CENTER for BIOLOGICAL DIVERSITY Because life is good.

February 17, 2015

Via electronic submission

Mary Nichols, Chair
California Air Resources Board
1001 I Street, PO Box 2815
Sacramento, CA 95812

Dear Chair Nichols and Members of the Air Resources Board:

This letter is submitted on behalf of the Center for Biological Diversity ("Center") regarding the California Air Resources Board's ("ARB") proposed adoption of the Low Carbon Fuel Standard, or LCFS, and the associated Draft Environmental Impact Report ("EIR"). The Center for Biological Diversity strongly supports the LCFS as a crucial tool in addressing the large proportion of California's greenhouse gas emissions and other air pollutants that comes from the production, transport, refining, and combustion of transportation fuels.

The Center appreciates ARB's continuing work on the LCFS and other measures to address pollution from transportation fuels. The extraction, refining, transport, and combustion of transportation fuels is the source of nearly half of California's annual greenhouse gas emissions, and the equivalent of more than 217 million metric tons of carbon dioxide (CO2e). This category of greenhouse gas emissions is accompanied by large amounts of nitrogen oxides and ozone pollution: 80 percent of California's total emissions of nitrogen oxides of nitrogen (NOx), and 95 percent of diesel particulate matter (PM) emissions. These pollutants are major contributors to the dangerously poor air quality that affects many communities in our state. Without a doubt, California must pursue every option and opportunity to reduce emissions from transportation fuels.

These comments identify specific opportunities to strengthen the proposed rule with respect to hydraulic fracturing and forest-sourced biofuels, and to strengthen the EIR's treatment of impacts to food prices and availability. Some of the noted issues exist in the previously adopted rule but warrant additional consideration in the proposed rule. In all cases, the Center believes there are real solutions for addressing these issues and enacting a strong LCFS that best serves California.

I. The Carbon Intensities Must Account for Energy Inputs and Greenhouse Gas Emissions Specific to Hydraulic Fracturing and other Carbon-Intensive Oil Recovery Methods.

The LCFS uses carbon intensity values generated via the Oil Production Greenhouse Gas Emissions Estimator (OPGEE) Version 1.1 Draft D, to provide average carbon intensities for

crude supplies by country or U.S. state, often specific to individual oil fields (including more than 150 different crudes in California). However, OPGEE Version 1.1, included by reference in the proposed rule, does not explicitly address fracking as a distinct category of crude production. As a result, it does not account for energy inputs and greenhouse gas emissions associated with many components of fracking and other enhanced oil recovery, such as: the pumping and transport of freshwater used in fracking fluid, manufacture and transport of constituent chemicals and fracking fluids, the manufacture and transport of frac sand, flowback emissions, and disposal of fracking fluids. These omissions are evident in the table of input categories for the OPGEE model, which lists input categories in some detail, and which is extensive for many oil production activities.[1] This oversight is also directly stated in the documentation for the OPGEE model.[2]

> Some techniques are not built in the current version of OPGEE, including CO2 flooding and hydraulic fracturing (also known as "fracking"). These modules will be added in the future.[3]
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> Because waste treatment emissions only occur sporadically, they are likely to be small when amortized over the producing life of an oil field. For this reason, emissions from waste treatment are considered below the significance cutoff in OPGEE v1.1 Draft D. Possible exceptions could be the treatment and disposal of fracturing fluids and fracturing flow-back water, due to the large volumes produced. Future versions of the model may include these factors.[4]

The undercounting of emissions and energy inputs specific to fracking raises concerns regarding the impacts associated with high carbon-intensity crudes (addressed in more detail in the next section). In addition, this undercounting undermines the ability of LCFS to effectively achieve its target reductions. Fracking and acidizing are major components of operations in many oil fields in California, North Dakota, and elsewhere. Correctly accounting for the emissions and energy inputs specific to fracking would significantly change both the carbon intensity values for many individual crudes as well as the state average crude carbon intensity used by the large refineries.

Furthermore, the inputs and calculations behind the carbon intensity lookup table indicate heavy use of standard default values instead of field-specific inputs.[5] For example, all California oil fields are given a default flaring-to-oil ratio of 13 scf/bbl oil, and a default pipeline transport distance of 100 miles. Similarly, the three oil fields listed for North Dakota all use the same default inputs for all values, resulting in identical carbon intensities, the relatively low 10.18. In

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[1] Oil Production Greenhouse Gas Emissions Estimator (OPGEE) Version 1.1 Draft D

[2] http://www.arb.ca.gov/regact/2011/lcfs2011/opgee_userguide.pdf

[3] OPGEE v1.1 Draft D, User Guide & Technical Documentation, page 42.

[4] OPGEE v1.1 Draft D, User Guide & Technical Documentation, page 83.

[5] OPGEE Version 1.1 Draft Lookup Table MCON Inputs, http://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/draft_lookup_table_mcon_inputs_opgee_v1_1_102914.xlsx

all of these cases, the LCFS is significantly underestimating carbon intensities for individual oil fields with heavy use of fracking and other high energy-intensity operations. The calculation documentation acknowledges as much with respect to many crudes, including the North Dakota crudes: "OPGEE does not account for emissions from fracking so the CI estimate will likely be low."[6]

We understand that ARB is currently developing these components--water pumping and transport, manufacture and transport of fracking fluid and acid constituents, the manufacture and transport of frac sand, flowback emissions, disposal of fracking fluids and flowback wastewater--to be included in future revisions to the LCFS. In the meantime, these emissions and energy inputs are either being undercounted or not counted at all in the carbon intensity value. Nonetheless, the proposed rule would explicitly include these faulty carbon intensity values, and incorporate the model inputs by reference. While the proposed rule states that ARB intends to update the LCFS at three year intervals, these low carbon intensity values would be in place until the LCFS is amended in the future.

The Center strongly supports ARB's development of a model to assign values to the carbon impacts of fracking and other carbon intensive enhanced oil recovery methods. Correctly accounting for the carbon impacts associated with fracking is critical to demonstrating that the LCFS has successfully reduced fuel carbon intensities by 10% by 2020 and achieved the projected reductions expected from this sector under AB 32. The results of modeling the carbon impacts associated with fracking may lead to retroactive correction of baseline and compliance schedules. One approach, in the interim, would be to apply an additional default value to the standard carbon intensity for crudes produced in oil fields where fracking is common, until the model for estimating emissions associated with fracking is completed and the carbon intensity values can be corrected.

II. ARB Should Consider Additional Measures to Directly Discourage the Development and Production of High Carbon Intensity Crude Oils Under the LCFS.

In the years since the LCFS was first adopted, the greenhouse gas pollution from the production of transportation fuels has become a much more important and visible issue in California and nationwide. The import of high carbon-intensity crude into California from the expansive hydraulic fracturing operations in the Bakken oil play in North Dakota has increased from essentially zero in 2009, to millions of barrels a year by 2014.[7] This has raised concerns not only over the greenhouse gas impacts but also over the dangers associated with transporting crude by railroad through our state and our communities. Over that same period, California has become increasingly aware of the extensive use and rapid expansion in high-intensity extraction methods such as hydraulic fracturing (fracking) and acidizing. Furthermore, California is now receiving imports of crude from the Alberta tar sands that are the focus of international opposition due to their tremendous damage to the people, land, waters, and wildlife of Alberta and their immense implications for the global climate.

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[6] OPGEE v. 1.1 Lookup Table Inputs, USA-North Dakota.

[7] Energy Almanac by CEC, http://energyalmanac.ca.gov/petroleum/statistics/2014_crude_by_rail.html, and the LCFS, Appendix H: 2014 Mid-Year Crude Average CI Estimate.

In 2014, there were five crudes that were not in the 2010 slate, with a production and transport carbon intensity greater than 15 gCO_2e/MJ, for a total of 61.[8] There are 17 crude sources (i.e. oil fields) in California that surpass this carbon intensity, and five with production and transport carbon intensity values greater than 30 gCO_2e/MJ. While some of these high carbon-intensity crudes are relatively small components of the state's domestic crude supply, this still amounts to hundreds of thousands of barrels per field. For example, Placerita crude has a production and transport carbon intensity of 41.72 gCO_2e/MJ and produced 447,209 barrels in the first six months of 2014.

Other high carbon intensity fields are relatively large components of California's domestic crude supply. Coalinga produced 2.9 million barrels in the first half of 2014, with a carbon intensity of 32.82 gCO_2e/MJ; Cymric, 7.6 million at 21.48; Kern Front, 1.5 million at 29.65; McKittrick, 7.6 million at 28.72; Midway-Sunset, 14.4 million at 29.27; Poso Creek, 1.7 million at 32.09; Round Mountain, 2.1 million at 27.77; San Ardo, 3.5 million at 31.48.[9] All of these crudes have production and transport carbon intensity values greater than 15 gCO_2e/MJ even without accounting for many of the greenhouse gas emissions and energy inputs associated with high-intensity production methods such as fracking, an issue raised in the previous section.

The initial LCFS regulation in 2009 included a "bright line" approach to high carbon-intensity crude oil ("HCICO"), in which HCICOs were treated as a distinct category separate from non-HCICO gasoline and diesel; the carbon intensities of the HCICOs were calculated separately and oil suppliers had to report the associated deficits compared to the baseline. The initial LCFS rule also required refinery-specific accounting of crude slates. This approach would have applied penalties specifically to refineries for crude oils that were above a "bright line" of 15 grams CO2 per mega joule and that were not part of the original 2006 crude oil slate.

When ARB amended the LCFS in 2012, the final regulation eliminated the bright line approach to HCICOs and replaced refinery-specific accounting with a statewide average crude carbon intensity. Although the amended rule did include provisions to require reporting of the carbon intensity of fuels by crude source, the current LCFS and the proposed rule were specifically designed to be "fuel-neutral" with respect to all crudes, including HCICOs.[10] Under this approach, an increase in carbon intensity at one refinery is not assigned to the responsible refinery, but is instead spread across the entire sector statewide, and refineries selling higher-carbon products to California will be debited only if the statewide carbon-intensity of all California refineries and importers increases over time. Such a system dilutes both the incentives for parties refining high-intensity crude to change their crude slates and any incentive

[8] Access Western Blend, Canada; Premium Albian Synthetic, Canada; Hamaca, Venezuela; Burrell, California; and Chico-Martinez, California. 2014 Mid-Year Crude Average CI Estimate.

[9] LCFS, Appendix H: 2014 Mid-Year Crude Average CI Estimate.

[10] "The LCFS is designed to encourage the use of cleaner low-carbon fuels in California, encourage the production of those fuels, and, therefore, reduce GHG emissions. The LCFS is performance-based and fuel-neutral, allowing the market to determine how the carbon intensity of California's transportation fuels will be reduced." ISOR at ES-2.

for refineries that may be maintaining or reducing the carbon-intensity of their crude oil slates to avoid higher-carbon crudes.

We urge the Air Resources Board to consider additional measures to directly discourage the development and production of high carbon-intensity crudes, such as the bright line approach to HCICOs and refinery-specific reporting.

III. The CA-GREET pathway for cellulosic ethanol from "forest waste" does not account for the carbon impacts associated with generating forest-sourced feedstock.

The CA-GREET "Pathway for Cellulosic Ethanol from Forest Waste" does not account for fuels or energy inputs associated with the forest management activities that generate woody biomass feedstock (e.g. harvest, limbing, piling).[11] The "Forest Waste" pathway apparently considers all forest-sourced feedstock to be "residue" from some existing forest management activity, and the CA-GREET model accounts for inputs and emissions starting at the point of collection of the feedstock material, such as from a slash pile. The Forest Waste pathway also does not account for forest carbon impacts (i.e., loss of forest carbon stores and foregone carbon sequestration) from the harvest activities that generate the residue materials.

There is an obvious, if implicit, assumption that all forest-sourced feedstock is waste from forest management activities that had already occurred or would have otherwise occurred. This assumption is not explicated or supported. The Forest Waste pathway defines forest waste generally as " treetops, branches, small-diameter wood, stumps, leaves, dead wood and even poorly-formed whole trees, as well as undergrowth and low-value [tree] species."[12] This definition includes virtually every forest carbon pool other than soil and the boles of large, commercially-valuable saw timber, and there are no criteria with respect to demonstrating that these feedstock materials are the residue of some otherwise occurring forest management activity, rather than the primary driver for a logging project.

If forest projects are planned, in whole or in part, in response to economic incentives created by the LCFS (for example, the availability of a nearby biofuels facility that makes forest projects more economically feasible than they would have been in its absence), the CA-GREET life cycle analysis would need to account for the carbon impacts associated with the forest management and harvest of those biofuels feedstocks. Such a scenario is already occurring in

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[11] Detailed California-Modified GREET Pathway for Cellulosic Ethanol from Forest Waste, 2009. Available at http://www.arb.ca.gov/fuels/lcfs/022709lcfs_forestw.pdf

[12] "Forest waste typically refer to those parts of trees unsuitable for sawlogs such as treetops, branches, small-diameter wood, stumps, leaves, dead wood and even poorly-formed whole trees, as well as undergrowth and low-value species. Nearly 20 billion cubic feet of wood is removed on an annual basis from lands in the United States. Of that volume, 16 percent is classified as logging waste, according to U.S. Department of Agriculture (USDA). This material is mainly tree tops and small branches that have been considered uneconomical to harvest. The USDA Forest Service Inventory and Analysis program estimates that in 2001, 61 million dry tons of residuals are available annually from harvesting and fuel reduction activities. A recovery system, which would follow behind a conventional logging operation, could recover 60 percent or 40 million dry tons of this waste for potential bioenergy and bio-based product markets." CA-GREET Pathway for Cellulosic Ethanol from Forest Waste, at 2.

the southeastern United States, where the export of wood pellets to Europe to replace coal for electricity generation and residential heating under the European Commission's climate and energy package doubled in 2013, to 3.2 million metric tons annually.[13] Traditionally manufactured from mill waste, wood pellets can also be produced from unprocessed harvested wood, and may constitute a new and growing demand on forest resources.

Because the CA-GREET model does not include emissions and carbon impacts associated with land use and land use change, a separate methodology (the Detailed Analysis of Indirect Land Use Change, or iLUC) was developed to account for indirect land-use change impacts associated with biofuels.[14] This methodology primarily addresses the carbon impacts associated with the conversion of agricultural land from food crops to biofuel feedstocks, and with the clearing of land to plant agricultural feedstock.[15] With respect to forests, the land-use change component addresses only the potential carbon impacts of forest loss to agricultural development. As a result, it does not consider any forest carbon impacts associated with the generation of forest-sourced feedstock in the Forest Waste pathway or elsewhere. These impacts include but are not limited to reduction in forest carbon stocks and lost future sequestration resulting from harvest of trees that otherwise would have continued growing and sequestering carbon, regardless of whether they are considered "poorly-formed" or "low-value." In short, even if forest remains forest, the increased removal of materials for cellulosic ethanol production may affect both terrestrial carbon stocks and atmospheric CO2 concentrations. A model that considers only change from one type of land use to another will not capture these relevant effects.

In 2009, the ARB Board directed ARB staff to establish a LCFS Sustainability Workgroup charged with developing criteria for each biofuel feedstock category in order to limit the effects of biofuels on carbon stores, GHG emissions, food supplies, and ecological values. However, the Workgroup has not yet proposed any such standards with respect to forest-sourced biofuels, and the LCFS otherwise contains no guidance specific to forest-sourced feedstocks or biofuels.

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[13] US Energy Information Administration, "U.S. wood pellet exports double in 2013 in response to growing European demand. May 22, 2014. Available at http://www.eia.gov/todayinenergy/detail.cfm?id=16391

[14] LCFS, Appendix I: Detailed Analysis for Indirect Land Use Change.

[15] "Carbon intensities are calculated under the LCFS on a full life cycle basis. This means that the CI value assigned to each fuel reflects the GHG emissions associated with that fuel's production, transport, storage, and use. The CA-GREET model accounts only for such direct effects. In addition to these direct effects, some fuel production processes generate GHGs indirectly, via intermediate market mechanisms. To date, ARB staff has identified an indirect effect that has a measurable impact on GHG emissions: land use change. A land use change effect occurs when demand for a crop-based biofuel brings non-agricultural lands into production. When new land is converted, such conversions release the carbon sequestered in soils and vegetation. The resulting carbon emissions constitute the "indirect" land use change (iLUC) impact of increased biofuel production. For the LCFS, iLUC emissions are attributable to biofuels produced from crops." ISOR, at ES-5.

We urge ARB to ensure that the energy inputs and forest carbon impacts associated with forest-sourced feedstock are fully accounted for before a CA-GREET pathway for cellulosic ethanol from forest waste, or any other biofuel from forest-sourced feedstock, is certified. In addition, we strongly urge ARB to complete the work of the LCFS Sustainability Workgroup, and to adopt standards specific to forest-sourced feedstocks before certifying any related CA-GREET pathways.

IV. The EIR Fails to Mitigate the Project's Foreseeable Impacts on Food Availability and Hunger among "the World's Poorest People."

The EIR indicates that increasing demand for biofuels can displace production of food crops in favor of biofuel feedstock crops.[16] The Detailed Analysis for the Indirect Land Use Change states that the economic model used to evaluate land use change impacts indicates that the LCFS will result in higher food prices, with some alarming outcomes.

> The LCFS, together with biofuel production mandates in the U.S. and Europe, will result in the diversion of agricultural land from food production to biofuel feedstock production. This diversion of agricultural land to biofuel production will exert an upward pressure on food commodity prices, and potentially lead to food shortages, increasing food price volatility, and inability of the world's poorest people to purchase adequate quantities of food. GTAP analysis predicts that price increases resulting from the additional demand for biofuels will result in reduced crop production, leading to lower food consumption.[17]

In short, the iLUC analysis predicts that the LCFS can exacerbate hunger and food shortages for "the world's poorest people." The Analysis cites Tenenbaum (2008) for references to these impacts.[18] More recently, a Word Resources Institute working paper by Searchinger and Hemilch (2014) found that "bioenergy that entails the dedicated use of land to grow the energy feedstock will undercut efforts to combat climate change and to achieve a sustainable food future."[19] The working paper concludes that "[p]hasing out the dedicated use of land to generate bioenergy, particularly biofuels, would reduce the food gap and, perhaps even more importantly, keep it from greatly expanding."[20]

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[16] "As discussed above, as demand for biofuel crops increases, it could displace production of food crops, resulting in conversion of both fallow and cultivated lands to biofuel feedstock crop production." Draft EIR, at 33.

[17] Appendix 1: Detailed Analysis for Indirect Land Use Change, at I-21.

[18] D. J. Tenenbaum , "Food vs. Fuel: Diversion of Crops Could Cause More Hunger.", Environmental Perspectives 116(6): A254-257, (2008).

[19] Searchinger, T. and R. Heimlich. 2015. "Avoiding Bioenergy Competition for Food Crops and Land." Working Paper, Installment 9 of *Creating a Sustainable Food Future*. Washington, DC: World Resources Institute, at 1. Available at http://www.worldresourcesreport.org.

[20] Searchinger and Heimlich (2015), at 28.

Currently, the LCFS includes no mechanism, either as part of the carbon intensity value or elsewhere, to account for these impacts. The Detailed Analysis for Indirect Land Use Change determines that the land use change model is incapable of modeling these impacts, and proposes to address the problem "in future updates."[21] Ultimately, the EIR finds that because ARB has no land use authority, it is not within ARB's authority to mitigate these impacts.[22]

Exercising land use authority is not the only possible approach to reducing these impacts, and ARB may not point to its lack of land use authority as a reason for implementing no mitigation measures. That is, an agency may not claim that mitigation is infeasible unless that agency truly lacks any authority to implement any feasible mitigation measures. (*See, generally, City of Marina v. Board of Trustees* (2006) 39 Cal.4th 341.) ARB must instead consider all feasible options to mitigate or avoid any significant land use change effects identified. ARB is designing the program that creates the incentives that are producing the impacts, and is thus responsible under CEQA for analyzing and mitigating those impacts. (*Cf. California Unions for Reliable Energy v. Mojave Desert AQMD* (2009) 178 Cal. App. 4th 1225.) Nor may ARB avoid its responsibility to disclose and analyze these impacts by simply declaring that mitigation is infeasible and the impacts unavoidable. "An agency may not "travel the legally impermissible easy route to CEQA compliance" by making a significance determination without fully analyzing a project's effects. (*Berkeley Keep Jets Over the Bay Comm. v. Bd. of Port Comm'rs* (2001) 91 Cal.App.4th 1344, 1371).

Accordingly, ARB is responsible not only for providing all the information it reasonably can about these indirect impacts, but also for considering whether there are any possible changes to the program itself (such as limitations on eligibility of particular feedstocks, eligibility requirements for biofuels, including a provision in the life cycle analysis that accounts for the potential of displacing food crops, or verification and certification requirements) that could change the incentives driving land use change and reduce the associated impacts. We urge ARB to take up every option for addressing this important issue.

V. Conclusion

The Center for Biological Diversity strongly supports the LCFS as a crucial tool in addressing the large proportion of California's greenhouse gas emissions and other air pollutants

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[21] Some stakeholders maintain that global changes in food consumption are not a direct consequence of biofuel production and staff should not consider food impacts in the modeling of iLUC while others argue that reductions in food consumption would require an assessment of the calorific content of finished food products in the GTAP-BIO model. The model as currently structured, is not capable of modeling any changes in food consumption driven by calorific content. Staff is therefore, proposing to address this issue in future updates. Appendix 1: Detailed analysis for Indirect Land Use Change, at I-21.

[22] "Potential agricultural and forest resource impacts could be reduced to a less-than-significant level by mitigation measures prescribed by local, State, federal, or other land use or permitting agencies (either in the United States or abroad) with approval authority over the particular development projects. However, because ARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels." Draft EIR, at 47.

that comes from the production, transport, refining, and combustion of transportation fuels. The Center supports ARB's development of a model to assign values to the carbon impacts of fracking and other carbon intensive enhanced oil recovery methods, and the Center encourages the LCFS Sustainability Workgroup's to develop standards specific to forest-sourced feedstocks.

We urge ARB to strengthen the proposed rule with respect to hydraulic fracturing and forest-sourced biofuels, and to strengthen the EIR's treatment of impacts to food prices and availability. For those issues that may take longer than ARB is currently contemplating for adoption of this rule--such as additional measures to directly discourage the development and production of high carbon-intensity crudes, and mitigating impacts to food prices and availability--we urge ARB to initiate the process of developing these measures, in the resolution adopting the revised LCFS.

Thank you for your consideration of these comments. Please contact me with any questions or concerns.

Sincerely,

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