February 23, 2021

Jason Gray
Chief, Cap-and-Trade Program
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

RE: Compliance Offsets Protocol Task Force Draft Final Recommendations – February 8, 2021

Dear Mr. Gray:

Indigo Ag applauds the continued and significant efforts by the California Air Resources Board (CARB) to reduce the greenhouse gas (GHG) emissions across the State's economy since the passage of the Global Warming Solutions Act (AB32) in 2006. California has demonstrated how offsets can be successfully integrated into a compliance cap-and-trade program, reducing the economic burden to businesses in California while also extending the climate benefits of the program beyond the sectors which fall under the cap. While the program has seen much success through its existing suite of compliance offset protocols (COPs), it has been almost six years since CARB adopted a new COP. During that time, we have seen significant advancements in the development of voluntary offset project protocols, especially around agriculture and land use. The Compliance Offsets Protocol Task Force (Task Force), created under Assembly Bill (AB) 398,[1] has conducted an extensive review of existing and potential protocols which could serve as new COPs as well as reviewed existing COPs. The Task Force has issued a draft final comprehensive report summarizing their significant efforts to review options for CARB to expand and improve its suite of COPs. The policy, technology, and business developments necessary to provide scalable agricultural offset projects are now in place, and we believe CARB must consider adopting COPs for agricultural land management activities.

Indigo Ag uses microbiology and digital technology to improve the quality, yields, and environmental sustainability of agriculture. We are now expanding our expertise to streamline the ability of farms to tap into environmental markets. Using a combination of direct sampling, farm-level data collection, biogeochemical models, and remote sensing (including satellite analytics), Indigo Ag can accurately determine the current carbon footprint of a farm and implement changes to decrease that footprint. Working with the millions of acres that have contracted to be a part of Indigo Carbon (and millions more who have expressed interest), Indigo Ag is helping growers on a journey to decrease net GHG emissions by more than 1 metric ton per acre of farmland annually.

The Task Force issued its Initial Draft Recommendations on October 7, 2020, and Draft Final Recommendations on February 8, 2021. Those recommendations consisted of five chapters, one of which was entitled "Analysis and Recommendations on Livestock, Agriculture and Rangeland." It recommended the development of three protocols: avoided conversion of grasslands, feed additives to reduce enteric emissions of methane from cattle, and diversion of manure storage from anaerobic

[1] Garcia, Chapter 135, Statues of 2014. (https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB398)

systems ("alternative manure management"). It is clear from the report that the Task Force conducted a thoughtful and detailed review of existing protocols as well as, in addition to considering agricultural practices that could be incorporated in existing or future offset protocols. We appreciate their outreach to the voluntary carbon offset registries and conversations with leading scientists from the University of California at Davis.

On October 29, 2020, we provided detailed comments on the Initial Draft report, which supported the adoption of an avoided grassland conversion protocol and stressed the importance of adopting COPs that incentivize changes to agricultural land management when they result in net GHG benefits. We encourage staff to review those comments, as our feedback on the Final Draft report build on those comments. We reviewed the February 8 version, and we appreciate the efforts of the Task Force to incorporate our comments.

We continue to support the adoption of an avoided conversion of grassland COP. Two voluntary registries, the Climate Action Reserve and the American Carbon Registry, have developed and refined protocols for this activity.[2, 3] In the case of the former, quantification is based on pre-modeled emission factors (leveraging the DayCent model), significantly reducing the costs of implementation. In the case of the latter, project developers are able to select biogeochemical models, expanding the applicability of the methodology to crop/region combinations which were unable to be modeled during development of the CAR protocol.

However, to achieve climate benefits on agricultural lands at scale, CARB must pursue the adoption of new COPs which incentivize changes to agricultural land management.

California grows more than 400 commodity crops and is the sole source for many commodities enjoyed throughout the United States, including almonds, artichokes, dates, prunes, figs, garlic, kiwifruit, olives and olive oil, pistachios, raisins, table grapes, and walnuts. California crops generated almost $50 billion in value in 2018 alone.[4] Conducting research to understand what practices generate net GHG benefits of just the top 20 crop and livestock commodities, responsible for more than $42.8 billion in value in 2018, will take decades. Expanding the scope to all 400 commodities may never occur.

We cannot wait even a decade to conduct this research and then implement practices to reduce net GHG emissions. Recent studies have found that increased temperatures, highly variable precipitation patterns, and increased frequency and intensity of heat waves and drought are already impacting California agriculture. The impacts of these climatic changes include a decrease in chill hours and crop yields and an increase in pests and diseases.[5] The future viability of many of these crops is uncertain.

The Final Draft Task Force report includes the following added language:

[2] Grassland Protocol Version 2.1 (2020). Climate Action Reserve. (http://www.climateactionreserve.org/how/protocols/grassland/)
[3] Avoided Conversion of Grasslands and Shrublands to Crop Production v2.0 (2019). American Carbon Registry. (https://americancarbonregistry.org/carbon-accounting/standards-methodologies/methodology-for-avoided-conversion-of-grasslands-and-shrublands-to-crop-production)
[4] Agricultural Production Statistics Review 2018-2019, 4 (2019). California Department of Food and Agriculture. (https://www.cdfa.ca.gov/statistics/PDFs/2018-2019AgReportnass.pdf)
[5] Pathak, T., Maskey, M.L., Dahlberg, J.A, Kearns, F., Bali, K.H., Zaccaria, D. (2018) Climate Change Trends and Impacts on California Agriculture: A Detailed Review. *Agronomy*, 8(3), 25. (https://doi.org/10.3390/agronomy8030025)

> Other practices may generate net GHG benefits, but the Subgroup identified the above seven practices as those that have the largest potential to generate net GHG benefits for agricultural producers in California and across the country. Other approaches, such as the use of biochar or combining multiple practices into a single, comprehensive protocol, have been considered and are being piloted by proponents. However, the practices considered are those where there is current or emerging research to support net GHG benefits and have largest potential GHG opportunity. The practices the Subgroup recommends have protocols that have been or could be modified and adopted by CARB as compliance offset protocols. If other practices and their associated protocols can demonstrate that they provide net GHG benefits that meet the AB 32 requirements under California cropping conditions, they should be considered in the future for regulatory protocols.[6]

Indigo Ag is currently implementing the Climate Action Reserve's (CAR) Soil Enrichment Protocol (SEP) with several hundred growers on millions of acres (Project ID CAR1459). The project is preparing for its initial verification and we expect to receive registry approval and generate credits during 2021. This project will demonstrate that it can "provide new GHG benefits that meet the AB 32 requirements" and the SEP should be considered as a future COP. This is the largest agriculture project in the history of environmental markets in terms of the scale of aggregation and practice change.

The practices being piloted with the SEP in our current project can be directly translated to California commodities. The combination of soil carbon measurements and modeling provides a "belts-and-suspenders" approach to offset project development. The "belt" is the soil carbon measurements conducted, at a minimum, every five years. While the technology to measure soil carbon is mature, significant research is rapidly improving the accuracy and reducing the costs. For example, the U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-e) Systems for Monitoring and Analytics for Renewable Transportation Fuels from Agricultural Resources and Management (SMARTFARM) program has funded a University of Utah project to "develop and deploy a distributed carbon sensor system that is buried into the soil, capable of locally stimulating a surrounding volume of soils at multiple depths, and sensing carbon and carbon flux at ultra-low operational cost. The sensor will enable high-accuracy and real-time decision data for cost-effective carbon removal, storage, and management."[7]

The "suspenders" is the annual modeling of agricultural conditions, including temperature; precipitation; fertilizer application rate, method, and form; soil type; and agricultural practices. The State already uses biogeochemical models to calculate N_2O emissions from agricultural soil management in croplands.[8] These same models will be used in future versions of the State's Natural and Working Land Inventory for the calculation of soil carbon fluxes.[9] By applying these approaches with a statistical,

[6] Compliance Offsets Protocol Task Force Draft Final Recommendations (2021). California Air Resources Board. p. 117. (https://ww2.arb.ca.gov/sites/default/files/2021-02/offsets_task_force_draft_final_report_020821.pdf)
[7] US DOE ARPA-e (2021). ARPA-E Announces $16.5 Million for Technologies Supporting the Biofuels Supply Chain. (https://arpa-e.energy.gov/news-and-media/press-releases/arpa-e-announces-165-million-technologies-supporting-biofuels-supply-chain)
[8] CARB (2018). CARB GHG Inventory Updates Documentation. p.8. (https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_00-16_method_update_document.pdf)
[9] CARB (2018). Technical Support Document for the Natural & Working Lands Inventory. p.87. (https://ww3.arb.ca.gov/cc/inventory/pubs/nwl_inventory_technical.pdf)

sample-based approach to aggregation and stratification, the protocols become far more scalable, and the transaction costs far more manageable than past agricultural protocols. Furthermore, a recent paper demonstrated that these models are capable of calculating seasonal and annual N_2O emissions from a diverse array of crops and these calculations are more accurate "than the Intergovernmental Panel on Climate Change emission factor approach."[10]

Indigo Ag strongly advises that CARB review the CAR SEP and the project under development. The Task Force's assessment of practices and protocols followed the common, reductionist approach used by many carbon offset policy practitioners: starting with a narrow practice definition and then building to an end result from that starting point. The history of agricultural carbon offset methodologies and projects over the last two decades has demonstrated that the typical narrow, reductionist approach to offset protocols does not result in practical, scalable offset protocols. One needs only to consider examples of protocols with low or no demonstrated success after years of availability in the marketplace (e.g., the Compliance Offset Protocol for Rice Cultivation Projects[11] was adopted in June of 2015 and has generated zero ARBOCs over 5 years[12]).

Current and future protocols need to incorporate joint project development

According to the Final Draft Task Force report, AB398, which created the Task Force, directed the Task Force to "develop recommendations to CARB on methodologies to allow groups of landowners to jointly develop natural and working lands offset projects."[13] Recommendations for joint project development are made throughout the report. Chapter 1, which focused on overarching and programmatic considerations, stated that the aggregation of project participants would "create efficiencies, reduce costs, and potentially create more interest in innovative financing structures to address the high upfront project costs that create a participation barrier to most small landowners."[14] This chapter recommended that CARB "Convene a workgroup comprised of interested stakeholders to advise CARB staff on key elements of an aggregation method that is credible, simple, and cost-effective."[15] The chapter on Blue Carbon and Wetlands (Chapter 2) states that joint project development "Allows for reduced verification/validation costs per acre."[16]

The Livestock, Agriculture, and Rangeland chapter (Chapter 4) states that "joint project development for agricultural producers is critical to their adoption" and recommends "full joint development of projects including the development of a single Offset Project Data Report, Verification, and Offset Verification Statement for the project."[17] Chapter 5 states that joint development "allows aggregation of smaller projects into a single combined project" and "lowers transaction costs and promotes greater participation."[18]

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[10] Deng, J., Li, C., Burger, M., Horwath, W. R., Smart, D., Six, J., et al. (2018). Assessing short-term impacts of management practices on N_2O emissions from diverse Mediterranean agricultural ecosystems using a biogeochemical model. *Journal of Geophysical Research: Biogeosciences*, 123, 1557–1571. (https://doi.org/10.1029/2017JG004260)
[11] Compliance Offset Protocol for Rice Cultivation Projects (2015). California Air Resources Board. (https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program/compliance-offset-protocols/rice-cultivation-projects)
[12] ARB Offset Credit Issuance Table. Accessed October 26, 2020. (https://ww3.arb.ca.gov/cc/capandtrade/offsets/issuance/arboc_issuance.xlsx)
[13] Compliance Offsets Protocol Task Force Draft Final Recommendations. p. 1.
[14] Compliance Offsets Protocol Task Force Draft Final Recommendations. p. 30-31.
[15] Compliance Offsets Protocol Task Force Draft Final Recommendations. p. 31.
[16] Compliance Offsets Protocol Task Force Draft Final Recommendations. p. 46.
[17] Compliance Offsets Protocol Task Force Draft Final Recommendations. p. 119.
[18] Compliance Offsets Protocol Task Force Draft Final Recommendations. p. 187.

We support the multiple recommendations of the Task Force to improve and enhance the ability to create joint projects. Joint project develop is a cornerstone of our project, and is critical for any field-based agricultural carbon. Through our technology, we are able to capture all the critical information necessary to quantify, monitor, report, and verify the practices on millions of acres annually. Joint development enhances the overall accuracy of the project-level accounting by reducing uncertainties across fields, practices, and soils. Rigorous standards for sample design and accounting for uncertainty ensures the integrity of credits issued to jointly developed projects. Lastly, joint project development is the most effective way to ensure the permanence of soil carbon sequestration . A jointly developed agricultural land management project is akin to a forest project whereby individual trees are not monitored (in this case, individual fields), but the project accounting focuses on the overall carbon pool in the forest (in this case, the jointly developed project).

We applaud the work of the Task Force. The current suite of COPs is insufficient to drive GHG reductions and enhance soil carbon sequestration on agricultural lands. According to the Draft Final report, almost 23 million acres are used for some form of agricultural production in California, including croplands and grazing land.[19] Through a mix of avoided conversion, direct GHG reductions, and enhanced soil organic carbon sequestration, and conservatively assuming benefits of 1 $tCO_2e\ acre^{-1}\ year^{-1}$, California's agricultural sector could add 23 million tCO_2e in emission reductions to the compliance offset market every year. On top of that, this approach would open opportunities for commensurate benefits on agricultural lands outside of the State. Such "offset diplomacy," generating benefits to farming communities across the US, would greatly enhance the impact and image of the California Cap-and-Trade Program.

CARB has done a tremendous job developing programs to reduce GHG emissions across the California economy, and the inclusion of agricultural land practices will continue the State's leadership. We thank CARB for this opportunity to offer these comments and look forward to continued collaboration to implement policies and strategies that further reduce emissions from the transportation sector.

Sincerely,

Max DuBuisson

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[19] Compliance Offsets Protocol Task Force Draft Final Recommendations. p. 114.

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