Sierra Institute
for Community and Environment

May 14, 2021

Sofia Mitchell
Office of Environmental Health Hazard Assessment
P.O. Box 4010
Sacramento, California 95812-4010

Re: Draft CalEnviroScreen 4.0 Report Comment Submission

Dear Ms. Mitchell:

The Sierra Institute for Community and Environment is writing to express our deep concerns regarding the latest draft version of CalEnviroScreen, version 4.0. We believe additional work is needed to adequately include and accurately characterize disadvantaged rural forested communities in California. We recognize and support the goals of AB 32 and SB 535 in building capacity within Disadvantaged Communities to aid in the implementation of projects that help the state meet its climate change adaptation and mitigation goals. Yes, there are a number of well-to-do rural forested communities in forested regions in the State of California, but there are a number of impoverished and disadvantaged communities in these regions as well. We know this from 25 years of study of rural forested communities and share directly recent studies underscoring this point.

Finding no disadvantaged communities across all rural forested landscapes in California should compel deeper analysis, or re-examination of the methods and data employed by CalEnviroScreen. We call for re-examination precisely because CalEnviroScreen is used to characterize disadvantaged for the purposes of distributing funds from the Greenhouse Gas Reductions Fund. We know that rural forest communities in the headwaters region of the state are critical to meeting California's climate goals, and lack of investment in this region resulting from mischaracterization of disadvantaged communities will be to the detriment of all.

Sierra Institute has been involved in rural community assessment work for 25 years. As we have stated before in previous comments on CalEnviroScreen, rural forested communities are left out of SB 535's definition of disadvantaged (communities scoring in the highest 25% of CalEnviroScreen scores). Our focus in this letter is on the core of the Sierra Nevada. For the Integrated Regional Water Management Groups and under a Proposition 1 contract with the Department of Water Resources, Sierra Institute has just completed a community socioeconomic and capacity assessment of the Mountain Counties Funding Region. CalEnviroScreen Version 3.0 did not characterize a single community within rural forested communities in the Sierra Nevada as disadvantaged (Figure 1), and version 4.0 did not improve or clarify this representation (Figure 2). Rural communities in the headwaters region face a unique suite of socioeconomic and environmental burdens, which are not accounted for under the current methodology of assessment.

Due to the lack of adequate representation of rural mountain communities, Sierra Institute, as part of its Disadvantaged Community and Tribal Involvement Program under the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1), conducted assessments of community well-being across the Sierra Nevada region using a variety of socioeconomic and community capacity indicators that are more uniquely suited to the context of low-population and rural communities. Public workshops were used to identify local communities and to assess their capacity relating to financial, social, cultural, human, and physical capital (Figure 3). A quantitative socioeconomic assessment was also conducted using six metrics drawn from US Census Bureau statistics (housing tenure, poverty status, education level, employment, and public assistance) (Figure 4). These assessments were combined to create an overall score of community well-being (Figure 5). As seen by comparing the figures below, many communities in the Sierra Nevada score within the low to moderate-low categories of community well-being, despite being designated with low burdens under CalEnviroScreen and not being considered Disadvantaged Communities.

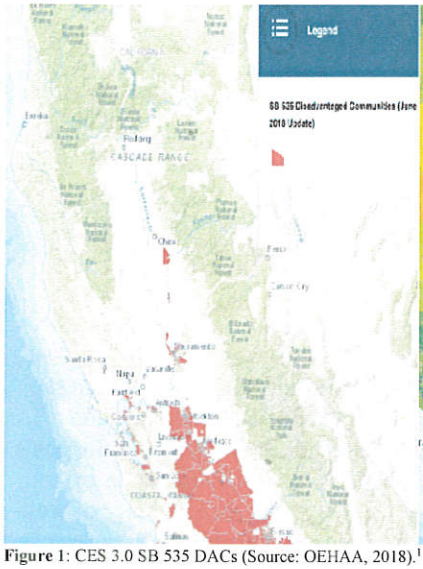

Figure 1: CES 3.0 SB 535 DACs (Source: OEHAA, 2018).[1]

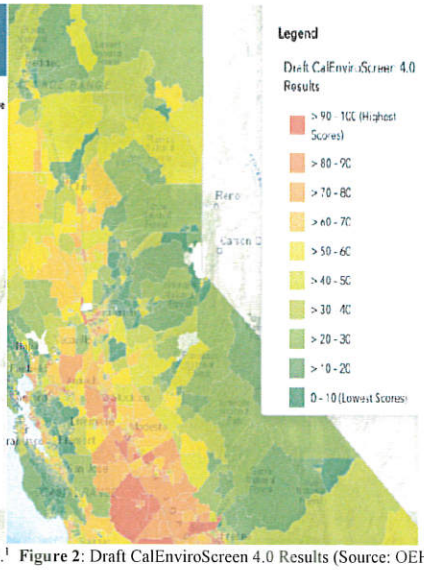

Figure 2: Draft CalEnviroScreen 4.0 Results (Source: OEHAA, 2021).[2]

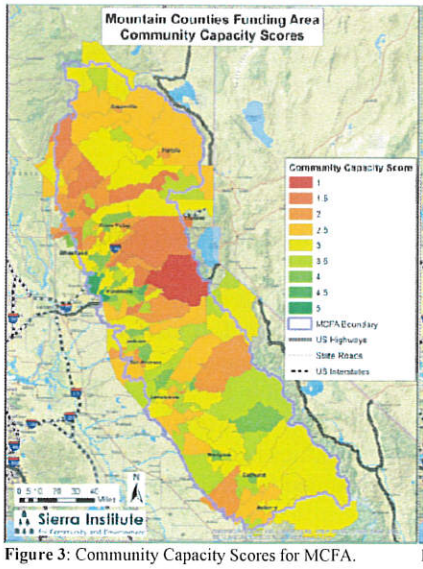

Figure 3: Community Capacity Scores for MCFA.

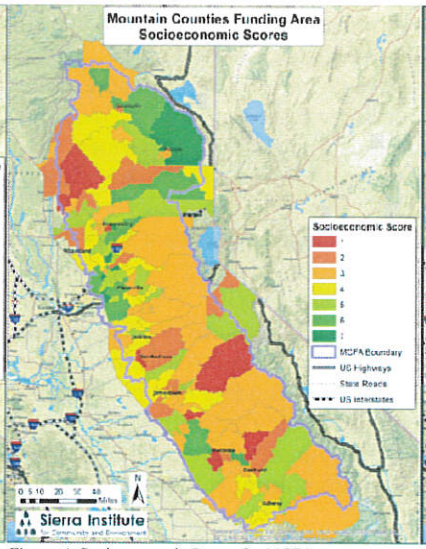

Figure 4: Socioeconomic Scores for MCFA.

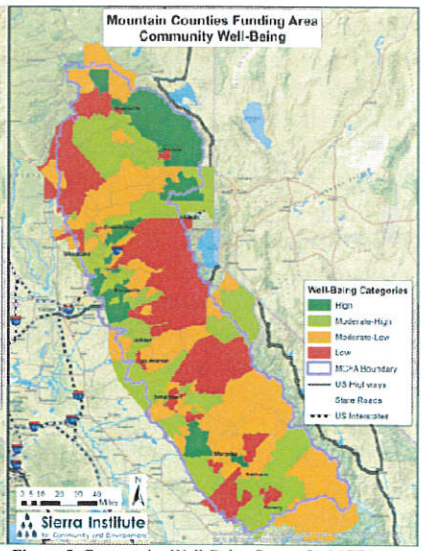

Figure 5: Community Well-Being Scores for MCFA.

It is essential that rural Sierra Nevada communities are not left out of Disadvantaged Community designations. Not only are these communities at a lower level of capacity to respond to and plan for the effects of global climate change, they are also at a greater level of vulnerability to its impacts, due to a greater dependence on natural resources for their livelihoods and social structures, lower levels of social and economic resources, physical isolation, and more. The vital natural and built infrastructure in the Sierra Nevada region must not be left behind due to insufficient and exclusionary measurement. Governor Newsome calls for, "All regions rising." CalEnviroScreen leaves the Sierra Nevada and other rural forested regions out.

[1] OEHHA. (2018). [Map of SB 535 Disadvantaged Communities Using CalEnviroScreen 3.0 results (June 2018 update)]. https://oehha.ca.gov/calenviroscreen/sb535
[2] OEHHA. (2021). [Draft CalEnviroScreen 4.0 Map]. https://oehha.ca.gov/calenviroscreen/report/draft-calenviroscreen-40

We recommend that consideration for rural mountain communities be made within the CalEnviroScreen tool in regard to the following initial categories:

Wildfire Burdens

Rural communities today face increasing risk and pollution burden from wildfires. The 2020 wildfire season demonstrated this, as nearly 10,000 fires burned over 4.2 million acres, making it the largest wildfire season recorded in California's modern history.[3] The human, financial, and infrastructure costs of these fires are enormous, with extensive impacts to rural forested communities. These impacts, including health consequences of episodic smoke events, damaged community infrastructure, water quality degradation from erosion and runoff, and more, are largely unaccounted for in CalEnviroScreen. Given the enormous toll being taken on these communities, the following burdens from wildfires need to be considered in future versions of the tool, and when designating funding for disadvantaged communities. Sierra Institute's initial assessment of 2020 wildfire impacts across the state demonstrated widespread human health impacts and emotional trauma, among other affects.

Air Quality

Smoke events from wildfire can greatly disrupt community well-being. Under the current metrics assessed by the CalEnviroScreen tool, the only indicator that would account for exposure to wildfire smoke would be the PM2.5 indicator. However, under the current version of the tool, PM2.5 is measured as an annual mean calculation over a three-year period. During a wildfire, levels of wildfire PM2.5 can greatly exceed ambient levels and spike within a short period of time. Measuring PM2.5 as an annual average over 3 years does not account for these episodic bursts of exposure to harmful particulates that can have lethal impacts. Additionally, CalEnviroScreen 4.0 is set to release its final draft in the summer of 2021, and the PM2.5 indicator measures data from 2015-2017. This timeframe does not account for the record-breaking wildfire seasons which have been endured by rural communities in recent years. The over 4 million acres that burned in the 2020 wildfire season was more than double the state's previous record, with six of the largest wildfires in California history having been in the last three years.[4] Contributions of PM2.5 to the air from these fires are therefore not being considered in the most recent CalEnviroScreen designations.

The CalEnviroScreen PM2.5 indicator also does not differentiate PM2.5 exposure from wildfire and other emission sources. This is particularly harmful for rural communities exposed to wildfire, as studies have found wildfire PM2.5 to be more toxic than equal doses from other ambient, or outdoor, sources of PM2.5.[5, 6] PM2.5 from wildfire smoke has been found to have greater concentrations of toxic water-soluble trace metals,[7] as well as a greater potential to cause inflammation and oxidative stress in the lungs than urban ambient particulates.[8] Therefore, communities may be exposed to more harmful variants of PM2.5 during episodic smoke events, which is not accounted for under current measurements of the CalEnviroScreen tool.

Water Quality

The majority of California's drinking water originates in forested environments that are increasingly at risk of these catastrophic and high severity wildfires. Wildfire impacts water quality through increased erosion and sedimentation, and higher concentrations and transport of nutrients and heavy metals. The presence of increased turbidity, suspended solids, nutrients and heavy metals pose a challenge for water treatment facilities because these contaminants require more processing or different equipment to remove.[9]

---

[3] CalFire. (2021). *2020 Fire Season*. https://www.fire.ca.gov/incidents/2020/
[4] McGough, M. (2020, September 22). *5 of the 6 largest California wildfires in history started in the past 6 weeks*. The Sacramento Bee. https://www.sacbee.com/news/california/fires/article245917915.html
[5] Aguilera, R., Corringham, T., Gershunov, A., & Benmarhnia, T. (2021). Wildfire smoke impacts respiratory health more than fine particles from other sources: Observational evidence from Southern California. *Nature Communications*, *12*(1). https://doi.org/10.1038/s41467-021-21708-0
[6] Wegesser, T. C., Pinkerton, K. E., & Last, J. A. (2009). California wildfires of 2008: Coarse and fine particulate matter toxicity. *Environmental Health Perspectives*, *117*(6), 893-897. https://doi.org/10.1289/ehp.0800166
[7] Karthikeyan, S., Balasubramanian, R., & Iouri, K. (2006). Particulate air pollution from bushfires: Human exposure and possible health effects. *Journal of Toxicology and Environmental Health, Part A*, *69*(21), 1895-1908. https://doi.org/10.1080/15287390600751264
[8] Williams, K. M., Franzi, L. M., & Last, J. A. (2013). Cell-specific oxidative stress and cytotoxicity after wildfire coarse particulate matter instillation into mouse lung. *Toxicology and Applied Pharmacology*, *266*(1), 48-55. https://doi.org/10.1016/j.taap.2012.10.017
[9] Emelko, M. B., Silins, U., Bladon, K. D., & Stone, M. (2011). Implications of land disturbance on drinking water treatability in a changing climate: Demonstrating the need for "source water supply and protection" strategies. Water Research, 45(2), 461-472. https://doi.org/10.1016/j.watres.2010.08.051

Water quality impacts are driven in part by water-repellent soils which form when soil vegetation is burned,[10] that are more common in high severity burn areas.[11] Water repellent soils reduce precipitation infiltration resulting in increased overland flow carrying sediment which deposits into streams draining the burned area.[12, 13] Increased sediment in streams poses multiple risks to water quality. It increases turbidity and total amount of suspended solids which complicates water treatment processes, potentially requiring modified treatment methods or higher treatment costs. In addition, as stream velocities slow down upon entering reservoirs, sediment is deposited and accumulates.[14] Over time, sediment deposition reduces reservoir capacity and shortens their operational lifespan.[15] For example, after the 2002 Hayman fire in Colorado, the city of Denver invested $7.3 million in restoration projects within the burn area, including planting 175,000 trees in an effort to revegetate the fire scar and reduce sedimentation. Despite these efforts, $30 million was spent in 2010 to remove nearly 480,000 m^3 of sediment from the Strontia Springs Reservoir to maintain reservoir capacity after years of sedimentation that accelerated after the Hayman fire.[16] This poses a potential heavy expense burden on rural communities to maintain reservoir capacity in response to post wildfire sedimentation.

Water treatment processes are typically designed to fit a certain source, and many are not designed or equipped to handle large water quality variations that exceed the thresholds they were designed for.[17] Since water quality is high in rural mountainous communities due to proximity to headwaters, treatment facilities are not designed to accommodate the influx in turbidity, suspended solids, nutrients, algal growth and heavy metals expected to follow catastrophic wildfires. To accommodate these impacts facilities usually have to invest in new infrastructure or more materials necessary to create potable water.[18] In recognition of these burdens, CalEnviroScreen should account for water infrastructure gaps in rural areas, as well as increasing threats to water quality resulting from severe wildfire. Specifically, it needs to account for the increased concentrations of sediments, suspended soils, heavy metals, and algal toxins in reservoirs that result from wildfire impacts, as well as infrastructure capacities to handle treatment of these episodic bursts in contaminants. These impacts underscore the problem of the exclusionary nature of CalEnviroScreen with respect to rural forest communities.

Socioeconomic Considerations

As compared to their urban counterparts, rural communities tend to have higher poverty and unemployment rates, less diversified economies, fewer overall social and economic resources, and are more dependent on government transfer payments.[19] The income gap between urban and rural communities is only continuing to widen, due to a variety of reasons, including lower rural educational attainment, as well as lower amounts of highly skilled jobs and lower returns to college degrees in rural labor markets.[20, 21] Specifically for rural mountain communities in the Sierra Nevada, communities have struggled diversifying their local economies, given a contraction of industries such as timber and mill operations, a shrinking tax base, and a scarcity of skilled workers.[22] While the CalEnviroScreen tool includes population characteristics indicators related to poverty, unemployment, and educational attainment, rural communities face a unique suite of socioeconomic challenges that are not adequately captured by the tool. Specifically, they face greater levels of physical isolation and geographic dispersion, as well as lower levels of institutional and community capacity, and are therefore more likely to lack access to needed infrastructure and services.

---

[10] Brooks, R. (n.d.). *After the fires - Hydrophobic soils*. Land Conservation Assistance Network. https://www.landcan.org/article/After-the-Fires-Hydrophobic-Soils/9
[11] Ffolliott, P. F., Stropki, C. L., Chen, H., & Neary, D. G. (2011). *The 2002 Rodeo-Chediski Wildfire's Impacts on Southwestern Ponderosa Pine Ecosystems, Hydrology, and Fuels* (RMRS-RP-85). United States Department of Agriculture/ Forest Service Rocky Mountain Research Station. https://www.fs.fed.us/rm/pubs/rmrs_rp085.pdf
[12] See footnote 11
[13] Geng, X. (2018). *Wildfire Impacts on Water Quality and Treatability* [Master's thesis]. https://uwspace.uwaterloo.ca/bitstream/handle/10012/13701/Geng_Xiaoshi.pdf?sequence=3&isAllowed=y
[14] Bladon, K. D., Emelko, M. B., Silins, U., & Stone, M. (2014). Wildfire and the future of water supply. *Environmental Science & Technology, 48*(16), 8936-8943. https://doi.org/10.1021/es500130g
[15] See footnotes 9,14
[16] See footnote 14
[17] See footnote 9
[18] See footnotes 9,13
[19] Hales, D., Hohenstein, M. D., Bidwell, M. D., Landry, C., McGranahan, D., Molner, J., Morton, L. W., Vasquez, M., & Jadin, J. (2014). *Ch. 14 Rural Communities. Climate Change Impacts in the United States: The Third National Climate Assessment* (10.7930/ J01Z429C). U.S Global Change Research Program. https://nca2014.globalchange.gov/downloads/low/NCA3_Full_Report_14_Rural_Communities_LowRes.pdf
[20] Lal, P., Alavalapati, J. R., & Mercer, E. D. (2011). Socio-economic impacts of climate change on rural United States. *Mitigation and Adaptation Strategies for Global Change, 16*(7), 819-844. https://doi.org/10.1007/s11027-011-9295-9
[21] Miller, K., & Thomas, R. (2002). *Rural poverty and rural urban income gaps: a troubling snapshot of the "prosperous" 1990s*. Rural Policy Research Institute, University of Missouri-Columbia. https://www.rupri.org/Forms/p2002-5.pdf
[22] Sierra Nevada Conservancy. (2019). *Protecting and restoring the health and resilience of Sierra Nevada watersheds and communities: The Sierra Nevada Conservancy Strategic Plan 2019-2024*. https://sierranevada.ca.gov/wp-content/uploads/sites/326/2019/12/StrategicPlan_web_a11y-20191217.pdf

In particular, there is no indicator in current versions of CalEnviroScreen that assesses access to proper medical treatment or health care costs. This is an issue, as rural residents are more likely to die from heart disease, cancer, unintentional injury, chronic lower respiratory disease, and stroke than those that reside in urban areas.[23] In fact, rural residents pay a greater share of their household income on health care than their urban counterparts, and also have higher financial and travel barriers to proper health care access.[24] Some of these barriers are physical; rural residents must travel greater distances to reach medical facilities, as rural areas are more spread out and face greater levels of physical isolation. Gaining access to health care in rural areas include challenges unique from urban areas. Health indicators in CalEnviroScreen, such as the asthma and cardiovascular indicators, do not account for the fact that rural areas may not have easy access to an emergency department (ED). These indicators are currently tracked using data on ED visits, the rates of which are likely underestimated in these areas. Previous suggestions made to OEHHA and CalEPA regarding CalEnviroScreen have called for the incorporation of an indicator that would examine things such as a lack of access to health care facilities, the proportion of doctors to the number of people in a population, availability of specialists, and more. Moving forward, these types of considerations should be taken into account when determining health burdens on communities, specifically for rural areas.

Conclusion

Incorporating these considerations into the CalEnviroScreen tool is particularly important given the wide variety of agencies that use this tool to designate funding, within and outside of CalEPA. Given their higher level of vulnerability to the impacts of global climate change, both from a socioeconomic and environmental standpoint, it is essential that rural forested communities are not excluded from funding opportunities designated for disadvantaged communities. An example of this can be found regarding development of microgrid capacity. SB 1339 requires the California Public Utilities Commission to adopt a tariff in order to commercialize microgrids. Several stakeholders have advocated to focus the proceedings going forward in communities designated as disadvantaged by CalEnviroScreen. This would result in the exclusion of many rural communities most vulnerable to wildfire or Public Safety Power Shutoffs. Despite the needed engagement and capacity building in these communities for biomass-powered microgrids, especially in an era of increasing wildfire risk, they may be overlooked as a result of designations by the CalEnviroScreen tool. Examples such as this greatly underscore the need to consider the burdens faced by rural communities, both in terms of needed capacity-building and fostering resilience to increasing environmental hazards.

We appreciate the opportunity to comment on version 4.0 of the CalEnviroScreen tool and we recognize the importance of identifying and incorporating disadvantaged communities into decision-making processes and funding opportunities. Our recommendations are summarized in the table below:

Category / Burden	**CalEnviroScreen Indicator**	**Recommendation(s)**
Air Quality	PM2.5	-Account for the episodic nature of wildfire smoke by altering the calculation of the PM2.5 indicator, which is currently an annual mean over a three-year period -Differentiate wildfire PM2.5 exposure from other sources of ambient emission
Water Quality	Drinking Water/Impaired Water Bodies Indicators	-Increase score for communities that have physically burned -Monitor concentrations of benzene in communities that have physically burned[25] -Examine concentrations of sediments, suspended soils, heavy metals, and algal toxins in reservoir sources resulting from wildfire impacts -Account for gaps in rural water infrastructure capacity to handle treatment of episodic bursts of

[23] Centers for Disease Control and Prevention. (2020, March 25). *About rural health.* https://www.cdc.gov/ruralhealth/about.html
[24] Jones, C. A., Parker, T. S., Ahearn, M., Mishra, A. K., & Variyam, J. N. (2009). *Health status and health care access of farm and rural populations.* Economic Research Service U.S. Department of Agriculture. https://www.ers.usda.gov/webdocs/publications/44424/9370_eib57_reportsummary_1_.pdf
[25] Proctor, C. R., Lee, J., Yu, D., Shah, A. D., & Whelton, A. J. (2020). Wildfire caused widespread drinking water distribution network contamination. *AWWA Water Science*, *2*(4). https://doi.org/10.1002/aws2.1183

		contaminants (i.e., sediment, suspended soils, and heavy metal concentrations from wildfire erosion)
General	N/A	-Incorporate data regarding community vulnerability to wildfire
Health Care/Infrastructure	Asthma and Cardiovascular Disease	-Incorporate metrics outside of ED visits, given that these are likely underestimated in rural areas
Health Care/Infrastructure	N/A	-Account for disparities in access to health care through metrics such as financial and travel barriers to proper health care access, as well as capacity of health care facilities (i.e., number of doctors relative to the population, etc.)

We would be happy to provide additional comment and support if there is interest in full consideration of the issues facing rural forested communities in California. Thank you for the opportunity to comment.

Sincerely,

Jonathan Kusel, PhD
Executive Director
Sierra Institute for Community and Environment