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Significance of Wood Product Markets in the Tree Mortality Crisis

Thank you for offering me the opportunity to testify on issues related to the utilization of woody biomass resulting from the tree mortality crisis.

A diverse and robust infrastructure for wood and excess woody biomass products is critical to avoiding immediate risks of the current tree mortality crisis, and to establishing long-term health of California's natural resources. Being able to sell woody biomass both reduces or eliminates the financial burden to the landowner and reduces the chance of hazard due to improper storage/disposal of the material.

The question of how to manage woody biomass is best seen from two sides: 1) a problem of safe "disposal" of excess woody biomass that maximizes environmental and economic benefit, and 2) an opportunity to find value in the products of forest management and restoration that supports rural development and economically enables the return of forest health in California. I have focused my testimony on the first perspective since it is the purview of the Working Group, although the two are inextricably linked.

Excess biomass from dead and dying trees is presenting an immediate risk to health and human life, as well as public infrastructure. Anecdotally, members of the Tree Mortality Task Force have reported that felled trees are piling up in roadside cutouts and other open spaces where they might present a hazard to people and vehicles, and sit ready to become fuel in the next wildfire.

Perhaps more critically, felling a tree can cost more than \$1,000 due to the need for specialized equipment and training, and finding residual value in the tree once it has been removed can help to offset that cost. As of April 2017, the US Forest Service, Caltrans, PG&E and others have removed roughly 650,000 dead or dying trees in response to the tree mortality crisis. The removal costs are unsustainable in the context of the scope and scale of the epidemic.

In addition, we cannot view this problem of excess biomass in isolation. California has a glut of woody biomass. Roughly two thirds of the material going to the state's landfills is organic in nature. When managed in a landfill, the waste breaks down anaerobically to produce methane, a potent greenhouse gas. Last year, the legislature passed SB1383 which requires CalRecycle to develop regulations in order to achieve a 75% reduction in the organic waste going to landfills, meaning that roughly 20 million tons of waste will need to be composted, converted to renewable energy, or otherwise recycled. Only a limited amount of woody waste can be utilized at compost facilities, and with the decline of the biomass energy infrastructure discussed in other testimony, there are few other outlets for the material.

In addition, woody agricultural waste, if not reincorporated into soil or converted to energy at biomass facilities, is frequently open-pile burned, causing air quality problems in air basins that are already in non-attainment.

In the short-term, we should continue to support the responsible expansion of existing wood processing and utilization infrastructure, and the establishment of new, shovel-ready businesses that can make use of the excess biomass at hand.

Sawmills and biomass facilities, chip-and-grind facilities producing mulch, and compost facilities are the primary examples of existing infrastructure that can potentially absorb the influx of material. The decline in California's biomass energy capacity presents a particular challenge, and this will be discussed in another session.

Beyond existing infrastructure, there is a range of new opportunities to use woody biomass, some standard and some cutting edge. To address the needs of the current crisis, we must focus on the immediate utilization opportunities, but we must do so with an eye towards the greater needs of biomass management and forest restoration.

In the long-term, restoring the health and resilience of California's natural landscapes is a challenge that exceeds the resources available at the local and state levels, and finding value in the excess biomass from restoration efforts will be critical to sustaining the work. As documented in testimony received by this commission in January, years of management for fire suppression have allowed forest stands to become unnaturally dense, one factor leading to the current tree mortality event. Assistant Secretary Jahns of the California Natural Resources Agency will testify on the long-term view of wood product markets and infrastructure in the state.

The Role of the Tree Mortality Task Force: Utilization—Market Development Working Group

The responsibilities of the Market Development working group, as outlined in the Task Force Incident Action Plan are as follows:

- Work with affected counties and existing wood product markets to determine the feasibility for expanded wood product markets in California.
- Provide for highest and best use of wood products.
- Identify and develop new technologies for biomass products (laminated wood products, etc.)
- Identify rules or regulations which may block the development of a utilization market.
- Provide regular updates at Task Force meetings to ensure effective communication and geographic coordination among all task force groups and stakeholders

This Working Group specifically targets market opportunities that *do not* involve direct conversion to electricity or fuels. The Biomass Working Group, led by Angie Lottes of the Watershed Center, houses efforts related to bioenergy conversion, and our groups coordinate closely. It is critical to develop both energy and non-energy utilization pathways, and in many instances they go hand in hand to maximize the value of the woody biomass.

Since the group was formed under the aegis of the Task Force, the purview of this working group is *limited to the specific problem of utilizing excess biomass resulting from the tree mortality crisis*. The immediate needs under the crisis cannot be fully extricated from the long-term need for wood product

processing infrastructure and markets, and so the group has worked on the immediate with an eye on the long term; however the focus has been on creating opportunities to support the removal and management of dead and dying trees.

Review of Work Group Activities

The Market Development Working Group has focused its efforts in the following areas:

State Procurement

The state utilizes wood material in many forms, and where possible the workgroup has sought to guide procurement in a way that utilized the current excess biomass over traditional, virgin material, to maximize environmental, greenhouse gas, and public health benefits. Examples of these efforts:

Staff from GO BIZ and DGS worked closely together to identify opportunities to utilize the excess material in the form of mulch on state facilities to meet landscaping requirements. DGS established a contract to procure bulk mulch from High Hazard Zones to meet the needs of state facilities, and that pathway remains in place to help move excess material once it becomes available.

Staff from DWR, the Salton Sea Project, ARB and the Regional Air Quality Management District have worked collaboratively to identify utility from excess biomass to control dust around the Salton Sea. As part of its management plan, the state and the regional air district must develop least-cost strategies for controlling dust at portions of the site, which poses a significant local air quality risk. The entities are currently testing two strategies for utilizing the excess woody biomass: 1) spreading large wood chunks around impacted areas to suppress dust and 2) Establishing dust barriers out of whole logs. This research is ongoing, and has the potential to utilize large quantities of material, save money, and displace virgin materials.

Business Support

The working group has had numerous meetings with businesses interested in utilizing the tree mortality excess biomass as a feedstock for products and energy, and remains open to meeting with any and all businesses for similar discussions. We have worked, through GO BIZ and CalRecycle, to connect entrepreneurs with the available tools, services and financial incentives from the state and federal government.

Regulatory Tools and Barriers

The Working Group has sought to identify and address regulatory tools and barriers in order to efficiently and effectively managing the excess biomass. As one example:

Emergency Waiver of Standards regulations from CalRecycle (Title 14, California Code of Regulations [CCR], Division 7, Chapter 3, Article 3, Section 17210 et seq.) allow local enforcement agencies, upon request from an operator, to waive standards, terms, and conditions in solid waste facilities permits. Typically, the request is for the facilities to accept disaster debris in excess of the normal tonnage amounts, to accept and process waste types that might not normally go to a facility, or to request that the facility be allowed to operate in a manner not consistent with specified permit terms, conditions, or

certain state minimum standards. The working group, with the support of CalRecycle, helped to clarify the process as it pertains to the temporary storage of excess biomass from tree mortality, allowing counties and jurisdictions to identify and quickly establish temporary locations for material that could otherwise pose a hazard if left *in situ*.

Evaluation of New Market Opportunities

Using existing literature, independent research, and a commissioned report from the Beck Group, the working group explored opportunities for establishing new infrastructure for utilizing excess woody biomass degraded from the tree mortality event. These markets included fuel pellets and logs, mass timber, exports as logs and chips, and others.

Brief Overview of Infrastructure

As of 2012, there were 77 primary forest product facilities operating in California, including 30 sawmills, 26 bioenergy plants, 11 bark and mulch facilities, 2 veneer plants, and 8 manufacturers of other primary wood products. The vast majority of timber harvest occurs on private lands, with federal lands making up roughly 15 percent of the harvest. Nearly half of the overall wood fiber harvested in the state goes to biomass energy, while a third goes to lumber, and the remaining goes to other products.¹

The processing capacity in the state, described above, has seen a *seventy percent* decline since the 1980s.

Existing Infrastructure and Markets

The reduction in mill capacity, the closure of biomass facilities, and other in-state processing capacity has resulted in diminished infrastructure and personnel capacity to manage and find markets for the woody biomass resulting from the tree mortality epidemic.

Despite the diminishment, the existing mill and biomass capacity, along with chip and grind and other infrastructure, have played an important role in absorbing a large portion of the biomass that is currently being removed to avoid damage to life and property.

The Working Group, through funds made available by the California Natural Resources Agency, commissioned a white paper on utilization opportunities for woody biomass from the tree mortality epidemic. The report, produced by the BECK Group, is quoted here at length:

“Based on industry interviews, BECK estimates that current utilization of dead trees by sawmills is approximately 475,000 Bone Dry Tons (BDT) per year. This occurs mostly in the Southern Sierra region. Current utilization of dead trees by biomass power plants isn’t known definitively. However, BECK estimates that biomass power plants could utilize as much as 1.1 million BDT per year under the BioRAM

¹ McIver, Chelsea P.; Meek, Joshua P.; Scudder, Micah G.; Sorenson, Colin B.; Morgan, Todd A.; Christensen, Glenn A. 2015. California’s forest products industry and timber harvest, 2012. Gen. Tech. Rep. PNW-GTR-908. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 49 p.

program. The volume of other existing uses for dead trees such as landscape material, soil amendments, firewood, etc. is also not known with certainty. However, based on estimated statewide production of sawmill by-products, which supply much of this market, BECK estimates these uses could be as high as 250,000 BDT per year. Importantly, utilizing dead trees for landscape material and soil amendments faces difficult economics. This is because those products, when produced from sawmill residuals, are lower cost than when produced from dead trees.

“BECK concludes from the industry interviews that two key factors allow for effective current dead tree utilization efforts. A brief description of each follows:

“Quick Response – Industrial scale private timberland owners experiencing tree mortality reported quickly responding to tree mortality outbreaks so that the trees can be salvaged before their highest economic value is lost due to quality degradation. Interviewees added that quick response also helps limit further spread of mortality from secondary damaging agents (e.g., insects or wildfire).

“Existing Infrastructure – Related to private firms being able to respond quickly, the dead trees currently being utilized are all being harvested by existing contractors; the resulting material the flows through established supply chains, to existing conversion facilities; and is being marketed through existing distribution channels into well-defined and developed markets. In contrast, any new conversion facilities and/or businesses developed to utilize dead trees will require planning, construction, commissioning, and operational ramp-up. Further, if such businesses are focused on new technologies or new markets, additional time may be needed for addressing start-up problems with the technology and for market development. BECK concludes that since there is a quality degradation process associated with dead trees, focusing utilization efforts on existing markets, infrastructure, and businesses is essential.”²

Main challenges

Focusing on the immediate problem, the excess woody biomass that is dead or dying has limited utility, degrades quickly, has uncertain availability, and is supported by limited and decreasing infrastructure for processing and manufacture. These characteristics make it difficult to market. A short analysis follows:

Degradation

The Ponderosa Pine begins to degrade as soon as the tree shows signs of die-off. There remains a lack of solid information about the rate of degradation of standing dead trees and the utility of the wood for various products as the wood degrades. Anecdotal evidence suggests that in the worst cases, the wood is degraded beyond utility other than as biomass fuel within six months of showing signs of mortality.

Distributed/Unpredictable Availability

² The BECK Group. Dead Tree Utilization Assessment. May 2017. Available at http://www.fire.ca.gov/treetaskforce/downloads/WorkingGroup/Beck_Group_Report_5-1-17%20.pdf

Trees removed by Caltrans and PGE, as well as private landowners, are geographically distributed and limited in supply. Anyone interested in establishing or expanding a business to utilize the material confronts the challenge of establishing a predictable supply of material.

Cost of Removal

The cost of removing an individual tree on private lands can be upwards of \$1,000, an expense that is difficult to cover with the value of the material.

Transportation

According to the BECK group, "Industry contacts reported limited forest products trucking capacity in the Southern Sierra region. This is apparently due to an aging workforce of independent trucking contractors who owned older equipment and who were faced with the choice of retiring, or recapitalizing their businesses with trucks that comply with California requirements for diesel engine emissions. Many apparently did not recapitalize their businesses."³

Limited Infrastructure

As mentioned above, processing capacity is historically low.

Education of Contractors

According to The BECK Group, "Industry contacts reported that a portion of the trees removed from high hazard areas could be utilized as logs, but were not being utilized in that manner because tree service contractors often cut tree stems into short lengths that do not match sawmill log purchasing specifications. Part of the reason for this may be that tree service contractors are not aware of log specifications among nearby mills, so efforts aimed at increasing awareness and education may be needed. Second, the tree service contractors may lack the heavy equipment needed to handle 30' to 40' long, large diameter logs."⁴

Immediate Utilization Opportunities

Existing Infrastructure

As mentioned above, existing mill, biomass energy and chipping infrastructure is able to absorb a portion of the excess biomass. Steps should be taken to educate contractors on opportunities for utilizing felled trees, and to ensure that contracts encourage identifying highest use for these materials.

State Procurement

The state has need for mulch, chipped wood and compost for water retention and erosion control on state property and construction projects. While this demand would make only small dent in the excess

³ The BECK Group. Dead Tree Utilization Assessment. May 2017. Available at http://www.fire.ca.gov/treetaskforce/downloads/WorkingGroup/Beck_Group_Report_5-1-17%20.pdf

⁴ The BECK Group. Dead Tree Utilization Assessment. May 2017. Available at http://www.fire.ca.gov/treetaskforce/downloads/WorkingGroup/Beck_Group_Report_5-1-17%20.pdf

biomass, it would help to establish use practices that could be replicated at federal and local levels, and would help with excess biomass from all sectors, not just forest material.

Export

While in-state utilization is preferable from an environmental and economic perspective, export markets have already proven to be a viable outlet for logs that supports the cost of tree removal and is relatively agnostic in terms of the degradation of material.

“Logs harvested in the U.S. have long been exported to other countries for processing into various forest products. BECK concludes that exporting logs is a business that potentially offers a significant opportunity to utilize dead trees. This is because: 1) a large global market exists for logs and there are substantial log export markets in Asia that are well suited for California’s U.S. West Coast location. For example, over the last 10 years the total volume of log exports from all U.S. West Coast ports has averaged 867 million board feet per year (roughly 2.6 million bone dry tons); 2) the lower log quality that may be associated with logs from dead trees may not a critical factor in some Asian log markets (e.g., China) because the types of lumber produced (e.g., concrete forming and pallet stock) are less quality sensitive; 3) existing companies in California are already actively engaged in exporting logs to Asian markets and could expand their operations.

“BECK concludes that exporting wood chips produced from whole log chipping dead trees is [also] a significant utilization opportunity. There are two potential markets for wood chips. The first is that Japan and China represent well-established and sizable markets for chips used in pulp/paper manufacturing. For example, in 2016 about 90,000 bone dry tons of chips were exported from a chip export facility in Samoa, California. In addition, per U.S. International Trade Commission data, during the last 20 years annual wood chip exports from Washington and Oregon to Asia have averaged 250,000 and 1,000,000 BDT respectively. The second potential whole log chip market is due a 2012 Feed-In-Tariff program enacted in Japan in 2012. It is designed to stimulate the development of renewable energy sources, including biomass power. In response to the program, several biomass fueled plants are in the development process in Japan, including plants which will source wood chips from international suppliers. While the energy market for chips is clearly still developing, energy chips produced in California would appear to have some advantages for serving this market. First, California’s dead trees are relatively dry, and therefore, chips from these trees would have low transportation costs (relative to higher moisture chips). Also, dry chips would yield more net energy during combustion. Finally, per industry interviews with existing California chip exporters, Japanese buyers are concerned about sustainability and it is believed that salvaging dead trees would be appealing to those buyers.”⁵

Conclusion

Much of the excess woody biomass resulting from the tree mortality epidemic is difficult to use and will end up at the least-cost pathway. Encouraging its use as a feedstock to produce energy is likely to be the primary way to utilize the material and avoid unsafe stockpiling, disposal to land, open burning or

⁵ The BECK Group. Dead Tree Utilization Assessment. May 2017. Available at http://www.fire.ca.gov/treetaskforce/downloads/WorkingGroup/Beck_Group_Report_5-1-17%20.pdf

landfilling. However, there are substantial environmental, social and economic benefits from finding and enabling higher uses wherever possible, foremost of which is that, the more economic value found in a dead tree, the greater the number of dead trees that can be removed in support of public safety and forest health. To support higher uses of this material, the state can:

- Continue to support businesses interested in utilizing the excess biomass through existing channels, including GO BIZ.
- Build “disposal” specifications into tree removal contracts.
- Focus on opportunities to utilize excess biomass in state operations, including Caltrans projects and project-specific use such as dust control at the Salton Sea.
- Identify and seek resolution for barriers to transportation.
- Explore policy mechanisms for speeding up the removal of dead/dying trees on publicly managed lands.
- Undertake education efforts for contractors on opportunities for utilization.
- Support research into the rate of degradation of beetle-killed wood.
- Evaluate the merits of more proactive tree removal to maximize value and utility. This would require a balance between removing trees early enough to maintain value, and not encouraging the over-harvest of healthy and ecologically important trees and snags.

In the long-term, the state should develop a focus on woody biomass and forest products infrastructure development. As we seek to transition our forest management and restore forest health, we will need to strengthen our expertise in forest products and markets, and develop a focused effort to support businesses that are interested in establishing in rural areas of California. This effort should focus on both high value products, as well as businesses that seek to use lower-value material likely to be in high supply. This issue will be covered in depth by Assistant Secretary Jahns in her testimony.