May 29, 2026

Comments in Response to Information Solicitation to Inform Implementation of the Dairy and Livestock Provisions of SB 1383

As a student at Stanford Law School, I offer the following comments in response to the California Air Resources Board's (CARB) Information Solicitation to Inform Implementation of the Dairy and Livestock Provisions of Senate Bill 1383.

Together with other individuals at Stanford Law School, I recently released a white paper examining the strengths and weaknesses of the State Water Quality Resources Control Board (State Water Board) and Regional Water Quality Control Boards' (Regional Water Boards) regulation of confined animal facilities (CAFs).[1]

Because CARB's regulation of methane will inevitably have downstream environmental effects, I **encourage CARB to coordinate with other state environmental agencies in implementing SB 1383 to adequately assess the regulation's impacts**. I therefore recommend that CARB:

- Collaborate with other state agencies with CAF-relevant data to create an interoperable dataset that includes universal facility identifiers.
- To prevent duplicative data collection, rely upon Regional Water Board data to determine CAF activity factors.
- Take broader environmental impacts into account as it determines how to regulate methane to avoid creating a regulatory system that addresses climate change at the expense of air and/or water quality.

1. **CARB should collaborate with other state agencies with CAF-relevant data to create an interoperable dataset that includes universal facility identifiers.**

CARB has asked whether "facility-level data sources [are available] that CARB could use to further inform . . . regulatory design."[2] At present, several California entities collect facility-level data about CAFs, including, among others, the Regional Water Boards, the California Department of Food and Agriculture, and CARB. Each agency stores the data that it acquires from CAFs in its own database using an agency-specific facility identifier. As a result, CAF data is siloed by agency, which makes it nearly impossible to track CAF compliance with environmental regulations *across* agency domains. I therefore recommend that CARB collaborate with other state agencies to create an interoperable, cross-agency dataset that

[1] ZOE ROBERTSON ET AL., CONFINED ANIMAL FACILITY PERMITTING AND REPORTING UNDER THE PORTER-COLOGNE WATER QUALITY CONTROL ACT: AN ANALYSIS OF REGIONAL BOARD ACTIVITIES (2026).
[2] Question 4.

includes unique facility identifiers. Doing so would enable CARB to more readily ascertain the downstream environmental effects of its regulations.

2. **CARB should rely upon existing Regional Water Board data to determine CAF activity factors.**

CARB has asked whether there are "existing programs or mechanisms for reporting in a way that is efficient and accessible for operators that could serve as suitable models"[3] and in what ways "interagency coordination [could] be leveraged to support industry stakeholders in adopting new practices and implementing mitigation strategies."[4] Because the Water Boards already collect detailed data related to CAF activity factors, CARB should rely upon this data to determine CAF activity factors. In particular, I suggest that CARB borrow two points of data from existing Regional Water Board data: (a) animal population and (b) animal characteristic data. Using preexisting data would reduce work for CARB and spare facilities from additional data production obligations.

Pursuant to the Porter-Cologne Water Quality Control Act, CAFs in every region must submit annual reports documenting farm data and waste production. The Central Valley Regional Water Board, the water board region with the largest number of CAFs in the state, provides the best available model for activity factor reporting.[5] The reports from this region are largely machine-readable, meaning that they generally can be scraped to identify activity factor data.[6] As such, they provide a useful starting point for CARB activity factor data collection.[7]

Currently, the Central Valley Regional Water Board collects the animal population and characteristic data that CARB will use to compute activity factors. Specifically, the Central Valley Water Board categorizes dairying animal into one of six groups in its annual reports: milk cows, dry cows, bred heifers (15-24 months), heifers (7-14 months to breeding), calves (4-6 months), and calves (0-3 months). The annual report forms require CAFs to provide information on the maximum number, average number, and average live weight of each animal group.

This data is significantly more granular than the herd size data contained in CADD's dataset. The CADD dataset divides animals into six categories—milk cows, dry cows, old heifers, young heifers, old calves, and young calves—that are less precise and descriptive than the categories used by the Water Boards. In addition, CADD does not distinguish between

[3] Question 8.
[4] Question 19.
[5] ROBERTSON ET AL., *supra* note 1, at 19.
[6] *Id.* at 23.
[7] The reporting scheme notably differs from Regional Board to Regional Board. *Id* at 19-20. The Central Valley Regional Water Board stands apart from its counterparts in the amount of data it collects: no other Regional Water Board collects detailed animal characteristic or land application data, and some Regional Water Boards do not require CAFs to report how much manure they produce. *Id.* at 2-023. I do not ask for CARB to resolve these discrepancies in region-by-region water reporting. In fact, the State Water Board is currently working standardize dairy reporting statewide with the promulgation of a Draft Dairy Order. STATE OF CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, DRAFT ORDER WQ 2024-00XX (2024).

minimum and maximum populations and does not include facility names in its public-facing dataset.

CADD_Facility Herd Size_v1.0.0 (1)

CADDID	Year	MilkCows	DryCows	OldHeifers	YoungHeifers	OldCalves	YoungCalves	BeefCattle	Reported (1) vs. Estimated (2) vs. No Data (3)	LabeledAsDairy
10001	2012	1000	160	173	127	169	81	0	1	1

Figure 1. CADD Facility Herd Size Dataset.

A. HERD INFORMATION

	Milk Cows	Dry Cows	Bred Heifers (15-24 mo.)	Heifers (7-14 mo. to breeding)	Calves (4-6 mo.)	Calves (0-3 mo.)
Number open confinement	0	0	1,275	1,350	1,310	1,305
Number under roof	7,865	800	0	0	0	0
Maximum number	8,025	815	1,325	1,375	1,340	1,340
Average number	7,865	800	1,275	1,350	1,310	1,305
Avg live weight (lbs)	1,400	1,450	1,000	750		

Predominant milk cow breed: Holstein

Average milk production: 75 *pounds per cow per day*

Figure 2. Representative Central Valley annual report.[8]

However, the data collected by the Water Boards does have some limitations.[9] First, only the Central Valley Regional Water Board collects granular animal population and characteristic data. The four remaining Regional Water Boards with significant CAF populations do not do so.[10] Second, not all annual reports are machine-readable: in the Central Valley, of the 858 annual reports I received for the 2024 calendar year, 588 reports were machine readable.[11] Reports not readily machine-readable will require additional time and effort to process. Finally, because the data in annual reports are not independently corroborated, it is possible that some of the data is not accurate.[12] This is not to say that Regional Water Board data should not be used—merely that CARB should take these shortcomings into account.

3. **CARB should take broader environmental impacts into account as it determines how to regulate methane to avoid creating a regulatory system that improves air quality at the expense of water quality.**

CARB has asked how the agency might "prioritize additional environmental and socioeconomic co-benefits in developing a dairy and livestock sector methane regulation pursuant to SB 1383."[13] CARB should consider potential impacts on other environmental markers, such as water quality, in designing its methane regulatory structure.

[8] Bidart Dairy No. 2, Annual Report (General Order No. R5-2007-0035) 2 (2024).
[9] Information Solicitation to Inform the Implementation of the Dairy and Livestock Provisions of SB 1383 3 (2026) [hereinafter Information Solicitation].
[10] ROBERTSON ET AL., *supra* note 1, at 23.
[11] *Id.* at 24. Note that the Central Valley nonetheless is home to the vast majority of CAFs in the state.
[12] *See id.* at 46.
[13] Question 22.

Concretely, I recommend that CARB learn two lessons from its implantation of LCFS. The program, while an inventive early action measure, has associated negative environmental externalities. First, CARB should avoid devising a regulatory scheme, like LCFS, that incentivizes the intensification of industrial animal agriculture. Second, CARB's efforts to reduce methane should not come at the expense of water quality: in driving the intensification of CAFs, entities known to have adverse effects on water quality, LCFS addressed methane emissions without addressing downstream environmental impacts.

To begin, research suggests that LCFS incentivizes the intensification of industrial animal agriculture. To reach this result, Stanford's Regulation, Evaluation, and Governance Lab (RegLab) collated pre-existing California agency datasets locating CAFs with digesters, employed statistical matching techniques to identify comparable dairies without digesters, and analyzed nine years of human-labeled satellite imagery. Doing so allowed RegLab to compare the growth of CAFs with and without manure digesters.[14] They discovered that, in response to methane reduction incentives (including LCFS), facilities with manure digesters grew by 860 mature dairy cows relative to matched controls over three years.[15]

The expansion of industrial animal agriculture under the LCFS program often—but need not—have negative effects on water quality. As an initial matter, manure digesters can malfunction, resulting in manure spillage. In 2022, one LCFS participant leaked over 375,000 gallons of manure over three weeks into a nearby stream.[16] Moreover, digesters do not eliminate the need for manure management. Manure still must be disposed of, often through land application. When crops are unable to utilize all nutrients present in the waste, excess manure nutrients can runoff into surface waters and leach into groundwater.[17] Releasing nitrogen and phosphorus into water bodies in sufficient quantities can trigger eutrophication (or "algal blooms"). Algal blooms deprive ecosystems of oxygen and, if toxic, can harm humans recreating or drinking from the water bodies.[18]

Nitrogen groundwater contamination is also associated with serious human health consequences. In the Central Valley, where residents often rely on groundwater for drinking, bathing, and other household needs,[19] researchers have observed increased incidences of

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[14] VARUN MAGESH ET AL., DO METHANE MITIGATION INCENTIVES INTENSIFY LIVESTOCK PRODUCTION? EVIDENCE FROM CALIFORNIA, 2016-2025 3(2025).
[15] *Id.* at 1-2.
[16] Jared Strong, *Company Filled Massive Manure Container Despite Signs of a Leak, DNR Says*, IOWA CAPITAL DISPATCH (July 6, 2022), https://iowacapitaldispatch.com/2022/07/06/company-filled-massive-manure-container-despite-signs-of-a-leak-dnr-says/. CARB, LOW CARBON FUEL STANDARD TIER 2 PATHWAY APPLICATION. STAFF SUMMARY. APPLICATION NO. B0725 1 (2025).
[17] ROBERTSON ET AL., *supra* note 1, at 12-16; *see also* Draft Dairy Order 52 (explaining that manure land application is the "overwhelming source of dairy waste discharges to groundwater").
[18] ROBERTSON ET AL., *supra* note 1, at 14.
[19] Draft Dairy Order 29.

methemoglobinemia, a condition wherein hemoglobin—a protein responsible for carrying oxygen in red blood cells—is converted to methemoglobin, a protein unable to bind oxygen.[20] Because infants have a different form of hemoglobin than adults, they are particularly susceptible to low oxygen levels, which can result in coma or death if not treated appropriately.[21] In brief, LCFS drives digester development without obviating the need to manage manure, a key source of water pollution.

In sum, CARB can avoid LCFS' pitfalls by ensuring that the strategies to reduce methane emissions promulgated under SB 1383 do not contribute to increases in manure production or manure mismanagement. For example, CARB should consider adopting regulations that encourage the use of alternative manure management practices, such as dry manure handling. The EPA suggests that the methane emissions reductions associated with dry manure management rival the those achieved with anaerobic digesters.[22] Because the application of wet manure to fields drives nitrogen groundwater leaching,[23] collecting and drying manure not only reduces methane emissions from lagoon storage but also reduces groundwater nitrogen leaching, yielding water quality co-benefits.[24]

Conclusion

Climate effects and broader environmental quality are intimately connected. CARB should seek out opportunities to collaborate with other state environmental agencies, particularly the State Water Board and Regional Water Boards, to coordinate data collection. Doing so would increase efficiency and decrease burdens on CAFs. Moreover, CARB should carefully consider—and minimize—the impacts of its climate regulations regulation on air and water quality.

Respectfully submitted,

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[20] *See, e.g.*, Arianna Q. Tariqi & Colleen C. Naughton, *Water, Health, and Environmental Justice in California: Geospatial Analysis of Nitrate Contamination and Thyroid Cancer*, 38 ENV'T ENG'G SCI. 377, 377 (2021).
[21] Draft Dairy Order 29.
[22] *Practices to Reduce Methane Emissions from Livestock Manure Management*, EPA, https://www.epa.gov/agstar/practices-reduce-methane-emissions-livestock-manure-management#one.
[23] Draft Dairy Order 23.
[24] CALCAN, REASSESSING THE ROLE OF ALTERNATIVE MANURE MANAGEMENT IN CALIFORNIA'S METHANE REDUCTION STRATEGY 21 (2026).