stanislaus National Forest, Resource Management Program Area, 19777 Greenley Road, Sonora, CA 95370.

[USDA] Forest Service 2004. Sierra Nevada Forest Plan Amendment. Final supplemental environmental impact statement and record of decision. R5-MB-046. Pacific Southwest Region. Vallejo, CA. 72 p.

[USDA] Forest Service 2009. Water Quality Protection on National Forests in the Pacific Southwest Region: Best Management Practices Evaluation Program, 2003-2007. USDA Forest Service, Pacific Southwest Region, Vallejo, California.

[USDA] Forest Service 2011. Soil and Water Conservation Handbook, Chapter 10- Water Quality Management Handbook, Section 12- Best Management Practices. R5 FSH 2509.22. USDA Forest Service, Pacific Southwest Region, Vallejo, CA. 237 pp.

[USDA] Forest Service 2012. National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide. FS-990a. April 2012. USAD Forest Service, Washington Office.

[USDA] Forest Service 2017. Forest plan direction. Stanislaus National Forest. Pacific Southwest Region. Sonora, CA. 202 pp.

York R, Keller R, Thomson A. 2015. Thinning treatments had minimal effect on soil compaction in mixed-conifer plantations. Calif Agriculture 69(3):157-163.