Dear California Air Resources Board,

The California Air Resources Board's Greenhouse Gas Emissions of Contemporary Wildfire, Prescribed Fire, and Forest Management Activities report fails to capture the full extent of emission associated with wildfire and will lead to an inadequate response in how California addresses climate change outlined in AB 32 and SB 32. CARB's inadequate methodology to qualify and quantify emissions associated with wildfire will limit funding for wildfire prevention and forest management with Greenhouse Gas Reduction Funds (GGRF) and will lead to severe consequences to people who reside in the State, 25% who currently live in wildfire-prone areas. Reducing funding for wildfire resiliency and community protection will result in future loss of life, destruction of communities and permanent impacts to ecosystem services, biodiversity, fragile natural habitat and forest carbon.

CARB's exclusion of anthropogenic emissions related to wildfire sources from the State's GHG Inventory infers that emissions associated with wildfire are all due to natural processes, thereby propelling the rhetoric that the State is meeting their GHG reduction target, compared to 1990 GHG levels. A preponderance of evidence from academics, government agencies, NGOs, and climate experts details that a considerable portion of contemporary wildfire activity and associated emissions are anthropogenic and outside of what would occur through natural processes. Whether or not CARB acknowledges that certain emissions associated with wildfire are anthropogenic, it remains to be a fact that California's GHG emissions, due to anthropogenic wildfire source emissions, are higher than 1990 levels. Although this may be inconvenient, CARB has a legislative obligation to accurately report anthropogenic GHG emissions under AB 32 and SB 32. Anthropogenic emissions relative to 1990 reference levels need to be included and accounted for in the State's GHG Inventory, including anthropogenic wildfire related source emissions.

Anthropogenic climate change is increasing the frequency and severity of wildfire.

Under CARB's Wildfire &Climate Change summary, CARB acknowledges "climate change, primarily caused by the burning of fossil fuels, is increasing the frequency and severity of wildfires in CA." Governor Newsom under Execute Order N-05-19 assigns, "climate change – persistent drought, warmer temperatures, and more severe winds – has created conditions that will lead to more frequent and destructive wildfires." The conclusion is that anthropogenic climate change is causing high-severity wildfire emissions and those emissions are therefore anthropogenic.

The contemporary high-severity wildfire regime is anthropogenic according to scientific data and research.

Fire suppression efforts during the 20th century have altered the fire regime and have led to changes in forest structural characteristics, causing more high-severity wildfire events and associated emissions (Young et al. 2017). The result is often extensive tree mortality, occurring in large contiguous patches (Lydersen et al. 2014, Jones et al. 2016). In areas that have not yet burned at high-severity, fire suppression-caused forests densification has increased competition among trees for water and other resources, destabilizing many forests by making them prone to mortality form other agents such as bark beetles and future wildfire (Stephens et al. 2018; Dendroctonus, Ips, Scolytus spp.; Kolb et al. 2016). The conclusion is that anthropogenic changes in the forest structure (fire suppression, management, etc.) has increased the frequency and size of high-severity wildfires and associated emissions and those emissions are classified as anthropogenic by the scientific and academic community with subject matter expertise. CARB has an

obligation to seek out and analyze research from credible sources with adequate scientific credentials backed by robust datasets. CARB's inaccurate conclusion that wildfire associated emissions are natural processes and not comparable to other non-wildfire related anthropogenic emission sources is not supported by scientific data. CARB needs to provide scientific data and research that emissions associated with wildfire are all natural (not anthropogenic), including high-severity wildfire emissions, if that is the position of this report.

The scale and frequency of the contemporary high-severity wildfire regime is not part of the historical terrestrial carbon cycle that is balanced by vegetation recovery and growth.

CARB's vegetation fuel combustion model to estimate GHG emissions associated with wildfire is limiting because it only includes emissions from combusted vegetation and fails to include a full life cycle analysis of GHG emissions associated with wildfire. Wildfires with extensive areas of high-severity were historically uncommon (Mallek et al. 2013; Safford and Stevens, 2016) and have been shown to have negative impacts on soil, plant diversity, and forest regeneration (Miller et al. 2011; Collins and Roller 2013; DeSiervo et al. 2015, Stevens et al. 2015) and in some cases transforming some forest sites into shrubfields that persist for decades (Russell et al. 1998, shatford et al. 2007). Research across 210,000 acres at 14 burned areas in northern California at a range of elevations had 640 plots, or 43%, that did not see any conifer regeneration (Welch et al. 2016). The researchers of the 2016 study noted that their data support a concern that the well-documented trend toward larger and more severe fires is a major threat to conifer forest sustainability in the region. CARB's claim on page 2, paragraph 1, of the report that "Fire is a part of Earth's terrestrial carbon cycle that is balanced by vegetation recovery and growth" is a very general and inaccurate statement that does not adequately detail the effects that burn severity has on long-term forest carbon, vegetation composition and ecosystem function. CARB does acknowledge on pg. 4, paragraph 3, that "Crown fires can kill forest trees, creating new areas of dead vegetation that can serve as fuel for future fires" and that "tree mortality has important implication for post-fire recovery", but CARB fails to provide a quantitative analysis of GHG emissions beyond combustion. A 2016 study that analyses decomposition of forest biomass that was killed due to the wildfire, but not combusted suggests that up to 85 percent of GHG emissions due to wildfire will occur following a wildfire due to decay, with a greater biogenic emission rate occurring in the first 10 years (Campbell et al. 2016). Pyrogenic carbon emission in any given fire tend not to exceed 15% of the forest's live and dead biomass (Campbell et al. 2007; Urbanski, 2014.) Moreover, since the majority of surface fuels are consumed in nearly all fire conditions, while standing biomass experiences little combustion even in a crown fire, it is difficult for a high-mortality fire to combust much more than twice the amount of carbon than does a low-mortality fire. By contrast, subsequent carbon emissions through decomposition of biomass killed in the fire but not consumed may range from none (e.g., low-severity fires when no trees are killed) to all of the prefire biomass (e.g., high-severity fires when all trees are killed). For this simple reason, cumulative carbon emissions through decomposition of fire-killed trees may exceed pyrogenic emissions and are more dependent on fire behavior than are pyrogenic emissions (Campbell et al. 2016). In high-severity wildfire, where forests are not likely to regenerate, CARB needs to quantify biogenic emissions due to wildfire in addition to quantifying emissions from wildfire combustion. Quantifying emissions for both biogenic and combustion will provide a more accurate measure of wildfire effects on long-term forest carbon, vegetation composition, ecosystem function and associated GHG emissions over the lifecycle of the wildfire disturbance.

Historical (pre-1800) wildfire regimes should not impact CARB's obligation to report GHGs under AB 32 and SB 32, but the comparison can be useful for context and acknowledgement of Native American stewardship.

The reference emissions standard under AB 32 and SB 32 is set at 1990. Whether or not pre-1800 wildfire anthropogenic emissions were greater or lower than anthropogenic wildfire emissions from 1990 is irrelevant to CARB's legislative obligation to report current year anthropogenic wildfire source emissions relative to anthropogenic emissions from 1990 levels. The fact that wildfire emissions may have been lower or higher in years prior to 1990, doesn't reduce the legislative requirement through AB 32 and SB 32 to reduce all GHG source emissions (including accounting for anthropogenic wildfire source emissions) to 1990 levels by 2020 and a 40% reduction by 2030. This report demonstrates that CARB has some capacity to calculate anthropogenic wildfire emissions in 1990 and compare 1990 emissions to current and future emissions associated with wildfire.

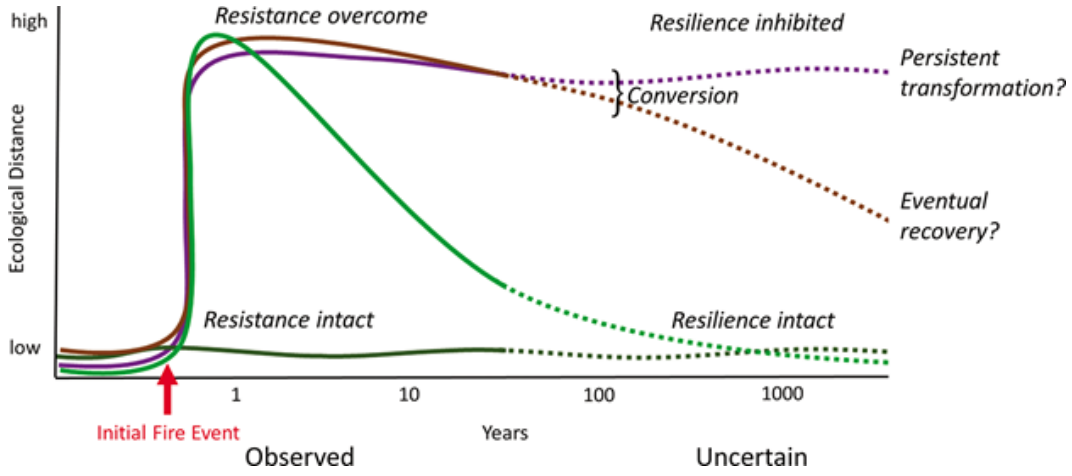
Even if a hypothetical quantification of pre-1800 anthropogenic wildfire emissions can be accurately compared and measured against contemporary anthropogenic wildfire emissions, the information needs to be distilled into something that is useful for CARB's methodology. A general comparison of all wildfire activity (natural, anthropogenic, pre-1800 regime and current regime) is useful for context, but for the purpose of GGRF and reducing anthropogenic emissions, CARB's comparison should be limited to comparing pre-1800 anthropogenic emissions to contemporary anthropogenic emissions in an effort to reduce current emissions if they are greater than historical emissions. The point of this comparison would be to determine if anthropogenic emission from wildfire has increased since pre-1800 (technically, since 1990 under AB 32 and SB 32, but some historical comparison is justified to place 1990 reference levels in context).

Pre-1800 anthropogenic emissions were less than anthropogenic emissions under our contemporary wildfire regime, on a per acre basis. Native Americans, through cultural burning practices, maintained forest structure. These Native American practices likely caused some anthropogenic emissions, but the practice was beneficial to the ecosystem – likely similar to current prescribed fire and cultural burning. Today in California, we unfortunately implement prescribed fire and cultural burning less than what Native Americans did pre-1800, but to suggest that pre-1800 cultural burning that produced anthropogenic wildfire emissions is equal to the anthropogenic wildfire emissions that society produces today (high-severity wildfire) on a pre-acre basis is suggesting that pre-1800 Native American culture and practices caused high-severity wildfires pre-1800. The conclusion is that pre-1800 anthropogenic wildfire emissions through Native American cultural practices resulted in low-severity wildfire behavior that was beneficial to the ecosystem, but since it is impossible to distinguish pre-1800 natural wildfire emissions from pre-1800 anthropogenic emissions this information has little practical purpose for comparing anthropogenic emissions though time. CARB should be careful in using hypothetical pre-1800 anthropogenic wildfire emission data in an attempt to justify the level of contemporary anthropogenic wildfire emissions because this logic would suggest that Native Americans produced high-severity wildfire emissions.

Wildfire impacts are long-term in conifer and mixed-conifer forests and failure to act will have lasting and devastating impacts to California's fragile ecosystem resulting diminished forest carbon and value for future generations.

In the Klamath region of northern California, it's predicted that 1/3 of the area will transition from forest to more fire prone shrub land in the near future due to anthropogenic causes (management, human-ignitions, climate change) causing more instances of high-severity fire. Almost 2 million acres is predicted to burn at high-severity, and out of that almost 1.25 million acres will no longer be forest. (Serra-Diaz et al 2018) High-

severity fire was historically uncommon. (Mallek et al 2013) (Welch et al 2016) The impacts to the Klamath will be significantly greater than other regions, which will also see high-severity fire and conversion. Once that conversion takes place, it's unlikely to recover to forest (chart below) and will maintain pyrogenicity (more frequent high-severity fire). (Coop et al 2020) Recent wildfire activity has unfortunately increased the risk to neighboring communities for the foreseeable future. Irreversible impacts to biodiversity, wildlife and forest ecosystems / habitat are grim with increased fire severity / conversion including acceleration of the climate feedback loop. The Klamath is predicted to be one of the most highly impacted and altered regions of the world in the next 100 years, due to climate change and high-severity wildfire. In relative terms, there is limited time to act before the ecosystem is altered essentially forever, on a human timescale. The chart below is (green) a fire resilient ecosystem reflecting historical fire regimes and (red/purple) an ecosystem largely altered by anthropogenic influences reflecting contemporary fire regimes / high-severity wildfire. CARB should do a better job to reference that wildfire resiliency and forest management work will have different results and be more effective in certain regions and vegetation types due to California's diverse landscape.



Human-ignited wildfires are anthropogenic.

Even if CARB inaccurately classifies a high percentage of contemporary high-severity wildfire as not anthropogenic, human-ignited wildfires are, by definition. Nearly 85 percent of wildfires in the United States are ignited by humans (2000-2017 data based on Wildland Fire Management Information (WFMI) and U.S. Forest Service Research Data Archive). Data on ignitions sources of wildfire is available for CARB to ascertain whether the cause of the wildfire was human or of natural cause (lighting, for example). CAL FIRE collects data on sources of wildfire ignitions in California. This data is easily accessible and CARB can easily distinguish human-ignited wildfire from wildfires that are not human-ignited.

Emissions associated with wildfire are not limited to natural ecosystems and GHG programs need to be aligned with economic and social benefits.

Emissions associated with wildfire need to account for and include emissions associated with recovery efforts and impacts to communities and the built environment. The Camp Fire in Paradise, CA is an example of emissions associated with wildfire, outside of the natural ecosystem. On November 8, 2018 the Camp Fire was started by PG&E faulty power line infrastructure. 18,804 structures were destroyed and 85 people died. On December 6, 2019 PG&E made a settlement offer of $13.5 billion for wildfire victims and on June 16, 2020 the utility pled guilty on 84 counts of involuntary manslaughter. There is no dispute that the Camp Fire was caused by an anthropogenic source and the destruction to Paradise and the surrounding

communities was the result of the Camp Fire. The conclusion is that the Camp Fire and all associated emissions due to the Camp Fire are anthropogenic and should be accounted for under this report.

CARBs methodology for associated GHG emissions relative to anthropogenic causes needs to be consistent between all GGRF programs. Using one methodology for a one program and using an entirely different approach and methodology for another program to reduce GHGs and maximize economic benefits to low-income populations under housing, transportation, job creation ecosystem services and other elements is problematic and will likely cause significant community trauma and destruction of communities that lead to increased GHG emissions.

A February 23, 2021 report by the California State Auditor outlines that CARB has failed to maximize economic benefits and foster job creation and specifically CARB is not allocating funding to geographically defined disadvantaged and low-income communities. The Sustainable Communities program provides funding primarily to reduce transportation and housing related GHG emissions, but these programs primarily provide funding for populated regions and rural communities do not receive priority funding. Rural communities are generally low-income regions with natural resource economies (tourism, recreation, forestry, agriculture) and extreme climate events, such as wildfire, can devastate the community and surrounding ecosystem resulting in long-term damage to economics, housing and ecosystem services. For example, the Slater Fire in Happy Camp burned 157,220 acres destroying 440 structures (approximately 200 homes) and killed two people. Happy Camp is a low-population, low-income community with a 30.6% poverty rate and 30% of the population identifying as Native American. The fire destroyed approximately 20-25% of the homes in the community and burned the surrounding ecosystem. An October 2020 article in The Guardian outlines systemic failures in Happy Camp due to the Slater Fire and the State's failure to address the wildfire crisis. Many other rural communities in the State are susceptible to fates similar to Happy Camp without funding and resources for wildfire resiliency.

In a report released in November 2018, CARB reported that the State is not on track to achieve the Sustainable Communities program's GHG reduction targets. CARB concluded that passenger vehicle emissions had not declined as significantly as expected and that vehicle travel had actually increased under the program. This is an opportunity for CARB to review methodologies embedded in the Sustainable Communities program, such as Vehicle Miles Travelled (VMT), which has unreliably been used as proxy for reducing GHG emissions, maximizing economic benefits and fostering job creation. The sustainability of a community is considerably more complicated than VMT or the size of a community. Increased Zero Emission Vehicle use will further diminish the accuracy of VMT as a proxy for to measure GHG emission and methodologies that justify GGRF allocations by accounting for VMT over long periods, such as the Sustainable Communities program, will need to validate the accuracy of VMT / GHG assumptions.

Wildfire mitigation and resiliency is one way for CARB to use GGRF allocations in a ways that maximizes economic benefits and fosters job creation by promoting in-state GHG emission reduction projects carried out by California workers and businesses. Jobs in ecosystem services can be critical in providing market mechanics to revitalize rural economies, according to a UCANR report. This is especially important in rural areas with disadvantaged socioeconomic conditions that have high exposure to ecosystem impacts, such as natural disasters or climate change (i.e. severe wildfires). A USGS / Nature Conservancy study estimated that the economic multiplier effect of a wildfire mitigation projects is 2.23 times. A rural community that receives $50M in wildfire resiliency funding has the potential to generate a potential $111M in regional economic activity. This is largely a factor of local labor as a high expense ratio (as opposed to imported materials) leading to direct payments to support local jobs, businesses and economics. If funding for

ecosystem services, such as wildfire mitigation, is allocated to rural regions the economic benefits will multiply and trickle down throughout the local economy increasing the total economic activity while protecting lives, property, infrastructure, fragile ecosystems and avoiding GHG emissions. In disadvantaged low-income rural areas, where other sectors do not provide economic stability, the ecosystem services sector can be an important ingredient to improve socioeconomic conditions.

The Sustainable Growth Council's (SGC) Affordable Housing and Sustainable Communities (AHSC) program has funded approximately $1.65 billion to construct 10,541 units since 2014 and the SGC's Sustainable Agriculture Lands Conservation (SALC) program has funded $153.6 million with the program goal to reduce residential development to avoid GHGs (collectively referred to as Sustainable Communities program). However, the state of California has lost 51,680 structures due to wildfire over the same period. Resources spent on ecosystem recovery, infrastructure repair and suppression represents greater cost and GHG emissions. CAL FIRE only funded approximately $182 million for fire prevention under GGRF since 2015.

AHSC
127 projects
$1.65 billion awarded
2.4 million metric tons of CO_2e reduced[20] (does not include 2020 project data)
10,541 affordable units funded

SALC*
83 projects
$153.6 million awarded
14.8 million metric tons of CO_2e reduced
101,440 agricultural acres protected

CAL FIRE - FIRE PREVENTION
10 million acres burned
$182 million prevention awarded
[1]Unknown CO_2e increased due to wildfire or reduced do to funding
51,680 structures destroyed 207 deaths

[1]SB 901 requires that CARB meet the GGRF accounting requirements and assess the GHGs associated with wildfire and forest management activities. State law also directs CARB to design programs that achieve other benefits beyond GHG emissions reductions.

The AHSC, SALC and Fire Prevention comparison demonstrates that GGRF allocations are utilized for projects with emphasis on community sustainability and GHG emission are not the only considerations for funding allocation. The comparison also demonstrates that CO_2e reductions can be a derivative of the program activities (AHSC: infill development to reduce VMT and <VMT will hypothetically < CO_2e) or (SALC: avoided residential development to < CO_2e). With regard to fire prevention and associated wildfire emissions, the protection of communities and structures will avoid future losses in CO_2e. (The derivative of

wildfire mitigation is to avoid suppression, recovery and structure loss that will reduce CO_2e.) Wildfire has destroyed over 51,680 structures since 2014, causing severe damage to the climate and community sustainability. State agencies such as CAL FIRE, Cal OES, and Cal Recycle are responsible for wildfire response and recovery so CARB can reasonably calculate wildfire associated emissions with regard to suppression, infrastructure repair and structure loss. For example, Cal Recycle administered the debris removal and recovery contract under the Camp Fire. It is reasonable for CARB to quantify emissions associated with these activities, such as the VMT (CO_2e) for debris hauling, removal, and repair, equipment emissions and other activities by collecting data from the other State agencies. Further, CARB can use accepted methods to calculate what emissions will be associated with rebuilding structures lost by wildfire, which would otherwise not need to be rebuilt, if not for the wildfire. If CARB fails to do an adequate calculation, CARB will be inconsistent with other GGRF programs and data on emissions associated with wildfire will be incomplete resulting in reduced GGRF allocation for fire prevention around communities to reduce wildfire severity. Without reduction in wildfire severity, more damage will occur in communities increasing emissions and causing considerable negative impacts to economic, social, public health and ecosystems functions. CARB needs to provide a quantitative and qualitative methodology that determines the positive effects of wildfire resiliency programs (forest management activities) that promote community sustainability and lead to reducing or avoiding CO_2e by reducing wildfire severity and protecting communities. GGRF allocations for wildfire resiliency and forest management activities to avoid future GHG emissions is consistent with other GHG program methodologies.

This comparison is not meant to argue that AHSC or SALC are not quality programs that can lead to more sustainable communities, but for this report to exclude the impacts that wildfire has on community sustainability and associated GHG emissions is inconsistent with other GHG programs. CARB needs to take a more holistic approach to community sustainability. More value can be achieved through the relationships between AHSC, SALC and wildfire resiliency. Where AHSC promotes infill development, SALC promotes reduction in rural sprawl and land conservation enabling improved management of protected lands to achieve greater and long-term benefits. SALC can reduce residential development in fire-prone areas. Land conservation can conserve large tracks on the community boundary where fire resiliency programs and forest management activities can be cost effective to implement and long-lived. This will increase ecosystem services and preserve biodiversity while providing community defensible space for wildfire protection, recreational opportunities, public access to nature, and sustainable agriculture products. A sustainable communities approach needs to align forest management activities and wildfire resiliency programs with other sustainable communities programs and prioritize funding and resources to maximize community sustainability. The only way GGRF can be allocated for wildfire resiliency in communities is if the GHG benefits for wildfire resiliency programs and forest management activities are quantified in the context of how these activities can avoid future wildfire GHG emissions by reducing wildfire severity and impacts to communities.

CARB does not exclude emissions from other anthropogenic sources in the GHG inventory because those sources are not fossil fuel sources.

CARB is correct that emissions associated with high-severity human caused wildfire are different from fossil fuel emissions, but emissions and effects associated with the contemporary wildfire regime devastating California are comparable to fossil fuels because anthropogenic high-severity wildfire emissions produce an enormous amount of GHGs that are not a result of natural processes. These wildfire emissions are due to post-1800 human activity, similar to impacts and emissions from fossil fuels. However, if current trends in wildfire activity continue, the effects associated with wildfire may be worse than fossil fuels in some regards.

Where fossil fuel emission are largely controlled and managed, high-severity wildfire is out of control. The out of control wildfires have destroyed millions of acres killing millions of creatures and where wildfire is severe, ecosystems and biodiversity may never recover or convert to a condition that produces fewer ecosystem services with less carbon sequestration. The contemporary wildfire regime has led to statewide blackouts, a public health issue, and destroyed thousands of structures and killed hundreds causing a humanitarian crisis, in some cases. The contemporary wildfire regime and fossil fuel consumption are a result of post-industrial human activity, but the contemporary wildfire regime is out of control and accelerating with far-reaching and permanent impacts to forest carbon, ecosystems and communities.

CARB accounts for anthropogenic emission sources outside of fossil fuel consumption in their GHG inventory, including but not limited to: Livestock, Landfill, Cement, Thermal Cogen, Residential Wood Burning and Agricultural Crop Residue Burning. CARB is inconsistent with the conclusion that because anthropogenic wildfire emissions are not fossil fuels, that wildfire emissions should not be quantified and reported in the GHG inventory. What CARB represents by this logic is that if a farmer starts a fire to burn a field or a person burns wood in their home, those emission are somehow distinguished form emission from an arson or utility stared wildfire. Arbitrarily accounting for emissions differently when the cause (anthropogenic) and result (GHG emissions due to burning) are the same is not representing data accurately or consistently. The suspicion is that since anthropogenic wildfire emissions are considerably more impactful, CARB is politicizing the science behind emission qualification and quantification by not to including anthropogenic wildfire emission because they will have a bigger impact on the State's GHG inventory and obligations under AB 32 and SB 32.

Future generations in California will likely care little about how a state agency like CARB defines one GHG emission source compared to another source. However, future generations will care if the State made an impact on climate change by reducing anthropogenic GHGs to the atmosphere, regardless of the source. Future generations will judge the State and its representatives on the accuracy of the information they present and how resources were allocated in solving the totality of the climate crisis, absent of political considerations. Politicization of science by limiting data collection or reducing the relevance of the data through unscientific approaches will damage credibility and the future of ecosystem and climate resiliency programs. Recent State audits should put CARB on notice to provide more through and accurate quantifications for GHG emissions and develop better programs and methodologies to reduce GHG emissions while providing community benefits. This is an opportunity for the State and CARB to assess the wildfire situation in California and provide accurate information and methodologies to help solve this crisis. Compared to the magnitude of the wildfire crisis, this report is inadequate and inaccurate. Inadequate and inaccurate information and methodologies will lead to a weak response to climate change, endangering the lives of thousands and likely destruction of millions of acres of habitat, fragile ecosystems and communities. At this time, it would be appropriate for CARB to ask the legislature for more time to conduct this investigation. Considerably more resources and subject matter expertise needs to be sourced and allocated for the purpose of this report.

Sincerely,

Anonymous native resident of northern California.
nativecaresident@gmail.com