

Draft
Sierra Forest Health Report

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The TMTF necessarily has an immediate focus on the urgency of addressing public safety risks created by the wide-spread and continuing expansion of an unprecedented number of dead trees. As we know, there is little that can be done to stem the current bark-beetle epidemic.

A second and equally important dimension of the TMTF is a focus on the health and resiliency of private and federal forests that are not already dead and dying. There is much that needs to be and can be done to implement a robust program of restoring and maintaining forest health and resiliency.

The Forest Health subcommittee believes action is needed commensurate with the current and projected risk, as well as with the magnitude of the environmental and economic value of the Sierra to the State of California and to the rest of the country. Objectively, the Sierra is California's most environmentally and economically important natural resource.

As the Chairman of the Tuolumne County Bark Beetle Task Force succinctly described the current situation in the Central and Southern Sierra, "We are experiencing an unprecedented ecosystems change event." Unfortunately, the consequences of this unfolding event are expanding northward in the Sierra and into the Cascade region of California.

While there are some significant differences among us on how to achieve forest health, we all recognize that whatever we particularly value or benefit from, our forests are dependent upon a healthy forest ecosystem. Several community-based collaboratives, such as the Yosemite-Stanislaus Solutions (YSS) collaborative, have forged consensus in purpose, intent and a scientifically-based restoration Plan of Action for their area of focus. However, the natural variability throughout the Sierra precludes a "one-size-fits all" solution. Instead, watershed or even sub-watershed, restoration plans will need to be devised and implemented.

To effectively address the current imperative for a Sierra-wide ecological restoration, we are recommending robust implementation of the Sierra Nevada Conservancy's Watershed Improvement Program, supported by enhanced efforts from relevant State and federal agencies, particularly CalFire, California Air Resources Board, the Public Utilities Commission, the California Energy Commission and California Fish and Wildlife.

State and federal partnerships for ecosystem restoration already exist for the Florida Everglades and the Chesapeake Bay. It is time for a similar commitment for California's Sierra, involving relevant State and federal agencies, and also the varied public and private interests that are beneficiaries of the Sierra's ecological and environmental wealth.

Rationale for the Recommendation

Forests in California and the Sierra Nevada/ Cascade regions in particular, are experiencing an unprecedented ecosystem change event. This is much more than an historic drought, reflecting the cumulative and amplifying consequence of 100 years of management policies that have had unintended consequences. The reality is that our Sierra forests, the source of over 60% of California's water supply and equally critical to GHG reduction goals, wildlife habitat, and source of raw materials and economic opportunity, are on a trajectory that is ecologically unsustainable.

Without a robust, scientifically-based forest health and resiliency plan of action, we are likely to reach a tipping point with profound impacts for California's environmental and economic health that will adversely affect water, carbon sequestration, wildlife, recreation, and economic opportunities. Increasingly, evidence indicates that part of the Southern Sierra have already reached that tipping point, where the ponderosa pine dominated forests may not be able to re-establish themselves in the lower elevations.

Many areas of the Sierra Nevada, and other places in California, are experiencing the cumulative effects of multiple decades of fire exclusion and widespread harvesting, without consideration of the ecological effects on flora and fauna or vegetative succession patterns. In response to past forest management, a large percentage of the federal, state, and private forests within the state contain dense, overstocked stands with heavy fuel loading and excessive ladder fuels. Drought and a warming climate are amplifying the consequences, as evidenced by the unprecedented bark beetle epidemic, responsible for killing over 53 million trees in the Sierra since 2010. The bark beetle epidemic continues to expand its range, undoubtedly killing millions more since then. Additionally, California has been experiencing rapid growth in the number, size and severity of uncontrollable wildfires; the explosive fire growth that occurred during the King and Rim fires are prime example of uncharacteristic fire behavior. leading research scientists to conclude that we have entered an era of "megafires."

It is time to recognize that these "unprecedented" events are symptoms of the greatly diminished ecological health of California's forests. The result is an accelerating decline of our forest's scenic, recreation, watershed, and forest product values.

Most importantly, as California continues its global leadership role in reducing GHG emissions, the stark reality is that California's laudable GHG reduction targets may not be achievable if we fail to address the growing trend of mega-fires that began before the current drought, and, according to current science, will likely worsen in coming decades due to increased temperatures during periods of little moisture.

As the Sierra forests continue their rapid decline, their capacity to sequester GHG is also rapidly declining. Much more dangerous, however, is that the rapid growth in size and

severity of wildfires is already offsetting the reductions of GHG being achieved through our investments in all other areas of the AB 32 program. For example, the 2013 Rim Fire is estimated by the USFS to have emitted more than 2.5 times the GHG reductions achieved in all other sectors through the AB 32 program that year. Even worse is that, as the USFS and Sierra Nevada Conservancy jointly testified to the ARB, the dead and decomposing vegetation from that one fire will emit four times as much GHG in the coming decades.

State, federal and university scientists agree that the recent pace and scale of forest management actions have been inadequate to make our forests sufficiently resilient to fire, insects, and drought. While State agencies and the Forest Service are doing what they can within existing budgets, significantly greater pace and scale of forest treatments is urgently needed to protect and improve the remaining green forest areas on both federal and private lands, thereby moving the overall forest to a more resilient condition.

Supporting Facts:

According to the Climate Central analysis of large wildfires (more than 1,000 acres) on U.S. Forest Service land in California:

- California has the largest population (11.3 million) living in the wildland-urban interface of any state. This is the area where development abuts and intersperses with wild lands like forests and grasslands and where homes are more at risk from wildfire than in urban areas.
- 30 percent of California's population lives in the wildland-urban interface.
- Over the last five years, California has seen an average of 94,000 more acres burn in large wildfires on U.S. Forest Service land than was typical in the 1970s. The more significant change is that the high severity percentage of areas burned frequently exceeds the historic 10% to 15%. Based on the fire regime and fire frequency in the Sierra Nevada, we should be seeing roughly 500,000 acres/yr of low-mixed severity fire and 10-15 % high severity (North et al. 2012; North et al. 2015).
- Since 2010, there are now an average 3 more large wildfires in California burning each year than there were in the 1970s. Annual area burned in these wildfires has increased six-fold. And wildfire season is now an average of 105 days longer than it was in the 1970s. During this time, the years with the hottest spring and summer temperatures were typically the years with the most large wildfires.

Projections based on 29 climate models suggest that the number of high wildfire potential days each year could increase by nearly 50 percent by 2050 if greenhouse gas emissions continue unabated. Southwestern states, including Arizona, California, New Mexico, and Utah, are expected to see the largest increases in high wildfire potential days by 2050.

Today's fires frequently differ from the historical fires that positively shaped the Sierra forest. Today's wildfires are larger in size and higher in severity, simultaneously magnifying their negative impact while reducing their ecological benefits. The conditions that contributed to the magnitude and severity of the Rim Fire are increasingly prevalent throughout the Sierra.

The State's Sierra Nevada Conservancy succinctly noted: "Overgrown forests are more susceptible to insect attack and drought because there are too many trees competing for limited water and nutrients. Reducing competition by doing more restoration, such as ecologically-sound thinning and using prescribed or managed fire, can help protect our still-green forests from future drought, insects, and disease."

Region Five of the United States Forest Service pinpointed a major source of our current risk and challenge:

"Unfortunately, unless Congress acts now to address how we pay for firefighting, the Forest Service will not have the resources necessary to address the forest die-off and restore our forests. Forcing the Forest Service to pay for massive wildfire disasters out of its pre-existing fixed budget instead of from an emergency fund like all other natural disasters means there is not enough money left to do the very work that would help restore these high mortality areas. We must fund wildfire suppression like other natural disasters in the country.

With the increasing size and costs of suppressing wildfires due to climate change and other factors, the very efforts that would protect watersheds and restore forests to make them more resilient to fire in the future are being squeezed out of the budget. Last year fire management alone consumed 56 percent of the Forest Service's budget. "

The stark reality is that all national forests within the Sierra are in an accelerating decline in their ecological health, which will result in an impoverished Sierra without a robust, sustained restoration program.

Ecological Restoration Goals

Over the last decade, the U.S. Forest Service, in partnership with state agencies and university researchers and NGO's, invested in scientific studies focused on learning more about how to respond to high severity wildfire risk while sustaining at-risk wildlife species within the national forests of the region. In 2009, Forest Service researchers published PSW GTR-220, An Ecosystem Management Strategy for Sierra Mixed-Conifer Forests. This and other contemporary publications began a shift in forest management thinking towards managing forest structure to emulate the natural heterogeneity of mixed conifer forests as an approach to restore resiliency to disturbance (e.g. fire), and to also manage for the variety of wildlife habitats characteristically found in these forests.

General Wildlife Habitat Restoration

Sierra Nevada forests provide habitat to many hundreds of species of wildlife. A growing number of these species have become rare and endangered, requiring special protection and management considerations. It is our intention that forest treatments will enable retention and/or improvement of old forest characteristics, but will also maintain a diversity of habitats across the Sierra's varied environments.

Current Impediments to establishing a Sierra Ecological Restoration Program

Stem from Three Primary Factors;

a) Difficulty in reaching agreement on suitable practices among the involved public, though progress is being made through such forums as the recently established State-federal Watershed Improvement Program, community-based collaboratives and the TMTF. We believe that suitable practices that focus on the primary (80-90%) fuel profile component contributing to wildfire behavior (the surface and ladder fuel treatments) have a much broader social license. Increased markets for small diameter wood products would further build public support.

b) Procedural requirements for meeting laws and regulations (e.g. NEPA compliance, required surveys) can be implemented in an overly cumbersome and repetitive manner. Our diverse group embraces the purposes, value and necessity of these environmental assessments. We also, though, recognize that we have often reached an almost Rube Goldberg intricacy in their application. NEPA is complex because the landscape and the issues are complex. The Forest Service has only so much staff capacity to do the work. We need to do better by using such approaches as combining NEPA efforts where possible and practical, as well as undertaking larger scale restoration plan utilizing state-of-the art environmental assessment technology.

c) Developing and implementing a program commensurate with the scope of the problem will require significantly more resources than the State or federal governments, as well as the multiple beneficiaries of the Sierra's economic wealth and environmental health, currently invest. We are now dramatically experiencing the consequences of our past and current under-investment. Rapidly scaling up to an ecologically significant scale in the short-term will require an equitable funding partnership between the State and federal governments, as well as participation from the array of other public and private beneficiaries. This would make the annual investment cost much less onerous. As one participant noted, there is a parallel to the bumper sticker that succinctly notes, "If you think education is expensive, try ignorance." There is growing evidence that we can either begin making necessary investments or pay a much higher price over time.

Elements of a Sierra Ecological Restoration Program

The dedication and cooperation of diverse interests has demonstrated that restoration is feasible. Most promising is that the Sierra Nevada Conservancy, in close coordination with the Forest Service, has proposed a Watershed Improvement Program which provides

a roadmap for undertaking needed restoration in a broadly supported and economically viable manner.

The following elements substantially reflect and are consistent with the principles underpinning the Watershed Improvement Program established by the Sierra Nevada Conservancy, and which the USFS has now pledged to support and help implement. Similarly, they are consistent with the preponderance of recent scientific research.

- A. One of the ironies of our current situation is the imperative to reduce the megafire and insect epidemic risks by re-introducing beneficial fire as the on-going guarantor of Sierra ecological health. We now have the means to do that through rapidly implementing the recently signed Fire MOU Partnership, which supports increased use of prescribed fire and managed natural ignitions as a tool in green forest and adjacent areas. Allocating resources and staff as part of a Beneficial Fire strategy is needed to move us from broad-based agreement in principle to meaningful implementation throughout the Sierra and beyond.
- B. Along with increased fire use, significantly increase strategic mechanical forest treatments in an ecologically sound manner. Properly planned and implemented, ecological-based thinning could simultaneously increase fire resiliency, reduce susceptibility to insect epidemics, protect and enhance wildlife habitat, create jobs, support rural communities and enable beneficial fire to be restored to the portion of the forest requiring such thinning.
- C. Design treatments to enhance and protect key wildlife values. Projects must be carefully designed to retain and/or restore, as needed, essential habitat values for at-risk wildlife species, and to move overall forest structure towards more natural, historic vegetative diversity. All projects would aim to enhance wildlife values, including retention and enhancement of particular individual trees (e.g. large, damaged or diseased trees) and large tree clumps in the scientifically-based “ICO” strategy that provide or could provide the structural characteristics needed for nesting, denning, or roosting. It will take time to rebuild old tree forest structure, removed from a century-plus of “high-grading”.
- D. Include other restoration actions with forest treatments. In conjunction with the strategic treatments that remove marketable trees, biomass removal, mastication and shredding or other methods of treatment, the Sierra Restoration Program will identify and implement additional ecological restoration actions within treatment areas. The goal of these actions will be to rehabilitate special aquatic features, restore degraded riparian areas and meadows, or restore areas suffering from erosion or sediment discharge.
- E. Provide legislative and administrative reforms that will enable private landowners to easily participate in use of prescribed fire with the support and assistance of State and Federal agencies.
- F. Provide appropriate incentives and assistance to rebuild California’s forest products infrastructure to undertake the scope and scale of work necessary to

restore the ecological health of the Sierra. This should especially include building new markets and infrastructure for community scale biomass utilization and smaller diameter wood utilization (i.e., commercialization of smaller diameter ladder fuel material <16" diameter generally). As part of the planning proposal, wood products industry representatives and state and federal agencies will collaboratively forecast and develop a realistic program of production levels expected to be generated from forest projects as a by-product of mechanical treatments. This can help the wood products industry to plan for long-term infrastructure and investments.

- G. Develop a regulatory framework to reduce the burdensome cost associated with infrequent small harvests by the non-industrial landowners within the state while assuring environmental protection.
- H. A particularly large and challenging impediment to ecological restoration is the lack of ability to remove the excessive volume of shrubs and smaller trees as they currently lack an economic market. Unless this is resolved, the Task Force believes there will be little progress. In turn, forest susceptibility to megafires and insect epidemics will grow with the growing risk that parts of the Sierra will be converted from biologically diverse and economically important forests to lower value shrubs and grasslands. The State and federal governments need to provide support and incentives for research in innovative ways to utilize these materials. Currently, the most viable option is to keep our bioenergy plants open and functioning as they significantly reduce GHG emissions, use biomass material beneficially, and enable forest restoration work to proceed. We also need to focus on community-scale combined heat and power facilities near to each national forest in CA.
- I. Restoring Sierra health requires a significant investment. Neither the Congress, nor the state nor major water purveyors nor other current beneficiaries are making adequate investments despite receiving sustained benefits. While the specifics of how to fund a Sierra Restoration Program is beyond our expertise, we believe the full range of beneficiaries should contribute to restoring their ecological health. Through such an appropriate cost-share approach, the impact can be fairly shared and minimized for all. One earlier estimate that restoring ecological health to the national forests in the Sierra would cost in the \$6 billion range sounds daunting at first. That this expense would occur over twenty years provides useful perspective, as does the fact that rebuilding the Bay Bridge similarly cost \$6 billion.
- J. Adaptive Management must become a reality for this program to succeed, especially if we are to successfully address climate uncertainty. Scientific research soundly documents the essential role of beneficial fire and the adverse consequences of the pervasive unnaturally dense forests. Yet there is much still to learn as we develop pursue Sierra restoration through implementation of the Watershed Improvement Program. As the Emeritus Chairman of the

U.C. Berkeley School of Forestry advises, the key is to have the humility to continue learning and applying what we learn as we go forward. Undoubtedly we will make mistakes. We will only succeed if we learn from them and adapt our management to lessons learned.

- K. Role for appropriate monitoring in order to continue our learning curve. Too often we fail to invest in monitoring due to the short-sighted desire to put more money into implementation. This has resulted in continuing practices that are not performing as predicted and are even producing more damage than benefits. Scientifically sound monitoring will be essential for the proposed program to succeed.

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