Background

The Cleveland-Ice House Forest Health Project is located on the Pacific Ranger District of the Eldorado National Forest within the South Fork American River Cohesive Strategy Area (SOFAR project). The South Fork American River watershed has large swaths of U.S. Forest Service-designated wildland-urban interface along a heavily traveled and visible state highway corridor with multiple small permanent and seasonal residences and heavy recreational use. National Forest project planning underway within this watershed and multiple land ownerships provide an extraordinary opportunity for us to work collaboratively across all lands. The watershed is experiencing increasing bark beetle activity and associated increasing tree mortality exacerbated by the ongoing drought (National Insect and Disease Risk Map 2012), which in turn is increasing the risk of wildfire.

This project includes areas designated by the 2014 Farm Bill to address insect and disease threats that impact forest health, and increase the risk of wildland fire. High stocking levels, overlapping crown canopies, and dense understory brush contribute to resource competition, leaving trees in the watershed susceptible to insect attack. Older mature plantations are at highest risk from western pine beetle which seek out weak trees of larger diameter, in areas with a high proportion of host-sized trees. However, younger plantations are at risk to other native insects which can severely damage developing terminals or shoots, eventually killing them. According to National Insect and Disease risk rating models, the proposed areas are categorized as high risk for pests that could destroy over 25 percent of basal area due to current forest conditions. In April of 2014, California Governor Edmund G. Brown Jr. specifically identified a corridor along the South Fork American River for treatment designation due to pest risks, later supported by Secretary of Agriculture Tom Vilsack on May 20, 2014.

We have been working with local individuals and groups to establish priorities, cooperate on activities, and increase public awareness of and participation in site-specific projects. We have been working with multiple local forest interest groups to identify desired vegetation and fuels conditions and develop approaches to meet those desired conditions. The Cleveland-Ice House project is entirely within the South Fork American River area and is designated by the 2014 Farm Bill. It also lies within the designated wildland-urban interface of the El Dorado County Community Wildfire Protection Plan.

The Cleveland-Ice House Forest Health Project consists of approximately 3,000 acres of plantations and neighboring natural stands we identified as overstocked and therefore at risk of loss to insect and disease. We have also identified several of these areas as strategic for future wild fire and prescribed fire management. Our prioritization of units is based on focusing treatments along the primary ridges and access roads, along the edge of the King Fire and in the wildland-urban interface. Once we identify these areas, we will connect our treatments with those of adjacent landowners to effectively change fire behavior on a landscape scale.

Purpose and Need for the Project

The current infestation of bark beetles in the Forest has been ongoing for a number of years and slowly building. Since 2007, mortality in ponderosa pines in both natural stands and plantations has been increasing. Pockets of dead trees (5 to 100 trees), have been found throughout the Forest, primarily in plantations, but individual large trees have also been attacked. According to the 2015 aerial detection survey, large polygons (over 200 acres) of bark beetle-associated mortality were noted east and south of Icehouse Reservoir. Based on the rate of fading trees detected in southern Sierra Nevada forests and uncertain precipitation this winter, high levels of mortality are still possible in 2016. We also anticipate mortality in white fir, red fir, incense cedars, and Douglas-fir.

Our insect and disease risk assessments of proposed treatment units show moderate to high risk of pest infestation. According to Oliver (1995), ponderosa pine stands where basal areas are over 120 square feet per acre, or stand density index is over 200, are at imminent risk of bark beetle-associated mortality. Treatments that reduce stocking or densities below these thresholds significantly reduce risk and potentially high mortality if bark beetles invade treated stands. Prevention is not guaranteed but improves chances that bark beetles will bypass treated stands in search for more preferable conditions.

The plantations within the project area, which were established following the 1992 Cleveland Fire and 1959 Ice House Fire, are at high risk of loss from insects and drought because stand densities are high and trees are competing for scarce resources (water, light, nutrients). A forest health protection review in 2015 validated the concern in the 2014 Farm Bill that the current stand conditions, within the Cleveland-Ice House plantations specifically, placed these areas at high risk of bark beetle infestation; and the continuing, prolonged drought conditions have raised the moisture stress and insect infestation risk.

1. There is a need to reduce the stocking levels and competing vegetation to improve resilience of these stands to insect and drought related mortality. There is also a need to make stands more resilient to fires by accelerating development of trees to a condition where they can withstand low intensity fire, and to reduce the surface and ladder fuels to reduce fire intensities within these stands.
2. There is a need to maintain or improve resilient forest conditions which is the capacity of an area to return to prior conditions and function after disturbance (USDA Forest Service, 2011). Resilient forests are those that not only accommodate gradual changes related to climate, but tend to return toward a prior condition after disturbance, either naturally or with management assistance (Millar et al. 2007).
3. Surface fuel loading levels, trees that are dead and dying due to insect and disease, and natural forest succession make stand replacing fire an ongoing risk to the landscape. Historically, periodic lower intensity fire would keep surface fuel levels down, and thin stands, reducing the risk of stand-replacing fire. The current fire regime has been influenced by historic fire suppression, effectively removing fire as a process on the landscape. The project area is close to private property, so the wildland-urban interface is a concern if a large fire were to occur in the area. Removing standing and down fuels reduces fuel loading and fuel continuity, and increases our ability to directly suppress fire in a safe and efficient manner.
4. There is a need to strategically place forest health treatments that are cost effective and complement planned and completed treatments on adjacent private lands. A neighboring landowner, Sierra Pacific Industries has a timber harvesting plan approved under the California State Forest Practice Act to thin, with follow-up treatment, their established plantations, to maintain health and increase growth as well as increase fire resiliency. The activities we are proposing for the Cleveland-Ice House Forest Health Project would complement the work initiated and planned on Sierra Pacific Industries lands.

Proposed Action

We propose reducing stand density, competing vegetation, and fuels on an estimated 3,000 acres of national forest system land within the South Fork of the American River drainage. We would commercially thin approximately 2,235 acres of 20-year old plantations, 441 acres of 54-year old plantations, and 259 acres of natural stands. Within all treatment units, we would also remove excess non-commercial conifers as biomass. We would prioritize treatment to slopes less than 35 percent to reduce costs. We would propose treating steeper slopes where we could implement treatments cost effectively and where treatment is necessary to meet our project objectives.

Stand Type	Treatment	Acres
Mixed	hand cut/hand pile	49
	mechanical treatment	129
Natural	mechanical treatment	259
Plantation	hand cut/hand pile	14
	mechanical treatment	2547

We would use a combination of thinning, chipping and masticating brush and smaller trees, and hand treatments including brush cutting, hand thinning, and pruning to reduce the stocking in the selected stands and to change the structure of live and dead material in treated stands. We would choose the most cost efficient and effective treatment within each stand based on timing, equipment availability, and post treatment results, but generally we would implement as follows:

- Stands with commercial-sized material and stands where mastication is not efficient or effective due to larger trees sizes, would be mechanically harvested using feller bunchers and rubber-tired or track-mounted log skidders to remove whole trees to landings.
- Stands which consist primarily of an over-abundance of smaller trees and shrubs would be masticated or chipped.
- Stands with slopes generally greater than 35 percent and areas where mechanical equipment is limited would be hand thinned.

In mechanically thinned plantations, we would tractor pile or masticate and chip existing and operation generated slash and small trees and shrubs with a track-mounted masticator or chipper. The mastication or tractor piling would occur shortly after the thinning is completed. We would machine pile and pile burn post-harvest as necessary to reduce surface fuels to less than 10 tons per acre. We may substitute mastication for tractor piling where surface fuels can be more effectively treated by this method and where maintaining or increasing soil cover is a higher priority.

We would have non-commercial material accumulated on landings disposed of or removed in a number of ways, including on-site burning, commercial and personal use firewood, or as co-generation fuel where feasible.

We would remove hazard trees (live and dead) of all sizes along utility lines, timber haul roads and landings to provide for safety of woods workers and the public throughout project implementation, except where we implement removal restrictions.

1. Reduce Stand Density through Thinning (Harvest): Remove selected conifer trees within identified natural stands and plantations through commercial and non-commercial thinning. Within the plantations we would remove trees to reach residual basal areas that would vary from approximately 60 to 100 square feet per acre in an uneven arrangement that would facilitate developing patterns of individual trees, clumps and openings and encourage species compositions consistent with slope position and aspect for the stand. We would thin for the lower basal areas on the upper portion of the dominant ridges and the higher basal areas on the mid to lower portion of the slopes. Within the natural stands, the trees harvested would generally be the shade-tolerant, understory trees with lower live crown ratios (the ratio of the size of the live crown to total tree height), indicators of bark beetles or disease.
2. Reduce Competing Vegetation and Fuel Treatments: During harvest operations, we would remove excess trees that do not meet commercial quality standards to landings for later disposal by burning or for cogeneration. Post-harvest tractor piling and burning would occur in the natural stands that have been thinned. We would masticate shrubs and small trees as a follow up treatment to harvest. We would also use it as the primary treatment in some plantations to reduce the density of shrubs, brush and small trees to less than 30 percent to reduce competing vegetation. We would prune selected

residual trees to increase the base height of live crowns. The increased height to live crown would reduce the risk of wildfire or prescribed fire moving into the crown.

3. Reconstruct Roads: We propose using best management practices (BMPs) for road reconstruction to facilitate treatments and improve water quality on roads accessing the proposed treatment units. Reconstruction activities may include: road rocking of specific segments, replacement of inadequate drainage crossings, cutting or trimming of trees and brush for sight distance improvement, elimination of ruts, replacement of existing, non-functional gates or barriers, ditch repair, and installation of waterbars and dips on roads with inadequate runoff control. In order to conduct the commercial thinning operations, we will need to reconstruct or conduct heavy maintenance on approximately 10 miles of existing system roads. We would use water from drafting sites that have suitable stream flow and access to abate dust from logging traffic. If water is scarce, we would use EPA approved dust palliatives such as magnesium chloride or lignin sulfonate for dust abatement.
4. Construct Log Landings: We expect no new log landings. However an undetermined number of existing landings may need to be enlarged to accommodate the accumulations of biomass that would be removed from the thinned stands. The size of the log landings may range from ¼ to ½ acre in size depending on how much logging debris is generated.
5. Burn Piles: Burning hand piles and landing piles would occur in accordance with the burn plan developed for this project.
6. Underburn: All stands would be analyzed to allow follow-up underburning using ground based and aerial ignition methods.