NATURAL AND WORKING LANDS
COMMENTS ON CARB WORKSHOP JULY 2021

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Thank you for your informative workshops and Scoping Plans. The following comments are presented to facilitate creation of Scoping Plans that help you achieve your mission.

"CARB's mission is to promote and protect public health, welfare, and ecological resources through effective reduction of air pollutants while recognizing and considering effects on the economy. CARB is the lead agency for climate change programs and oversees all air pollution control efforts in California to attain and maintain health-based air quality standards."

Governor Newsom's Executive Order sets forth worthwhile goals, including conservation of 30% of CA lands and ocean by 2030. Translating this aspiration into climate-friendly policies is challenging, in part because there is widespread disagreement about actionable details.
https://www.gov.ca.gov/2020/10/07/governor-newsom-launches-innovative-strategies-to-use-california-land-to-fight-climate-change-conserve-biodiversity-and-boost-climate-resilience/
The following comments provide scientific perspectives on which planning may be based. Some of these plans require collaboration with other agencies.

The foremost policy goal is to increase sequestration and net C stocks. This is best achieved with minimal management that excludes salvage logging, clear cutting, removal of biomass for incineration, and prescribed burning. Each policy should be based on science, not tradition (1, 2).

Set interim targets, every 2 years, for increasing net C stocks.
Three kinds of terrestrial habitats that sequester and store the most carbon are forests (especially old growth), peat, and wetlands. Each of these emit methane due to decomposition. This is highest in tropical climates with high humidity and precipitation. Forests have the highest ratio of C sequestration to methane emission.

Conduct cost: benefit analyses to include Social Cost of Carbon, air quality, decarbonization of our economy, attenuation of climate change, and ecosystem benefits.

Please a moratorium on development that destroys habitats with the highest sequestration potential.

See legislation introduced in CA Legislature and Congress.
Consider the provisions of AB 284 re. natural and working lands
https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB284
Consider these Congressional bills re. agriculture
H.R.5861
H.R.6718
H.R.6182
.H.R.2803

AGRICULTURE

In collaboration with CalGEM, halt permitting for unconventional oil and gas extraction technologies. Each of these is either carbon-intensive or water-intensive (3). Also in concert with CalGEM, oppose the oil industry initiative to poison our groundwater (4).

Transform our food production from carbon-intensive synthetic to regenerative agriculture. Please further high standards for carbon-storing organic agroecology including no-till farming, no use of plastics, no use of seeds treated with herbicides and pesticides, no synthetic fertilizers (many emit N2O which has high GWP), no application of herbicides and pesticides, crop rotation, intercropping, agroforestry, no use of water contaminated by chemicals used in nearby fracking, and using biomass only as mulch and fertilizer. Use Integrated Pest Management. Impose environmental impact taxes on carbon-intensive, synthetically-raised crops as well as livestock farming.

Livestock is to be phased out and replaced with crops. Methane is stored in undisturbed soil. Tilling releases methane (5, 6, 7, 8, 9, 10),

FOREST MANAGEMENT

Forests significantly decrease toxins that are emitted from the combustion of fossil fuels.

* nitrogen oxides, e.g., NO2, exacerbate and increase incidence of respiratory disorders, diabetes mellitus, and cardiovascular disorders

* ozone (O3) near ground level increases respiratory disorders and shortness of breath

* sulphur oxides (e.g. SO2) decrease longevity and induce wheezing

* carbon monoxide (CO) causes confusion, shortness of breath, and cognitive impairment

* particulate matter (especially PM<2.5um) causes congenital disorders, cancer, cardiovascular disorders, respiratory disorders, dementia, and chronic kidney disease. In 2018, 8.7 million people were killed by PM (11).

Some of the above have GHG properties. E.g., PM from combustion is primarily carbon and is black. This absorbs solar heat.

Established urban trees were studied for decreasing the 5 asterisked pollutants. Trees significantly decreased premature deaths and medical costs (12). In contrast to trees, carbon capture technologies remove only CO2 and do not improve EJ.

An acre of logged forest is not quickly replaced by planting an acre of seedlings. Baby trees need to grow for many years to reach the sum of biomass in a logged acre. In the case of logging an acre in a 50 year old plantation, it would take 50 years of growth of new seedlings on that acre to reach an amount of biomass and stored carbon equal to that removed. Timber companies typically use a 40 year rotation schedule for each harvest. For the initial 15 years after a clearcut harvest, carbon emissions from logging exceed sequestration by the seedlings. And less than half of the carbon removed is stored in lumber products (13).

Old growth forests on our public lands are to be mapped, e.g., by the USGS or USFS. They are to be surrounded by a buffer zone that is at least a half mile wide and consists of less mature forests. These are to be managed passively, i.e., by letting nature take its course - a.k.a. process conservation and proforestation. Over decades, the buffer zones would approach the quality of old growth forests. Extractive resource operations, livestock grazing, and construction of new roads are to be prohibited on these lands. Damaging activities; e.g., off-road vehicle or snowmobile operation, hunting, and vehicle-based camping outside of campsites; are also to be prohibited.

Forests managed passively, I.e., via proforestation, sequester and store more carbon than forests which are actively managed. This is true even for forests that have reached old-growth maturity (14,15,16,17,18,19).

The Sierra Club recommends that incentives be used to modify forestry operations conducted by U.S. corporations in foreign nations. The objective is to decrease destruction of these forests for timber, pulp, palm oil, livestock, and crop agriculture. The SC further recommends that U.S. agencies “ensure the integrity of international forest activities” by advancing SC policies abroad. This includes net forestation, improving forest quality, replacing synthetic agriculture with organic, avoiding forest simplification and impairment, halting illegal logging, prohibition of exporting or importing wood pellets (for biomass burning), and curtailing unsustainable logging practices. International treaties are the most effective way to actualize these policies (20, 21).

Incentives are needed for individuals and non-government entities (corporations, trusts, and non-profit organizations) to divest from forest-destroying companies and reinvest in companies that engage in forest-friendly practices. An example of the latter would be timber firms that follow Forest Stewardship Council (FSC) guidelines and long harvest rotations. Similar

incentives for government entities (municipalities, pension funds, schools, and counties) are needed to fund forest preservation. Green bonds that fund publicly-owned projects to improve forest quality and net forestation would increase net carbon stocks. Legislation may be required to mandate divestment.. Discontinue subsidies for logging. Half of the hardwood harvested in U.S. is used to construct shipping pallets. Half of these are discarded after 1 use. Incentivize reuse or replacement with recycled plastic pallets in order to preserve more forest acreage.

To diminish the frequency and intensity of wildfire, understory vegetation removal, via burning or mechanical means, has been used to decrease "fuel". This has numerous disadvantages including high cost, need to repeat at least every 5 - 10 years, rapid release of GHGs and toxins into the atmosphere, and significant decrease in ecosystem services (22, 23). Both mechanical and combustion methods are labor intensive, require equipment, and entail transportation. These inputs generate significant GHG emissions. Burning causes immediate emission of CO2 and black carbon (a kind of particulate matter that causes several of our most common and deadly chronic illnesses). The emissions from prescribed burning are more toxic than the emissions from wildfire or burning coal. This is due to a low combustion temperature, which burns incompletely and appears smokey and smoldering. Many species of wildlife are adversely affected by the toxins.

In contrast, vegetation removed by mechanical means (and left in piles distant from tree trunks) releases carbon over many years as it decomposes and feeds the topsoil. In the case of redwood leaves, decomposition takes about 7 years. In the case of branches, decomposition takes many decades. Thus, mechanical removal is better for public health and climate change than combustion. However, due to the numerous disadvantages of each method, removal is to be minimized. Disadvantages include decreased ecosystem services (e.g., watershed formation), slower growth rate (and sequestration rate), decreased habitat for many species, public health hazards, impaired health of wildlife, execution of decomposers, impaired humus formation, exacerbation of the climate crisis, and increased risk of wildfire. There is a lower fire risk in forests that are free from prescribed burning interventions. This is rarely directly due to prescribed burning raging out of control. Decreased understory vegetation leads to hotter temperatures and increased rates of evaporation in forests. It also opens up the forest to higher wind velocities, which rapidly spreads fire throughout the forest and beyond. It is very difficult for fire crews to contain wildfire when winds are carrying embers across roads.

Before the Industrial Revolution, prescribed burning may have produced net benefits. However, since the onset of accelerating climate change, its disadvantages outweigh its benefits.

Based on his decades of study and boots-on-the ground observations as a forest manager, F.P. stated, "Climate and weather determine wildfire risk significantly more than understory vegetation...it is more important to decrease the causes of accelerating climate change than to decrease understory vegetation...There is no scientific consensus on thinning because some scientists...are ...in the pocket of the timber industry...There is broad consensus among non-conflicted scientists that allowing some fires (distant from urban areas) to burn is necessary" for forest regeneration.

Most research concluding that prescribed burning prevents wildfire is methodologically weak. Research concluding that it does not is plentiful. I have dozens of references if you are interested (24, 25, 26, 27, 28).

(Methods of protecting development from wildfire are well-known: a) decelerate climate change, b) harden electric transmission lines or install lines underground, c) establish a 100 foot buffer zone that is free from vegetation at the urban-wildland interface, d) prohibit development in areas of high wildfire risk, e) prohibit cook-fires, use of fireplaces, and open pile burning - especially during the extended fire season, f) install mesh screens over vents, g) remove fallen leaves and branches from rooftops and yards, and h) trim trees overhanging roads.)

Post-fire salvage logging has not been proven to decrease risk of wildfire or increase carbon stocks. The Sierra Club recommends Exclusion of Commercial Logging (ECL) on public lands.

Clear cutting is the most destructive method of logging and should be banned statewide.

Commercial loggers prefer a short harvest schedule for their tree plantations, averaging about 40 years. Lengthen timber harvest cycle to a minimum of 80 years. Establish a schedule of fines for harvesting in less than 80 years.

Set an annual quota on logging by limiting the total acreage of timber harvest permits (THP). If carbon stocks are not increasing, decrease the THP quota.

Establish an import policy to prohibit government purchase of products that are produced via deforestation.

Due to extractive industry operations, mismanaged carbon offset schemes, excessive logging, wildfire, arson, and forest management with torches and chainsaws; both the Amazon Forest and Boreal Forest in Canada have become net carbon emitters instead of sinks. Let's aim to prevent this in CA.

CARBON OFFSETS

Replace offset schemes and carbon-trading with conservation easements and designation of new wilderness areas governed by the RoadlessRule.

Standards to define effective offset programs are needed on a global scope. A global inventory of tracts of land for which credits have been purchased would help to prevent double dipping. Fixed duration carbon offset credits would incentive polluters to innovate in ways that decarbonize their operations. At the beginning of a year, polluters would pay a fee that would provide credit for only one year of offsets. If the land, e.g., forest, burns down, then it would be ineligible for future offset credits. Polluters are more likely to decrease opposition to climate change policies because attenuating climate change would decrease risk of wildfire and enable them to continue renewing annual offset credits.

Offset programs do not decrease toxic emissions from industry, fossil fuel production, or fossil fuel combustion.

The fees to buy offset credits are so low in CA and most other states that it does not increase energy prices enough to curtail demand and emissions. If fees are raised to the Social Cost of Carbon and only CA lands are eligible for CA offset programs, this may improve program efficacy. Currently, the Social Cost of Carbon used by the federal government is $51/MT CO2e and will probably be raised in 2022 (29, 30, 31, 32, 33, 34, 35, 36).

BIOMASS INCINERATION

Instead of using biomass for generation of electricity and production of biofuels, use it as mulch, compost, paper, and lumber. Use non-wood botanicals and PCR for paper. To decrease the use of wood, use HempWood. Incineration of biomass for electricity generation emits a quantity of GHGs (including hazardous co-pollutants) that is up to 50% greater than the amount emitted from using coal. Biomass electricity generation releases 350% more GHGs than natural gas (70 - 90% methane) (37, 38) The combustion of biofuels, e.g. for transportation, also immediately releases GHG and toxic emissions and is inefficient compared to ZE battery electric power and renewable hydrogen fuel cells.

Globally we are harvesting more trees and fallen biomass than we are planting or growing by deferred logging. In the USA, we harvest twice the amount that is added by new growth each year. Harvesting biomass contributes to this deforestation (39, 40) and decreases the ecosystem services of forests (41, 42, 43, 44, 45, 46).

In CA, there are about 30 biomass incineration facilities. These are 30 - 40 years old, inefficient, and heavily subsidized. These are not cost-competitive with renewable energy generation. They emit tons of GHGs and toxic air pollutants. They should be shuttered and the land used for conservation or more climate-friendly kinds of buildings.

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