Appendix H: Hazardous Fuels Reduction Plan

Sugar Loaf Mountain
Hazardous Fuels Reduction Plan

Kevin Whitlock, MBA, RPF 2436
Under the Trees – Forestry & Environmental Service
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Fuel Treatment Prescription

The recommended forest management activities specific to the Sugar Loaf Mountain property are based on an ecological approach which retains biological legacies, retains and promotes species diversity on the landscape, improves existing fuel breaks and prescribes vegetation management of "thinning from below".

The recommended actions include: 1) implementing thinning from below using hand crews to remove vegetation adjacent to the designated evacuation route within 50 feet of the road surface, while maintaining the aesthetics value of the site. 2) Prune residual stems to remove ladder fuels. 3) Throughout the property, conduct fuel treatments in the isolated pockets of fuel loading to release existing suppressed trees. 4) Conduct follow-up treatments every two to five years.

The overall goal of the proposed vegetation management activities is to develop a healthy forest through the reduction of forest fuel loads, thereby reducing the risk of catastrophic fire, and subsequent erosion and sedimentation.

Thinning from below fuels management is the treatment of plants and litter to reduce the frequency, rate of spread, and size of Wildland fire. Vegetation management is a proactive approach to reducing wildfires and their intensities as opposed to the reactive approach of fire management. A realistic objective for fuels management is to reduce a fire's rate of spread and other undesirable fire behavior. Vegetation treatments include removing heavy accumulations of surface fuels, thinning trees and brush to break up the horizontal continuity; pruning lower limbs to remove ladder fuels; and pulling invasive species.

The project area is located within the Nevada City Wildland Urban Interface (WUI), recognized as a community at risk of catastrophic wildfire. The site conditions are extreme, in the overstory, thick Manzanita and hardwoods cover the south facing aspect with suppressed conifers established in the understory. The north aspect is a mixture of overstory conifers and hardwoods, with an understory of low lying shrubs. These conditions are typical of a Montane Hardwood-Conifer (MHC) land cover. The MHC is composed of a pronounced hardwood tree layer, with an infrequent and poorly developed shrub stratum, and a sparse herbaceous layer with scattered conifers in small patches or individuals. Common associates in the MHC are ponderosa pine,

Douglas fir, incense cedar, California black oak, Live oak, bigleaf maple, dogwood, and Pacific madrone. Chaparral species such as Ceanothus and Manzanita form a shrubby understory, and compose a part of the upper canopy in areas dominated by shrubby species.

Vegetation or fuel is the ***only*** element that can be manipulated to change fire behavior. Successful vegetation management treatments to reduce fire intensity and rate of spread, requires efforts be spent on decreasing the volume of fuel and increasing the separation or arrangement of the fuel.

The goal of fuels treatment is to raise the canopy base height, thereby improving the stand's resistance to initiation of passive or active crown fire, reduce basal area or stand density, thereby increasing the average stand diameter which improves stand resiliency to disturbances such as drought, insects, diseases, and fire; and enhance stand heterogeneity without a significant increase in fuel bed depth.

Ground and ladder fuel maintain heat transfer into the crowns which allows active crown fire to move with the help of the prevailing wind. By removing the ground and ladder fuel, the heat transfer does not occur which often leads to the fire dropping out of the crown allowing suppression activities to commence.

The fuel bed depth or ground fuels need to be modified, providing a mosaic pattern, with little continuity. In this situation, a ground fire will "creep" around, generally providing a low intensity burn, and minimal tree mortality.

The treatment areas were chosen based on the primary concern of fire from both internal and external threats. The internal threats are specific to the proposed day-use area, and any area where the public has access through the property. These areas are specific to the east side of property along Coyote Street, and the internal access road.

The external threat, where the potential for external ignition is considered **Moderate to High,** includes North Bloomfield Road, Coyote Street, Highway 20, and an area to the south of the property, approximately 150 feet east of the intersection of Highway 49 and North Bloomfield Road, an intermittent watercourse that will act like a chimney, rapidly moving fire upslope.

Where homes or other improvements are present at lower densities, appropriate fire prevention strategies include enforcement of compliance with fire safe regulations and appropriate building codes. These strategies reduce the probability of fire propagating across the interface between structures and surrounding vegetation.

In more densely populated interface areas, successful protection hinges primarily on appropriate pre-fire strategy, which focuses on building code compliance, improvements (e.g. non-wood

roofs, water supply), and fire safety regulation enforcement (e.g. road access, and vegetation clearance).

Fuel Load
The fuel load is considered high with an average 15 to 20 tons per acre.

Treatment Guidelines

Thinning from Below / Understory Fuels
This practice is to reduce the potential of damage from wildfire, pests and moisture stress; restore natural plant communities; achieve a desired understory plant community; improve aesthetics and open space values; improve wildlife habitat; and to achieve a desired level of shrub density.

Objective: To reduce fuels and improve growth by increasing growing space for selected residual trees.

Method: Thinning from below can be done with a masticator, or by hand crews using chainsaws. Mastication can be used on slopes up to 35% where there are heavy fuels. Any steeper slopes should be treated by using chainsaws and hand crews.

Hand clearing using crews with chainsaws, loppers, and pole saws. The hand crew material will be cut and stacked for chipping. Chipping will take place along the roadway with the chipped material being broadcast back into the project area.

Standards: Vegetation of 1-6 inches dbh (diameter at breast height) should be spaced no greater than 15-20 feet, trees 7-12 inches dbh should be spaced no greater than 20-25 feet. Thinning from below should include the removal of any diseased, damaged, and/or insect infested tree larger than 12 inches dbh, while retaining trees that are healthy, vigorous, and of the best phenotypic quality available in the pre-treatment stand. If any trees over 6 inches dbh are targeted for removal they will be tagged (flagged or marked) for review by City staff.

Vegetation surrounding healthy trees should be removed. Spot treatment around individual or small groups of trees throughout the property should be a minimum of three times the height of surrounding vegetation. Tree cutting will be consistent with the Nevada City Tree Ordinance.

Pruning
Pruning is the practice of removing the lower branches from the tree. Pruning will reduce fire damage to the tree crown by removing the lower branches (fuel ladder). Pruning also improves

the quality of trees for wood products and improves the appearance of the stand. Pruning should be done during tree dormancy, which is September through March.

Objective: The primary objective of this treatment is to increase the distance from any surface fuels to the live crown of trees. This will reduce the likelihood that a surface fire will extend into the live crown of trees.

Method: Pruning should be accomplished by hand cutting limbs flush with the branch collar, without damaging the cambium. Retain and prune sound, healthy trees exhibiting good growth and a straight trunk.

Standards: Prune trees to a minimum of 10 feet above ground or ½ of the live crown ratio, whichever is less.

Only trees that are vigorous, sound, and well-formed should be pruned. Not more than 50% of the live limbs should be removed; otherwise, the tree's growth could be reduced.

Follow-Up / Slash Disposal

Slash is the woody debris (residue) of cut trees, pruning, and brush left after thinning treatments.

The options for slash disposal include mastication, piling and burning, and/or chipping the material for transportation to a co-generation plant or spreading on site. Resulting material from mastication and, or chipping can be left on-site to provide ground cover but should not be more than four (4) inches in depth. The objective of the treatment is to treat the resulting slash to reduce the potential fire hazard and reduce the threat of insect attack/spread.

To effectively reduce the fuel hazard, the slash disposal options noted above should be employed in 90% or more of the work area.

Follow up treatments should be scheduled every two to five years depending on vegetation growth.

Aesthetics

Maintaining an aesthetic appearance of the property is important to the landowner. Vegetation management activities recommended in this plan will change the appearance of the forest, making it more open, but should still keep a pleasing appearance.

Much of the opposition to vegetation management activities is due to the changed physical appearance of the area. The following Best Management Practices (BMPs) are suggested to minimize the adverse visual effects of vegetation management activities.

Best Management Practices (BMPs)

- Reduce damage to residual trees.

- Cut all broken trees, leaners (trees tipped or dislodged during a thinning operation), and badly scarred trees except where they are being *retained* for a specific purpose (biological legacy) and consistent with the Nevada City Tree Ordinance. Vegetation to be *retained* should be identified by flagging prior to treatment.
- Clean up all refuse (man-made debris).
- To reduce erosion from fuel treatment, bare mineral soil in excess of 800 square feet should be covered with chip or re-seeded using weed free - native grasses wherever possible.
- Leave visual buffers in isolated pockets along or adjacent to traveled roads.

Additional Performance Criteria and Measures

SSI and Friends of Sugar Loaf will carry out the following performance criteria and measures in addition to the Best Management Practices and Standards spelled out by Kevin Whitlock earlier in this report. Some of these measures are more stringent than the range recommended ins some instances by Mr. Whitlock, and will take precedence.

Work Season

Performance criteria: Avoid fire, erosion, and bird nesting periods.

Hand fuel reduction activities will be conducted from September to March only in order to avoid fire hazard from removal activities and to avoid bird nesting season.

All fuel reduction activities shall be timed with awareness of precipitation forecasts and likely increases in site runoff. Fuel reduction activities may proceed only after sufficient erosion control measures are in place. Revegetation, restoration and erosion control work is not confined to dry periods.

Hand fuel reduction only, no mechanical mastication. Note that the Proposed Fuel Treatment Map includes a potential 5 acre mastication area in the southern portion of the property; this is no longer proposed for mastication but will receive hand crew treatment.

Erosion Control

Performance criteria: Erosion control measures will take place surrounding or within all work areas as needed to ensure that no soil erosion over existing conditions will result from the project.

Erosion control mechanisms

Final erosion control plans are to be prepared prior to work start and adjusted as needed as work proceeds. The plans shall include the following:

In addition to covering with chips to a maximum depth of 4" or re-seeding using weed-free native grasses as already specified by the professional forester, newly bare mineral

soil areas of 800 square feet or greater shall be protected from erosion by other methods, or a combination of other methods. These include but are not limited to placement of mechanical barriers and the installation of retention features at the foot of hillside work areas.

Follow up should occur at years 2, 3, and 4.

Slash Disposal

Slash disposal shall be conducted to avoid topsoil removal and residual impacts on and around the chipping zone.

Brush dragging paths will be distributed across the site to reduce topsoil removal and brush dragging tracks will be revegetated or chip covered.

If a central on site mechanical chipping site is needed it will be located on city property as close as possible to a road or where access arrangements can be made with a private property owner on existing cleared areas or areas to be cleared as part of the project. Smaller chipping sites will be located on road turnouts on the City owned side of Coyote Street or on Sugar Loaf Rd.

No burning of slash will be allowed.

Water Quality

Performance criteria: Site runoff quantity and quality shall not exceed current conditions.

SSI will monitor runoff from the site as well as the sediment content of receiving features to ensure that erosion impacts are not occurring and remedial measures will be taken as indicated.

Biotic Resources/ Protection of Sensitive Plant and Animal Species

Performance criteria: Sensitive habitat and identified sensitive plant and animal species shall be avoided and protected.

Final biotic surveys

The potential for sensitive plant and animal species to occur on the site is relatively low. A biological survey assessment of the general area has been conducted. Only three species were identified with moderate potential for occurring on the site (Brandegee's clarkia, moderate likelihood; Butte County fritillary, low to moderate likelihood; Coast Horned lizard, moderate likelihood). Final on site surveys for these sensitive plant and animal species will be conducted in Spring, 2016 before work begins to identify avoidance areas and any other necessary protective measures. Surveys will also be conducted for the Unlikely and Low Likelihood plant and animal species at the same time.

Since work will be conducted largely in September and October; nesting birds of non-sensitive species are not expected to be affected by the project.

Revegetation

Performance criteria: Ability of the cleared areas to regrow in low growing native grasses and plants historically predominant on the site should be the goal.

The need for and desirability of revegetation of specific species in identified areas beyond the native grass reseeding recommended by Kevin Whitlock will be examined and implemented by SSI as may be agreed as work proceeds.

Cultural Resources

Performance criteria: Historic and cultural resources will be avoided.

The CHRIS search discovered one recorded pre-historic period cultural resource and nine historic period recorded resources within ¼ mile of the site. It concludes that there is a moderate potential for additional prehistoric and historic resources to be located with ¼ mile of the site. As a result, Sierra Streams Institute will retain an archaeologist upon the recommendation of the local Nisenan Tribal Council to fully survey the site before work begins and follow avoidance advice on prehistoric or historic features which may be given.

Relative to cultural resources, the region including the site is part of the Nisenan ethnographic-period settlement. The Nisenan group of the Nevada City Rancheria is active in the community. They have toured the site with SSI. According to Shelly Covert, secretary of the Nevada City Rancheria Tribal Council, Sugar Loaf mountain was used as a lookout and signal point for the tribe as well as a place for contemplation. Oral history notes that the top of the mountain was once more rounded than flat as it is today and that there was a battle with the Camptonville Nisenan group at one time on the mountain. Its original name was Koo' Lăŭ.

Relative to historic resources, the 31 acre site is part of the original 400 acre plus Manzanita Diggings mining claim. The Manzanita Diggings and Coyote Diggings and gold extraction related activities appear to have all occurred off site between what is now Coyote Rd. and Highway 20. On site, the historic Cooper Toll Rd. and an early water conveyance ditch appear to have passed through and are the only known historic features on the 31 acre site per the Wycoff study. We will avoid these sites. Early accounts note that the mountain was logged many times after Gold Rush era settlement. The 31 acre mountain has no historic accounts of buildings or post Gold Rush era habitation and has served as a prominent visual backdrop to the City since its inception. (Wycoff, *Sugar Loaf- Nevada City's Promontory and the Adjoining Manzanita Diggins*, 2004.)

Aesthetics

Performance criteria: It is important to achieve a non-uniform, natural appearance to the work particularly as viewed from Nevada City and adjacent roads and properties.

Specimen tree/ vegetation tagging

As specified in the Whitlock report, tag all specimen trees, shrubs, or vegetation groupings in proposed work areas which should not be removed or which should receive special protective treatment during the work for aesthetic or biological reasons.

Tree retention

The site is not heavily forested and its slopes are predominately manzanita covered. Trees over 12" in diameter will not be removed unless dead, diseased, insect infested, or hazardous. There are few small trees on the property, most are over 12" in diameter. Trees 7" to 12" in diameter may be removed only if critical to thin stands to reduce fuel ladder by ensuring that they are no closer than 20 to 25 feet from the larger trees. None of these 7" to 12" trees will be removed in important visual groupings, some of which are distinctive closed canopy oak groupings, unless needed to ensure the health of the larger trees. Rather, emphasis will be placed on reducing the understory of trees and limb pruning. Any tree cutting of dead, diseased, insect infested, or hazardous trees or trees of 7" to 12" in diameter will be reviewed by the City Planning Commission in a public hearing per its Tree Cutting Ordinance and recommendations will be followed.

The project involves only minor alteration to the land and, as a result, there is no requirement for a Timber Harvest Plan Harvest Plan.

Light on the Land Approach

The fuel treatment plan focuses on hand crew treatment near the perimeter Coyote Rd and the old existing trail which runs parallel to Coyote Rd., along the dirt trail/road to the top of the mountain, and on the south and southwest perimeter of the site adjacent to developed properties. These are the site evacuation routes and areas where fire might most likely start. The center and northern area of the site will receive spot treatment by hand crews. This approach is required to limit visual impacts on the most highly visible slopes.

Long-Term Management Plan and Sustainability
(prepared by SSI and Friends of Sugar Loaf)

Sugar Loaf is under the ownership of the City of Nevada City which takes the stewardship of its land seriously. The City owns and manages over 270 acres of wildlands within City limits. Sierra Streams Institute has a long operating volunteer program which successfully completes vegetation management and restoration projects as well as stream monitoring annually. Together with the Friends of Sugarloaf,

which has supported activities related to Sugar Loaf for 11 years, these two groups have a commitment to assist the City in fuel management and fostering biodiversity on Sugar Loaf for ten years after project completion and beyond.

Two follow up work sessions by the hired professional fuel reduction crew will take place under the grant program in 2017 and 2019. The longer term management plan after project completion in 2019 will entail yearly Fall and Winter volunteer crew follow up to maintain a reduced fuel state and make any further recommendations to the City.