Southern Oregon Climate Action Now

SOCAN

Confronting Climate Change

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Reference HB3003

Chair Marsh and Members of the House Committee on Climate, Energy and Environment.

I write as cofacilitator of Southern Oregon Climate Action Now (SOCAN), an organization of over 2,000 rural Southern Oregonians who are concerned about the climate crisis and urge statewide action to address it. The mission of SOCAN is to promote awareness and understanding of the science of global warming and its climate chaos consequences and stimulate individual and collective action to address it. Since rural Oregonians occupy the frontlines in experiencing the impact of the drought, shrinking snowpack, wildfires and extreme weather that the climate crisis imposes, we are strongly committed to statewide action.

The effort to obtain a tax incentive for removing western junipers from Eastern Oregon rangeland into which it has encroached over the last many decades to be used as a feedstock for electricity generation seems to be based on the premise that this will restore soil moisture and streamflow. The description of the technique by Deboodt (undated) summarizes this principle.

Exploring the impact of juniper control by clearing, Ray et al. 2019 compared a treated and untreated watershed in western Oregon and found significant though small improvements in soil moisture content in the treated watershed (1 – 3%). Meanwhile, exploring a very different system in the Great Plains, Zhou et al. (2020) studied removal of eastern juniper from rangeland and reported soil moisture increase of 1.6 to 1.9 times with increased annual run-off of 4.46 – 4.54 times.

Abdallah et al. (2019) report that shrubland and grassland encroachment by western juniper negatively affects livestock forage and habitat for important species such as the greater sage grouse.

In their study of carbon composition in invasive western juniper stands in Oregon Abdallah et al. (2020) report on the distribution of carbon in aboveground vegetation and below-ground roots, etc. They compared a watershed that had been subjected to clearing and another that was not treated and report finding that most of the carbon was below ground (assessing down

to 50cm). Although aboveground carbon was reduced in the treated watershed, below ground carbon increased. They concluded that: "the benefits of juniper control can be attained without substantially affecting the potential for ecosystem carbon sequestration."

There was no mention during testimony of a full lifecycle assessment of carbon emissions from the use of juniper biomass. We are, therefore, left without an knowing the overall carbon balance of the use of this biomass source in electricity generation. However, considering that the negative effect on carbon storage, if it exists, is small, the benefits of juniper management suggest it is worthwhile.

Central to HB3003, is the principle of using the harvested juniper to power plants generating electricity. In terms of the climate change consequences, the fundamental argument behind the use of biomass to generate electricity is that the carbon dioxide released when the wood is combusted is carbon dioxide trapped from our current atmosphere instead of trapped from an atmosphere 300 or more million years ago and released into today's atmosphere. In addition, it is argued, the recovering photosynthesizing forest will recapture emitted gas. On face value, this makes sense, but there are counter arguments suggesting this is not quite the benefit it appears to be.

The first concern is that wood is not a very efficient source of energy in that it releases more carbon dioxide per Megawatt hour or unit of heat generated than fossil fuels (e.g., Hanson and Ranganathan 2017). They also indicate that: "…smokestack CO2 emissions from combusting wood for heat can be 2.5 times higher than those of natural gas and 30 percent higher than those of coal per unit of generated energy. In terms of electricity generation, smokestack emissions from combusting wood can be more than three times higher than those of natural gas, and 1.5 times those of coal per MWh." This, of course, simply accounts for the immediate emissions resulting from the combustion of the wood. When accounting the greenhouse gas costs/benefits, we must also include the full life cycle emissions, in the case of the juniper feedstock, this means the emissions associated with harvesting the trees, transporting them to the power plant, and processing them for use. In addition, the length of time a replacement forest takes to recoup the carbon lost at harvest, called the 'payback time' or 'time to repay the C debt,' for C varies by location and species. This question would be relevant to any biomass sourced from non-juniper harvested trees. Mitchell et al. (2012) computed this for Oregon forests indicating that it can easily take a century or more for the debt to be repaid. That, of course, doesn't account for the carbon sequestration potential of a standing tree foregone by its harvest.

It is noteworthy that the bill urges tax incentives when the juniper biomass employed in power generation is only 50%. This could result in the bill incentivizing the harvesting and combustion of biomass that is not juniper and mean that the tax breaks offered in the bill would promote harvesting other timber to provide feedstock. During the Public Hearing, it was suggested that a shortage of juniper could be augmented by bringing biomass from California. This would

substantially increase the lifecycle carbon emissions that result from the tax incentives through the transportation of biomass to Oregon.

Another argument used to support this proposal is that harvesting the junipers and using them to produce electricity constitutes a better use than leaving them to be burned in a wildfire when the carbon dioxide is released without any benefit.

In a western juniper stand with 30% tree cover, Rau et al. (2010) assessed that only 25% of the ecosystem carbon resides in the aboveground biomass pool and only 68% of that above-ground C was lost following prescribed fire. It is not clear what percentage of aboveground or ecosystem Carbon would be removed during the clearing of juniper for combustion, but this analysis suggests that fire in a juniper stand may result in less than 20% carbon loss from the ecosystem.

Proponents of the proposal offered the following statement in support of their proposal: "Wildfire emissions in 2020 essentially negated 18 years of reductions in greenhouse gas emission. The positive impact of all that hard work over almost two decades is at risk of being swept aside by the smoke produced in a single year of record-breaking wildfires." Presumably this item is intended to convince the audience that carbon losses from fire in Oregon will negate our statewide emissions reductions. However, this is a little deceptive since the statement by Michael Jerrett relates to his study published in 2020 that refers to California. On the other hand, Law et al. (2018) reported: "Fire emissions were only between 4% and 8% of total emissions from all sources (2011–2015 and 2001–2004, respectively." However, it remains unclear what the audience should conclude from the Jerrett statement.

Should we conclude that it's better to harvest our trees than leave them exposed to wildfire? It is possible that 2020 emissions in Oregon were substantially greater than the annual averages reported by Law et al. (2018), and ongoing climate change will increase the carbon losses in Oregon due to fire. However, maybe we should look again at the Law et al. (2018) study which indicates that carbon losses due to harvesting in Oregon from 2011 to 2015 averaged 34.45 million tons of carbon dioxide equivalent. During this period, the total greenhouse gas emissions from the state ranged between 60 and 63 million tons (DEQ 2022) placing losses from timber harvest at about 35 or 36% of total statewide emissions. Countering the suggestion that wildfire risk will increase during the century, Law et al. (2018) argued that, in fact, models suggest: "by 2100, simulations show increased net carbon uptake with little change in wildfires." Indeed, if the conclusion of Abdallah et al. (2020) reported above is accurate, wildfire in a juniper stand would result in little immediate carbon loss, and – in the long term - might actually increase ecosystem stored carbon. The message is that if we are looking to remedy what is responsible for a huge percentage of the state's emissions, rather than targeting wildfire, maybe we should look at tree harvesting.

Since there appears to be benefits to controlling the juniper, and doing so has limited, if any, long term carbon consequences, maybe the solution to the dilemma posed by the proposal that

the incentive should apply to all biomass burned if 50% is juniper should be adjusted. Maybe the incentive should apply only to that proportion of the feedstock combusted in a power plant that is juniper.

Respectfully Submitted

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