STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

DRAFT ORDER WQ 2024-00xx

IN THE MATTER OF REVIEW OF
WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO R5-2013-0122
FOR MILK COW DAIRIES IN THE CENTRAL VALLEY REGION
ISSUED BY THE CALIFORNIA REGIONAL WATER QUALITY BOARD,
CENTRAL VALLEY REGION
SWRCB/OCC FILES A-2283(b)

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BY THE BOARD:

In this order, the State Water Resources Control Board (State Water Board or Board)[1] reviews Order R5-2013-0122, Reissued Waste Discharge Requirements General Order for Existing Milk Cow Dairies (Dairy General WDRs), issued by the Central Valley Regional Water Quality Control Board (Central Valley Water Board) on October 3, 2013. The Dairy General WDRs authorize discharges of waste from existing milk cow dairies to waters of the state within the Central Valley region and set forth numerous requirements for monitoring, reporting, implementation, and evaluation of waste management practices.

For reasons discussed below, the State Water Board concludes that the Dairy General WDRs should be remanded to the Central Valley Water Board for reconsideration and revisions, as directed herein and as otherwise appropriate. It is important to recognize at the outset of our discussion that, not only does this order address issues raised by petitioners in their challenge to the Dairy General WDRs at Section II, it also establishes a new regulatory framework for nitrogen discharges from dairies for the next iteration of the Central Valley Water Board's general waste discharge requirements for dairy waste discharges to groundwater (hereafter referred to as the revised dairy general waste discharge requirements) at Section III. It should be emphasized that we intend that the new regulatory framework for nitrogen discharges apply not only to existing dairies but to all dairies subject to the Central Valley Water Board's authority, including dairies that have commenced operation or consolidated or expanded since the Central Valley Water Board's adoption of the Dairy General WDRs, and those that may commence operations in the future. We also make certain components of the regulatory framework precedential for dairies regulated by other regional water quality control boards, depending on their waste management practices, as specified in Section III.G.

[1] Board Members D'Adamo and Firestone are recused from involvement in this proceeding.

We are establishing the new regulatory framework for nitrogen discharges primarily because, since the issuance of the Dairy General WDRs, there has been a fundamental shift in our understanding of the relative nitrogen loading to groundwater from the different sources of dairy waste discharges. It is now generally acknowledged that the practice of applying manure, process wastewater, and fertilizer to dairy croplands, commonly referred to as land application, is responsible for the vast majority of dairies' nitrogen impacts to groundwater quality—a consequential departure from long-held assumptions that the greatest nitrogen loading to groundwater is from seepage of dairy waste stored in earthen waste retention ponds. At the same time, as discussed in Section I.B, and due in part to data collected in response to the Dairy General WDRs, we are learning how the dairy industry's waste management practices are responsible for a significant portion of the nitrate contamination of groundwater in the Central Valley. The extensive over-application of dairy waste to land—and the resulting impacts to the groundwater and the communities that rely on the groundwater—has forced us to take a hard look at what we now recognize has been an inadequate approach for regulating dairy waste discharges. We conclude that, going forward, we must regulate dairies' land application practices primarily as a method of disposing of dairy waste that has secondary benefits of fertilizing crops, rather than a method of crop fertilization that may have incidental impacts to groundwater. As a result, a major part of the new regulatory framework focuses on developing new requirements that will ultimately restrict dairies' land application of their waste to levels that correlate directly to ceasing causing or contributing to concentrations of nitrates in groundwater that exceed safe drinking water levels.

We acknowledge that government pricing mechanisms for dairy commodities prevent dairies from simply raising their prices to pay for necessary investments in dairy waste management improvements. We further recognize that we need to develop a more precise understanding of the fate and transport of dairy waste discharges to groundwater, and that the dairy industry and its partners need to continue to develop technological and market improvements to facilitate the distribution and use of dairy waste for off-site use as a fertilizer, soil amendment, and other purposes on a significant

scale to adequately address the issue. Some of this work has already commenced under the leadership of the California Department of Food and Agriculture.

However, as we discuss in Sections I.B and I.H, we now know that dairies are a major contributor to the widespread nitrate groundwater contamination and many rural households in the Central Valley are plagued with nitrate-contaminated drinking water, resulting in severe health, economic, and quality-of-life impacts. We therefore believe that shifting the predominant paradigm is critically important. Instead of continuing to allow the dairy industry to dispose of its waste by over-applying it to dairy croplands, the dairy industry needs to transition to modern and sustainable waste management practices. Dairy waste should be recognized as a valuable and beneficial byproduct that has multiple potential uses, including application as a fertilizer to dairy croplands and other agricultural lands at rates that are protective of groundwater quality and the communities that rely on that groundwater. This transition will require substantial effort and time. With our support and oversight, the Central Valley Water Board's revised dairy general waste discharge requirements will, consistent with our new regulatory framework, take significant steps toward ultimately requiring dairies to make fundamental operational changes to cease causing or contributing to concentrations of nitrate in groundwater that exceed safe drinking water levels. This is also the reason that, as specified in Section III.G, a substantial portion of the regulatory framework is precedential statewide and will therefore apply to dairies in other regions—to take strides towards ensuring that everyone in the state reliant on groundwater for drinking water has access to safe drinking water.

In the sections that follow, we begin by setting forth the procedural and chronological background of the Dairy General WDRs at Section I, starting with brief descriptions of the dairy industry and its water quality impacts and the history of the Dairy General WDRs, including the court case to which the Dairy General WDRs in part responds, and the petition for our review of the Dairy General WDRs that was the catalyst for this order. From there we summarize other developments, including intervening actions by the State Water Board and the Central Valley Water Board that have some bearing on the matter before us. We then turn to the significant issues raised in the petition at Section II and, finally, describe the new regulatory framework to

be used by the Central Valley Water Board in its development of revised dairy general waste discharge requirements on remand and specify the items that have statewide precedential effect at Section III.

I. FACTUAL AND PROCEDURAL BACKGROUND

A. The Dairy Industry

The dairy industry is an important part of California's agricultural economy. It is estimated that 89 percent of the state's cows and 81 percent of the state's dairy farms are located in the Central Valley region. California dairy farms are a significant producer of the nation's milk supply. In 2012, California dairy farms produced about 41.7 million pounds of milk, approximately one-fifth of the nation's milk supply that year. California's dairy industry is a vital component of the economy in the Central Valley. Dairies generate jobs in a variety of sectors, from employees on the farm, providers of farm and veterinary services, other farmers who grow feed, processors of milk and dairy products, transporters of feed, milk and dairy products, and many others.[2]

B. Dairy Waste

Dairy cows in the Central Valley excrete approximately one pound of nitrogen and 1.29 pounds of inorganic salts per cow per day. Thus, a 1,000-cow dairy generates approximately 365,000 pounds of nitrogen and 470,000 pounds of inorganic salts per year.[3] Dairy waste contains high concentrations of salts and nutrients (including nitrogen, ammonia, phosphorus, and potassium compounds). Dairy facilities require regular storage for waste generated onsite. Waste generated at dairies is stored in solid form in piles or in liquid form in waste retention ponds. Dairies eventually dispose of the waste that they generate, typically by applying it to their cropland to produce feedstock for their herd.

The water quality impacts from dairies' waste management practices are now much clearer. A 2017 study by University of California, Davis (hereinafter referred to as

[2] Dairy General WDRs, Information Sheet, p. IS-19.

[3] *Id*., Information Sheet, p. IS-25.

the UCD 2017 Study) concluded that agricultural lands, including dairy croplands, are the largest contributor of nitrate to groundwater in the Central Valley.[4] Synthetic fertilizer is the largest source of nitrates from agricultural lands, accounting for nearly sixty percent of all nitrogen fluxes to agricultural lands. The second largest source is dairy waste at nearly twenty percent.[5] Dairy manure now accounts for fully one-third of the total nitrogen applied to agricultural lands in the San Joaquin Valley and the Tulare Lake Basin.[6]

The UCD 2017 Study also indicates that the highest potential loading rates for nitrogen to groundwater are associated with the crops most intensively fertilized, and particularly with those crops typically receiving dairy manure (i.e., corn, sorghum, sudangrass, cotton, miscellaneous other field crops, and grain and hay).[7] The estimated average annual application rate of manure nitrogen applied on dairy cropland in the Central Valley is 890 pounds per acre.[8] By contrast, the California Department of Food and Agriculture's Fertilizer Research and Education Program recommends application rates between 180 and 216 pounds of nitrogen per acre to produce sileage corn.[9] Therefore, the estimated average annual land application rate of manure nitrogen exceeds the currently recommended application rates for one of the main crops being cultivated by land application of dairy waste by four to one (4:1) or more. Nitrate loading

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[4] Thomas Harter et al., *Nitrogen Fertilizer Loading to Groundwater in the Central Valley*, Final Report to the Fertilizer Research Education Program, Projects 11-0301 and 15-0454, California Department of Food and Agriculture and University of California, Davis (Aug. 2017) (hereinafter cited as *Harter, Final Report*), p. 9 at <http://ucanr.edu/sites/groundwaternitrate/files/268749.pdf> (as of July 25 , 2024).

[5] *Id*., p. 166.

[6] *Id*., p. 109.

[7] *Id*., p. 165.

[8] *Id.*, p. 112.

[9] California Crop Fertilization Guidelines, available at <http://www.cdfa.ca.gov/is/ffldrs/frep/FertilizationGuidelines/Corn.html#:~:text=Application%20Rate,-When%20losses%20are&text=Therefore%2C%20for%20a%20grain%20yield,N%20and%20soil%20derived%20N> (as of May 6, 2024).

to groundwater associated with dairy forage crops accounts for a sizable fraction of the total loading of nitrate to groundwater in the Central Valley.[10]

While there is no dispute that the dairy industry is vital to our state, dairies must be responsible for the waste that they generate. The total estimated nitrogen excretion amount from dairy cattle in the Central Valley has risen exponentially from 1945 to 2005. Higher annual nitrogen excretion is driven by the growth in the Central Valley dairy herd size and the growth in per-cow milk production. Total nitrogen excretion from the Central Valley dairy herd has increased by about 1,200 percent from less than 40,700 tons of nitrogen per year in the 1940s to 520,000 tons nitrogen per year in 2005.[11] Dairies' continued waste disposal to cropland through land application has now been demonstrated to adversely affect the beneficial uses of groundwater and cause severe social and economic impacts to communities in the Central Valley region who are reliant on groundwater as a drinking water source. This cannot continue unabated.

C. History of the Dairy General WDRs

Beginning in 1982, the Central Valley Water Board waived the requirement for most dairy operators in the Central Valley region to file a report of waste discharge or obtain waste discharge requirements.[12] By statutory enactment, all waivers existing as of 2000 were automatically terminated in 2003 if not rescinded before then.[13] In 2002, the Central Valley Water Board declared by resolution that it would issue a conditional waiver, waste discharge requirements, or National Pollutant Discharge Elimination System (NPDES) permits to the dairies in the Central Valley—although it was unable to do so before the deadline specified in the resolution.

In 2007, the Central Valley Water Board issued Waste Discharge Requirements General Order R5-2007-0035 (2007 Dairy General WDRs) for existing milk cow dairies,

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[10] *Harter, Final Report, supra*, p. 134 ("The high [ratio of nitrogen applied to nitrogen removed] for corn, sorghum, and sudan … is particularly concerning due to the large harvest rate, which means that the absolute amount of potential groundwater nitrogen loading may be particularly high in these dairy forage crops.").

[11] *Harter, Final Report, supra*, p. 108.

[12] Dairy General WDRs, Information Sheet, p. IS-2; Wat. Code, §§ 13260, subd. (a).

[13] Wat. Code, § 13269, subd. (b)(1).

which were those that were operating as of 2005 and that had filed a report of waste discharge in response to the Central Valley Water Board's request in 2005.[14]

The Asociación de Gente Unida por el Agua and the Environmental Law Foundation filed a petition asking us to review the 2007 Dairy General WDRs. After we dismissed the petition, the petitioners filed a petition for writ of mandate with the Superior Court of Sacramento County, arguing that the 2007 Dairy General WDRs were not consistent with the requirements of State Water Board Resolution No. 68-16, the Statement of Policy with Respect to Maintaining High Quality Waters of the State (Antidegradation Policy).[15]

Ultimately, the Court of Appeal in *Asociacion de Gente Unida por el Agua v. Central Valley Regional Water Quality Control Bd.* (2012) 210 Cal.App.4th 1255 (*AGUA*) rejected the 2007 Dairy General WDRs' antidegradation analysis on several grounds, one of which remains relevant to the Dairy General WDRs, as discussed below. The Court of Appeal found that the 2007 Dairy General WDRs allowed dischargers to continue historic practices that had already caused groundwater degradation. While the 2007 Dairy General WDRs purported to prohibit the further degradation of groundwaters consistent with the Antidegradation Policy, the court concluded that the 2007 General Dairy WDRs' prohibition was illusory because it lacked an effective method to detect further degradation, let alone prevent it.[16] The Central Valley Water Board issued the Dairy General WDRs to replace the 2007 Dairy General WDRs in response to the *AGUA* decision.

D. The Dairy General WDRs

The Dairy General WDRs apply to owners and operators of existing milk cow dairies of all herd sizes within the Central Valley region.[17] It defines "existing milk cow

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[14] Dairy General WDRs, Information Sheet, p. IS-2.

[15] State Water Board Resolution No. 68-16 is at <http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/1968/rs68_016.pdf> (as of June 13, 2024).

[16] *Asociacion de Gente Unida por el Agua v. Central Valley Regional Water Quality Control Bd.* (2012) 210 Cal.App.4th 1255, 1274-78 (*AGUA*).

[17] Dairy General WDRs, p. 1, Finding ¶ 1.

dairies" as all dairies that were operating as of October 17, 2005, filed a complete report of waste discharge (ROWD) in response to the Central Valley Water Board's letter in 2005 requesting a ROWD, and had not expanded since October 17, 2005.[18] The permissible herd size of the existing milk cow dairies is the maximum number of mature dairy cows identified in the ROWD, plus an additional 15 percent to account for the normal herd size variation expected to occur at the dairies.[19] The Dairy General WDRs regulate approximately 1,300 dairy operations.[20] The Dairy General WDRs categorize four primary sources of dairy waste discharges in relation to the waste's location on dairies or how it is managed: production areas, such as milking parlors, corrals, and feed storage areas;[21] land application[22] (e.g., applying manure, process wastewater, and fertilizers to cropland); new or expanded waste retention ponds; and existing waste retention ponds[23] (hereinafter referred to as the four primary sources of dairy waste discharges).[24]

Pertinent to the issues addressed in this order, the Dairy General WDRs issued in 2013 contains the following receiving groundwater limitation: "Discharge of waste at existing milk cow dairies shall not cause the underlying groundwater to exceed water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution

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[18] *Id*., p. 2, Finding ¶ 7.

[19] *Id*., p. 2, Finding ¶¶ 7-9. Herd sizes fluctuate as dairies operators manage the herd by continually producing calves to maintain a consistent production of milk. The producing calves are replaced over time and excess cows are marketed for beef production or for replacement elsewhere. (*Id*., p. 2, Finding ¶ 8.) An increase in the number of mature cows of more than 15 percent is considered an "expanded" dairy not eligible for coverage under the Dairy General WDRs. (*Id*., Information Sheet, p. IS-4.)

[20] *Id*., p. 3, Finding ¶ 12.

[21] Production areas include "barns, milk houses, corrals, milk parlors, manure and feed storage areas, process water conveyances and any other area of the dairy facility that is not the land application area or the ponds." (Dairy General WDRs, p. 19, § D.)

[22] The Dairy General WDRs describes land application as the "application of animal waste and other materials containing nutrients to any cropland under control of the Discharger …." (*Id*., p. 21, § E.5.)

[23] The Dairy General WDRs define "existing ponds" as those wastewater ponds in operation as of May 3, 2007, when the Regional Water Board issued the dairy general waste discharge requirements in 2007. (*Id*., p. 16, fn. 5.)

[24] *Id*., Information Sheet, p. IS-24.

or nuisance"[25] (hereafter, Groundwater Limitation). We are most concerned here with the water quality objective to support the municipal and domestic supply (MUN) beneficial use, the maximum contaminant level (MCL) of 10 milligrams per liter (mg/L) for nitrates.[26] We support the Groundwater Limitation as drafted, except that it omits a requirement that the dairy waste discharges also not "contribute" to an exceedance of water quality objectives, which is an important restriction where, as here, there may be multiple sources of pollution. However, as we will explain in Section III, the bigger problem is that the Dairy General WDRs do not require dairies to restrict their land application of dairy waste to levels that are directly related to the 10 mg/L MCL for nitrates.

The Groundwater Limitation is immediately effective, except where a dairy is in compliance with the Dairy General WDRs' time schedule.[27] Briefly, the time schedule consists of a two-phase, iterative process, totaling a maximum of 16 years. The time schedule applies to any deficient management practice employed for each of the four primary sources of dairy waste discharges that impacts groundwater (production areas, land application, existing waste retention ponds, and new or expanded waste retention ponds). As a result, each dairy subject to the Dairy General WDRs must implement management practices in accordance with the time schedule and, ultimately, is required to comply with the Groundwater Limitation no later than the end of the 16-year time schedule.[28]

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[25] *Id*., p. 23, § F.1. The Dairy General WDRs do not authorize point source discharges into surface waters, including waters of the United States. Although the Dairy General WDRs contain various prohibitions concerning discharges to surface waters, our review here is limited to issues concerning discharges to groundwater.

[26] See *id*., Information Sheet, p. IS-8 ("Water quality objectives that apply to groundwater include, but are not limited to, (1) numeric objectives, including the bacteria objective and the chemical constituent's objective (includes state MCLs promulgated in Cal. Code Regs., tit. 22, §§ 64431 and 64444 and are applicable through the Basin Plans to municipal and domestic supply"); see Cal. Code Regs., tit. 22, § 64431, Table 64431A (providing an MCL of 10 mg/L for nitrate (as nitrogen)).

[27] Dairy General WDRs, p. 23, fn. 6, § F.1, pp. 28-29, § M.

[28] The 16-year timeframe for dairies to implement management practices protective of groundwater quality is the time within which dairy discharges must cease causing an exceedance of the Groundwater Limitation. It is not the deadline within which water quality objectives must be achieved in the groundwater itself.

Consistent with the State Water Board Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program[29] (Nonpoint Source Policy), the Dairy General WDRs provide the option for dairies to join a third-party intermediary that has agreed to take on certain responsibilities for its members, including developing and implementing a representative monitoring program in lieu of each dairy implementing its own individual monitoring program to evaluate compliance with the Groundwater Limitation.[30] The Central Valley Water Board approved a representative monitoring program workplan submitted by the Central Valley Dairy Representative Monitoring Program (CVDRMP) in 2012.[31] Because more than ninety-eight percent of dairies subject to the Dairy General WDRs participate in the CVDRMP's representative monitoring program,[32] we focus much of our discussion in this order on the CVDRMP and its representative monitoring report. For dairies participating in a representative monitoring program, the first phase of the time schedule assigns six years to the representative monitoring program to, among other requirements, conduct studies to identify any deficient management practices and identify upgrades or alternative practices for dairies to implement to comply with water quality requirements.[33] At the end of the first phase (which concluded in April 2019), the Dairy General WDRs require the CVDRMP to submit a summary representative monitoring report which identifies protective management practices that member dairies must implement during the time schedule's second, ten-year phase to meet the Groundwater Limitation.[34] In the report, the CVDRMP is required to identify time schedules for the implementation of the identified management practices that are as short as practicable, but in no case longer than ten years from the date the Executive Officer approves the

[29] The Nonpoint Source Policy is at <http://www.waterboards.ca.gov/water_issues/programs/nps/docs/plans_policies/nps_iepolicy.pdf> (as of June 13, 2024).
[30] Dairy General WDRs, p. 29, § M.
[31] *Id*., Information Sheet, p. IS-32.
[32] *Id*., Information Sheet, p. IS-30.
[33] *Id*., p. 29, § M.
[34] *Ibid*.

report.[35] The CVDRMP's proposed time schedules for final compliance must be supported by "appropriate technical and economic justification."[36]

The Dairy General WDRs also contain an opportunity for extensions to the time schedule deadlines that is available only for dairies participating in the representative monitoring program. The provision for extensions allows the Central Valley Water Board to modify any deadline contained within the time schedule, including the deadline to comply with the Groundwater Limitation, "based on evidence that meeting the compliance date is technically or economically infeasible," or that compliance by an earlier date is feasible.[37]

The Dairy General WDRs require that dairies use the following management practices to control the four primary sources of dairy waste discharges: production areas, existing waste retention ponds, new or expanded waste retention ponds, and land application areas.

For production areas, general grading and drainage and other practices to limit infiltration to groundwater must be implemented. Generally, such requirements include the design and maintenance of production areas in a manner that "limits infiltration so that wastes, nutrients, and contaminants generated are directed to the manure retention pond(s)."[38]

For existing waste retention ponds, the Dairy General WDRs require compliance with design standards specified under California Code of Regulations, title 27, applicable to confined animal facilities (i.e., lined or consisting of soils comprised of at least ten percent clay and not more than ten percent gravel or equivalent impermeability)[39] (generally referred to as title 27 minimum design standards). The Central Valley Water Board acknowledges in the Dairy General WDRs that the title 27 minimum design standards are not protective of groundwater under all conditions. The

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[35] *Ibid*.
[36] *Ibid*.
[37] Dairy General WDRs, p. 29, § M.
[38] *Id*., p, 19, § D.1-5; *id*., Information Sheet, p. IS-15.
[39] *Id*., p. 16, § C.4; *id*., Information Sheet, pp. IS-8 to IS-10; see Cal. Code Regs., title 27, § 22562, subd. (d).

Central Valley Water Board concludes, however, that the immediate replacement or retrofitting of existing waste retention ponds with single or double liners is not a practicable economic option for many dairies.[40] As a result, to control discharges from existing waste retention ponds, the Dairy General WDRs explicitly rely on the 16-year, iterative time schedule for applicable protective management practices to be identified by the CVDRMP and subsequently implemented by dairies, if determined to be necessary.[41] Thus, while the iterative, 16-year time schedule generally applies to each of the four primary sources of dairy waste discharges, the Dairy General WDRs expressly rely on the time schedule to evaluate and identify management practices for existing waste retention ponds already considered to cause unacceptable groundwater impacts.[42]

The requirements for new or expanded waste retention ponds are more stringent than the title 27 minimum design standards: they must be constructed in accordance with a "tier 1" or "tier 2" design approach. A tier 1 pond is constructed with a double liner consisting of two liners of 60 mil (0.06 inches) thickness high density polyethylene or material of equivalent durability with a leachate collection and removal system (constructed in accordance with California Code of Regulations, title 27, section 20340) between the two liners. A tier 2 pond consists of a single liner (sited and constructed in accordance with United States Department of Agriculture Natural Resources Conservation Service [NRCS] Conservation Practice Standard 313 or equivalent) coupled with groundwater monitoring and technical reporting showing that the design is protective of groundwater quality.[43]

Land application of manure, process wastewater, and fertilizers to crops must be in accordance with a nutrient management plan (NMP) certified by a specialist.[44] Attachment C to the Dairy General WDRs consists of the nutrient management specifications and planning requirements for manure and wastewater applied to land

[40] Dairy General WDRs, p. 9, Finding ¶ 28.c; *id*., Information Sheet, p. IS-18.
[41] *Id*., p. 9, Finding ¶ 28.c; *id*., Information Sheet, pp. IS-18 to IS-19.
[42] *Id*., p. 9, Finding ¶ 28.c; *id*., Information Sheet, p. IS-18.
[43] *Id*., p. 17, § C.5; *id*., Information Sheet, pp. IS-17 to IS-18.
[44] *Id*., Attach. C, NMP.

application areas, a key feature of which is the requirement that nutrients be applied to crops at what the Dairy General WDRs refer to as a "reasonable agronomic rate." The agronomic rate is expressed as an "application and removal" regulatory endpoint of 1.4.[45] More specifically, dairy waste must be applied to fields in amounts that ensure that the total nitrogen applied to any field (A, for application) does not exceed 1.4 times the nitrogen that will be removed from the field (R, for removal) in the harvested portion of the crop (often referred to as the A/R ratio), with some exceptions.[46] Any nutrients

[45] *Id*., p. 20, § E.2, (requiring land application of waste be conducted with the technical standards for nutrient management contained in Attach. C, NMP); *id*., Attach. C, NMP, p. C-11, § V.B.2.

[46] The Dairy General WDRs were issued before we adopted Order WQ 2018-0002 (*Eastern San Joaquin River Watershed*) (see fn. 88, *post*, for a general description of that order) in which we endorsed the definitions for nitrogen applied and nitrogen removed developed by the Agricultural Expert Panel, so the Dairy General WDRs use somewhat different definitions. In contrast to Order WQ 2018-0002, the Dairy General WDRs includes in its computation of nitrogen application the nitrogen remaining in the soil from the previous season and atmospheric nitrogen deposition. With respect to the nitrogen removed, the Dairy General WDRs includes the harvested portion of the crop but not the nitrogen sequestered in the permanent wood of perennial crops. (Compare Dairy General WDRs, p. 21, § E.5. *and id.*, Attach. C, NMP, § V.B.1.a, & V.B.2.a, with Order WQ 2018-0002, p. 38.) In evaluating the different definitions, the CVDRMP's SRMR concludes that atmospheric nitrogen deposition is relatively negligible, and nitrogen deposited in soils is difficult to quantify and not necessary in the accounting scheme. (CVDRMP Summary Representative Monitoring Report, pp. 35-36, § 2.2.1.) As a result, the CVDRMP recommends that the Agricultural Expert Panel's definitions be adopted for use by dairies. (*Id*., p. 35, § 2.2.1.)

The regulatory framework established by this order does not utilize the A/R ratio, but it acknowledges (*post*, fn. 193, and corresponding text) that the Regional Water Board may require its use as an additional method to inform or manage nitrogen inputs and outputs. Additionally, this order also recognizes (*post*, fn. 194 and corresponding text) the benefits of reporting the "A-R difference" value as providing useful information about how much nitrogen is left in the soil to potentially reach groundwater and directs it to be used in the irrigation and nitrogen reporting plan included in the revised dairy general waste discharge requirements. The revised dairy general waste discharge requirements should use the definitions for nitrogen applied and nitrogen removed that we endorsed in WQ Order 2018-0002, in the absence of further direction from us following additional scientific review. (See State Water Board Order WQ 2023-0081 (*Central Coast Irrigated Agriculture*).)

generated in excess of the targeted amount needed for crop production generally would be subject to offsite removal, treatment, or storage.[47]

For each of these sources of dairy waste discharges, except existing waste retention ponds, the Central Valley Water Board concluded that the above-noted management practices constitute "best practical treatment or control" (BPTC) under the Antidegradation Policy. For existing waste retention ponds, the Central Valley Water Board concluded that BPTC is the iterative, two-phase time schedule (i.e., requiring waste retention ponds found not to be protective of groundwater to be replaced or upgraded within the 16-year compliance deadline).[48]

The Dairy General WDRs also require each dairy to submit all reports as specified in the accompanying Monitoring and Reporting Program.[49] Dairies are required to monitor wastewater, soil, crops, manure, surface water discharges, and storm water discharges. Dairies are also required to monitor surface water and groundwater (e.g., test domestic and agricultural wells) and submit reports in accordance with a monitoring and reporting program, or alternatively, participate in a "representative monitoring program."[50] Each dairy must prepare and implement a waste management plan for the dairy production area and prepare and implement a nutrient management plan for all areas used for land applying dairy waste (we discuss land

[47] Dairy General WDRs, Attach. C, NMP, p. C-7, § IV (providing, "[e]xcess manure nutrients generated by the Discharger must be handled by export to a good steward of the manure, or the development of alternative uses"), p. C-11, § V.B.2.b (providing that if "application of total nitrogen to a land application area exceeds 1.65 times total nitrogen removed from the land application area through the harvest and removal of the previous crop, the Discharger shall either revise the NMP to immediately prevent such exceedance or submit a report demonstrating that the application rates have not and will not pollute surface or ground water.")

[48] *Id*., pp. 8-9, Finding ¶¶ 28(a)-(d), pp. 15-22, §§ C - E; *id*., Information Sheet, pp. IS-14 to IS-19.

[49] *Id*., p. 27, § J.2.b.

[50] *Id*., p. 27, § J.2 (requiring reports as specified in the attached Monitoring and Reporting Program). Dairies participating in the representative monitoring program will have their respective information reported by the program pursuant to an approved monitoring plan. (*Id*., MRP, Attach A, p. MRP-17.)

application, a management practice, below).[51] Each dairy must retain records for the production area and the land application areas.[52]

E. The Petition and the State Water Board's Order to Review the Dairy General WDRs

On November 4, 2013, in response to the Central Valley Water Board's adoption of the Dairy General WDRs, Asociación de Gente Unida por el Agua and Environmental Law Foundation (collectively, petitioners) timely filed a petition for review with the State Water Board. On December 15, 2015, the petitioners requested that we place the petition in abeyance. On December 14, 2017, petitioners requested that we remove the petition from abeyance and activate it. On December 21, 2017, we activated the petition and solicited responses to the petition from the Central Valley Water Board and other interested persons. Thereafter, responses to the petition were filed by the Central Valley Water Board and interested parties Dairy Cares, California Farm Bureau Federation, and James G. Sweeney and Ameila M. Sweeney, and the Central Valley Water Board filed the administrative record.[53]

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[51] *Id*., p. 26, §§ J.1.b (referring to Attachment B, the Waste Management Plan for Production Areas), J.1.c (referring to Attachment C, the Nutrient Management Plan).

[52] *Id*., p. 28, § K.

[53] The administrative record for this proceeding consists of the record prepared by the Central Valley Water Board on the adoption of the Dairy General WDRs and certain additional documents that post-date the adoption of the Dairy General WDRs that we have determined would aid our review. The additional record documents are identified on the petition page at <http://www.waterboards.ca.gov/public_notices/petitions/water_quality/r5-2013-0122.html> (as of May 6, 2024) and the additional documents are either posted on the petition page or direction is provided as to how they may be obtained. We provided notice that the aforementioned documents would be made a part of the administrative record when we circulated a draft of this order for public comment. The additional record documents include the following documents shared during noticed ex parte communications: (1) State Water Board, Staff handout, Background Information, Nitrate Discharges to Groundwater (Sept. 1, 2021); (2) PowerPoint Presentation, J.P. Cativiela, Administrator, and Theresa Dunham, Kahn, Soares & Conway, on behalf of Central Valley Dairy Representative Monitoring Program, Summary Representative Monitoring Report (Sept. 27, 2021); (3) State Water Board Resolution No. 2019-0057 (excerpted

On September 4, 2018, we adopted Order WQ 2018-0021 to review the Dairy General WDRs on our own motion to allow sufficient time to address the merits of certain issues in the petition.[54] To the extent petitioners raised issues that are not discussed in this order, either in whole or in part, such issues are dismissed as not raising substantial issues appropriate for review in this order.[55]

F. The Central Valley Dairy Representative Monitoring Program and its 2019 Summary Representative Monitoring Report

In the accordance with the requirements of the Dairy General WDRs, the CVDRMP developed a workplan for its proposed representative groundwater monitoring

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recital); (4) Central Valley Water Board, New Nitrate Control Program, Coming Together to Resolve the Safe Drinking Water Challenge; (5) PowerPoint Presentation, Management Zones, Nitrate Control Programs, and Dairies (Oct. 11, 2021); (6) State Water Board, Staff handout, SWRCB Staff's Preliminary Straw Proposal - For Distribution to Stakeholders Waste Retention Ponds (Oct. 2021); (7) Map of Giolotti Dairy, Handout (Jan. 7, 2022); (8) PowerPoint Presentation, Data Needs (May 9, 2022); and (9) PowerPoint Presentation, J.P. Cativiela and Ryan Flaherty, Co-chairs, CDFA Manure Recycling & Innovative Products Task Force (April 11, 2022); and (10) California Department of Public Health, Nitrate Fact Sheet (May 2014).

The additional record documents also include those that are cited to in this order (which were not shared during the ex parte discussions): (1) Central Valley Dairy Representative Monitoring Program, Summary Representative Monitoring Report (April 1, 2019); (2) Thomas Harter et al., Nitrogen Fertilizer Loading to Groundwater in the Central Valley, Final Report to the Fertilizer Research Education Program, Projects 11-0301 and 15-0454, California Department of Food and Agriculture and University of California, Davis (Aug. 2017); (3) Pacific Health Institute, The Human Costs of Nitrate-contaminated Drinking Water in the San Joaquin Valley (March 2011); (4) California Department of Food and Agriculture, California Crop Fertilization Guidelines (5) Environmental Justice Coalition for Water, Thirsty for Justice: A People's Blueprint for California Water (2005); (6) Carolina Balazs, et. al, Social Disparities in Nitrate Contaminated Drinking Water in California's San Joaquin Valley, Environmental Health Perspectives (June 2011); (7) Central Valley Salinity Alternatives for Long-Term Sustainability, Fact sheet, Nitrate Control Program; (8) Natural Resources Conservation Service, Conservation Practices Standard, Code 313; (9) Natural Resources Conservation Service, Conservation Practices Standard, Code 520; and (10) National Engineering Handbook, Part 651, chapter 10, appendix 10D.

[54] See Cal. Code Regs., tit. 23, § 2050.5, subd. (c).

[55] *Id*., § 2052, subd. (a)(1); *People ex rel. Cal. Regional Water Quality Control Bd. v. Barry* (1987) 194 Cal.App.3d 158, 175-77; *Johnson v. State Water Resources Control Board* (2004) 123 Cal.App.4th 1107, 1114.

program to serve as the alternative to installation of individual monitoring wells at each dairy.[56] The CVDRMP's workplan proposed to collect data from monitoring wells at 42 dairies spanning from Tehama County in the north to Kern County in the south, with 440 wells at 274 sites. It also proposed to evaluate dairy operations and management practices for specific waste management practices to facilitate the evaluation of cause-and-effect relationship to groundwater impacts and to establish current groundwater conditions.[57]

The CVDRMP also satisfied the requirements in the Dairy General WDRs of submitting annual reports each year for its members. The annual reports describe the monitoring activities that were conducted during the preceding year, evaluate whether the monitored dairies are implementing management practices that are protective of groundwater quality, and evaluate whether the CVDRMP is on track to timely complete and submit a summary representative monitoring report (due April 1, 2019).[58]

The CVDRMP timely submitted its Summary Representative Monitoring Report (SRMR) on April 1, 2019. The report's findings and conclusions are informed not only by the annual reporting on the CVDRMP's groundwater monitoring[59] and dairies' management practices as required by the Dairy General WDRs, but also on a collection of detailed technical reports provided to the CVDRMP since its inception in 2010, academic literature review, consultation with academic and professional experts in relevant fields (e.g., hydrology, agronomy, engineering), and special studies and other

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[56] Dairy General WDRs, MRP, Attach. A, p. MRP-22, § III.
[57] *Id*., Information Sheet, p. IS-32.
[58] *Id*., p. 29, § M; *id*., Information Sheet, pp. IS-32 to IS-33.
[59] The CVDRMP started groundwater monitoring activities in January 2012 on 18 dairies in Stanislaus and Merced Counties. In January 2013, monitoring activities were expanded to a total of 42 dairies, including facilities as far north as Tehama County and as far south as Kern County. The monitoring well network on these dairies comprises of [*sic*] 443 dedicated monitoring wells that are distributed over 250 well sites. At most of these well sites, individual wells are arranged in nested facilities (i.e., two or more wells installed adjacent to each other) to facilitate groundwater sample retrieval from the uppermost zone of first-encountered groundwater under variable groundwater level conditions. Monitoring wells were located and designed such that they intercept groundwater that originates from individual management units (i.e., downgradient of lagoons, corrals, and crop fields). (CVDRMP Summary Representative Monitoring Report, p. 6, § 1.4.1 (internal footnote omitted).)

work related to waste retention ponds not required by the General Dairy WDRs. As detailed below, we find that this body of work has led to an improved understanding of dairies' waste management practices and the way those practices impact groundwater quality.[60]

The CVDRMP's SRMR concludes that impacts to groundwater from dairies were observed throughout the representative monitoring network.[61] These groundwater impacts appear throughout the region, although the data show that dairy impacts to groundwater vary depending on several factors, including soil type, management practices, and depth to groundwater.[62]

The CVDRMP's SRMR also details the CVDRMP's findings and recommendations for on-farm management practices and provides cost estimates for its recommended and non-recommended practices for each of the four primary sources of dairy waste discharges. However, although the Dairy General WDRs require the SRMR to include proposed solutions that *will* result in compliance with the Groundwater Limitation within the final compliance deadline for management practices found not to be protective of groundwater quality,[63] the CVDRMP's SRMR's principal findings and recommendations pivot from that directive. The CVDRMP's SRMR shift is premised on two significant developments that occurred after the Central Valley Water Board adopted the Dairy General WDRs.

1. Improved Understanding of Relative Nitrogen Loading Rates

The first of those significant developments is the CVDRMP's analysis of special studies that has led to an improved understanding of relative nitrogen loading rates from waste retention ponds, production areas, and land application areas. The CVDRMP's SRMR combines the results of its own studies that estimated loading rates from waste retention ponds and production areas with the UCD 2017 Study's estimates of nitrogen fertilizer loading rates from different sources in the Central Valley, including dairy

[60] *Id*., pp. i, 7-9, 26-30.
[61] *Id*., p. 6, § 1.4.1.
[62] *Id*., p. i.
[63] Dairy General WDRs, p. 29, § M.

cropland. In an marked departure from the conventional assumption that seepage from existing waste retention ponds is the most significant source of nitrogen loading to groundwater from dairies, the CVDRMP's SRMR concludes that approximately 94 percent of all nitrogen loading from dairies (estimated at approximately 79,000 tons of nitrogen per year from all dairies in the Central Valley) is due to spreading dairy waste across crop lands, whereas seepage from waste retention ponds and production areas comprise four percent and two percent, respectively.[64] The core of the CVDRMP's SRMR's recommendations are based on the new understanding of the relative contribution of nitrogen loading from the different sources of dairy discharges.

Regarding management practices for production areas and existing waste retention ponds, excepting those that "do not intersect the water table,"[65] the CVDRMP's SRMR recommends those practices required under the Dairy General WDRs be continued without any added requirements. In recognition of the relatively low nitrogen loading from these discharge sources, coupled with the significant costs to implement improved management practices, particularly for waste retention ponds (e.g., installing a liner), the CVDRMP's SRMR's overarching proposed strategy is to focus improved control strategies on loading from land application.

For new or expanded waste retention ponds, the CVDRMP's SRMR recommends replacing the tier 1 and tier 2 alternative requirements with a single-layer liner requirement with no groundwater monitoring.[66] For different reasons, the CVDRMP's SRMR concludes the tiered options are unrealistic or too costly.[67]

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[64] CVDRMP Summary Representative Monitoring Report, p. 9, § 1.4.2. We evaluated the underlying data regarding the relative contributions to nitrogen loading from the sources of dairy waste discharges and generally agree with those findings and conclusions.

[65] *Id*., p. 57, § 2.7.4.

[66] *Id*., pp. 58-59, § 2.8.

[67] For example, because tier 1 ponds (double liner with leachate collection and removal system) are approximately 40 to 50 percent more expensive than tier 2 (single liner with monitoring and reporting) ponds, few have been built. Also, because the tier 2 option requires installation of monitoring wells, groundwater quality monitoring and reporting, costs are significant and, in any event, the Central Valley Water Board is disinclined to authorize use of a tier 2 pond in areas where the Groundwater Limitation is exceeded in the groundwater underlying the pond. (*Id*., pp. 58-59, § 2.8.)

Regarding land application practices, while a majority of the dairies reported applying manure nitrogen in accordance with the 1.4 A/R regulatory endpoint, the CVDRMP's SRMR concludes that such reporting is likely inaccurate or much of the manure is "unaccounted for."[68] The rationale provided is that there is a high level of imprecision associated with implementation of the A/R ratio, stemming from the ratio's inherent assumptions, imprecise sampling and testing to quantify key inputs and outputs, and generalizations regarding nutrient inputs that in some cases replace actual measurements.[69] The CVDRMP's SRMR asserts that these imprecisions need to be addressed to improve the utility of the A/R ratio as a nutrient management tool.[70]

It is of no surprise, then, that the CVDRMP's SRMR recommends removing the 1.4 A/R ratio from the Dairy General WDRs as a regulatory endpoint, in part owing to these imprecisions but also because dairies are not currently able to comply with it.[71] Regarding the scale of nitrogen loading to groundwater due to land application practices, the CVDRMP's SRMR recognizes that current economic, technical, and regulatory challenges associated with potential solutions to conduct land application in a way that would comply with water quality requirements, such as increasing manure

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[68] *Id*., p. 10, § 1.5.1.1.

[69] The CVDRMP Summary Representative Monitoring Report explains:

> Evidence garnered from annual reports to the Regional Water Board by individual dairies suggests a substantial amount of "unaccounted-for" manure nitrogen exists on many dairies. This unaccounted-for portion is essentially the difference between nitrogen excreted by cows (supply) and what is reported as being applied to agricultural fields to fertilize crops (demand) and/or exported from the dairy. Some of the unaccounted-for portion of nitrogen can be attributed to volatilization of nitrogen as ammonia and other gases, but those pathways don't fully explain the difference between excreted nitrogen and applied nitrogen. Large amounts of unaccounted-for nitrogen, combined with the imprecision in measurement of applied nitrogen and irrigation water, can result in overapplication of nitrogen to crops and reduced [nitrogen uptake efficiency].

(*Id*., p. 10, § 1.5.1.1.)

[70] *Id*., p. 38, § 2.2.4.

[71] See *Id*., pp. ii-iii, p. 10, § 1.5.1.3, p. 39, § 2.2.4.

exports off-dairy to other irrigated crops, or manure denitrification, do not currently exist at sufficient scale.[72]

The CVDRMP's SRMR does not identify upgraded management practices that dairies could implement to meet the Groundwater Limitation within the Dairy General WDRs' final compliance deadline, as required by Section M of the Dairy General WDRs. Instead, its recommendations call for a staged strategy that prioritizes near-term efforts to be implemented, such as flow meters, improved sampling and reporting, and enhanced education on nitrogen use efficiency and planning.[73] The CVDRMP's SRMR reasons that no dairies in the region will be able to comply with the Groundwater Limitation until a significant and sustained collaborative effort among dairies, academia, government, and relevant industries coalesces to develop strategies to remove excess waste from dairies at the requisite scale. That effort would include research, development of markets for manure products, and incentive programs, along with other actions.[74]

2. CVDRMP's Shift Away from Requirement to Implement the Groundwater Limitation within Ten Years

This brings us to the second significant development that occurred after the Central Valley Water Board adopted the Dairy General WDRs that led the CVDRMP's SRMR to shift away from recommending management practices that would comply with the Groundwater Limitation within ten years. In 2018, the Central Valley Water Board adopted amendments to its water quality control plans for the Sacramento River and San Joaquin River Basins and the Tulare Lake Basin (Basin Plans) to incorporate a Central Valley-wide Salt and Nitrate Control Program referred to as the "Central Valley Salinity Alternatives for Long-Term Sustainability" (CV-SALTS).[75]

The CVDRMP's SRMR acknowledges that the Central Valley Water Board had not yet obtained our necessary approval of CV-SALTS, but characterizes CV-SALTS as

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[72] *Id*., pp. 12-13, § 1.5.2.
[73] *Id*., p. 10, § 1.5.1.3, p. 12, § 1.5.2.
[74] *Id*., p. ii.
[75] The Regional Water Board adopted the CV-SALTS by Resolution R5-2018-0034 and adopted revisions to the program by Resolution R5-2020-0057.

a “monumental shift in policy” insofar as the amendments recognize that currently available technology and practices cannot be expected to ensure nonpoint source discharges are able to meet nitrate water quality standards in the near future and the return of groundwater to drinking water standards could take many decades.[76]

Resting on that characterized shift in policy, the CVDRMP’s SRMR concludes that the directive in the Dairy General WDRs for it to recommend protective management practices be implemented within 10 years is unrealistic. The CVDRMP’s SRMR recommends the development of revised dairy waste discharge requirements that would allow dairies to avail themselves of CV-SALTS’ flexible compliance approach while progressively improving management practices.[77] The CVDRMP’s SRMR suggests that the dairies and cooperating entities work toward the goal of achieving “whole-farm nitrogen balance”[78] by reducing excess nitrogen loading. In the meantime, the CVDRMP’s SRMR recommends its dairy members participate in the CV-SALTS compliance approach, including participation in management zones, in replacement drinking water efforts, and the funding of salinity management and monitoring programs.[79] The CVDRMP’s SRMR recommends a continuing and enhanced role for the CVDRMP (similar to an ILRP third-party coalition) to assist in administering its recommendations.[80]

Taking these considerations into account, the CVDRMP’s SRMR recommends generally that the Dairy General WDRs’ final deadline to comply with the Groundwater Limitation should be removed and replaced with another deadline deemed suitable by the Central Valley Water Board in revised waste discharge requirements.[81]

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[76] CVDRMP Summary Representative Monitoring Report, pp. ii-iii. The CVDRMP’s SRMR’s recommendations relied on the version of CV-SALTS initially adopted by the Regional Water Board in 2018, prior to our October 2019 direction to the Regional Water Board to revise CV-SALTS. (State Water Board Resolution No. 2019-0057). As a result, the CVDRMP’s recommendations are not informed by the final version of CV-SALTS, as discussed in the next section.

[77] CVDRMP Summary Representative Monitoring Report, pp. ii-iii.

[78] We discuss the concept of whole-farm nitrogen balance at Section III.A.4.

[79] CVDRMP Summary Representative Monitoring Report, p. iii.

[80] *Id*., pp. 20-21.

[81] *Id*., p. iii.

G. The CV-SALTS Program

On October 16, 2019, we approved the initial iteration of CV-SALTS , but with directions for the Central Valley Water Board to make targeted revisions to the Amendments within one year.[82] The directed revisions that are most relevant to this proceeding include our requirement that management zone implementation plans "must include proposals for enforceable and quantifiable interim deadlines that focus on reducing nitrates in ongoing discharges and a proposed final compliance date for ongoing discharges of nitrate to cease causing or contributing to exceedances of the applicable water quality objective in the receiving water,"[83] and our requirement that "all discharges of nitrate must cease causing or contributing to exceedances of water quality objectives in the receiving water within a term that is as short as practicable for each discharger or category of dischargers participating in the management zone but in no case longer than 35 years."[84] We also stated that the Central Valley Water Board "should set a maximum of 50 years as a goal for restoring basins to achieve nitrate water quality objectives throughout the basins" and "may recognize, however, that some basins may require more than 50 years to achieve restoration or may qualify for de-designation of beneficial uses through the water quality control plan amendment process."[85]

We also directed the Central Valley Water Board to "ensure that affected residents in localized areas within management zones with nitrate concentrations exceeding 10 mg/L ("hot spots") are identified and provided access to drinking water."[86] Finally, we stated that waste discharge requirements implementing CV-SALTS must comply with the Nonpoint Source Policy as applicable,[87] and that CV-SALTS does not

[82] State Water Board Resolution No. 2019-0057.
[83] *Id*., Resolved ¶ 4.g.
[84] *Id*., Resolved ¶ 4.h.
[85] *Id*., Resolved ¶ 4.h.
[86] *Id*., Resolved ¶ 1.g.
[87] *Id*., Resolved ¶ 1.l.

supersede the precedential requirements contained in our Order WQ 2018-002.[88] The Central Valley Water Board made the directed revisions, and we approved the revised CV-SALTS on June 1, 2021.[89]

The CV-SALTS program prioritizes addressing health risks from drinking water exceeding the nitrate standard. Prioritized groundwater basins and sub-basins have been identified for program implementation according to specified timelines. Nonprioritized basins will follow as directed by the Central Valley Water Board's Executive Officer. Participants in prioritized areas must assess nitrate levels in groundwater used for drinking water and submit an Early Action Plan if levels exceed the primary MCL for nitrate.[90]

For long-term implementation, CV-SALTS contains two approaches: Path A reflects the traditional permitting approach where the individual assumes all compliance responsibilities and costs. Path A is available on a permittee's election or when a management zone is not available. Path B uses the establishment of management zones to foster collaborative and cost-effective nitrate control solutions, including providing replacement water to residents reliant on domestic wells with unsafe levels of nitrate.[91]

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[88] *Id*., Resolved ¶ 1.k. In WQ Order 2018-0002, we reviewed the Central Valley Water Board's Waste Discharge Requirements General Order No. R5-2012-0116 which regulates discharges to groundwater and surface water from irrigated lands for growers within the Eastern San Joaquin River Watershed that are members of a third-party group. In that order we provide precedential direction to all regional water quality control boards regarding their irrigated lands regulatory programs to better protect water quality by minimizing over-application of nitrogen fertilizers, improving grower management practices, and creating a foundation for developing and sharing best farming practices on a statewide basis. While that precedential direction does not apply to dairies because they are not part of our irrigated lands regulatory program, some of the issues addressed in WQ Order 2018-0002 are relevant to this proceeding, as we discuss further in this order.

[89] State Water Board Resolution 2021-0019.

[90] See generally, Water Quality Control Plans for the Sacramento River and San Joaquin River and Tulare Lake, chpt. 4 (hereafter, Sacramento and San Joaquin Basin Plan and Tulare Lake Basin Plan, respectively, and collectively, Basin Plans).

[91] See generally, Basin Plans, chpt. 4.

H. Understanding Nitrates and Health Impacts from Nitrates in Drinking Water

Nitrates are compounds commonly found in drinking water supplies. Their presence in groundwater is generally linked to septic systems, manure, and use of fertilizers.[92] In the Central Valley, a substantial number of residents rely on groundwater wells for drinking water, but in some communities water supply and domestic wells do not meet safe drinking water standards due to high nitrate concentrations.[93] Ingestion of nitrates in drinking water poses the greatest human health concerns.[94] Many households in the Central Valley drink or cook with unfiltered tap water, unaware of potential nitrate contamination and the associated risks of adverse health outcomes.[95] However, nitrate-contaminated water can be used for bathing babies and children, as well as for showers, because nitrates are only a concern when ingested and are not absorbed through the skin.[96]

Nitrates can interfere with the ability of red blood cells to carry oxygen to body tissues, leading to a condition known as methemoglobinemia.[97] This is particularly concerning for infants, whose immature stomach environment facilitates the conversion of nitrates to nitrites, which are then absorbed into the bloodstream. This condition, often referred to as “blue baby syndrome,” can occur when infants ingest high levels of

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92 California Department of Public Health, Nitrate Fact Sheet (May 2014), available at: <http://www.waterboards.ca.gov/public_notices/petitions/water_quality/docs/wc_13287/fact_sheet_nitrate_may2014_update.pdf> (as of June 14, 2024).

93 Central Valley Salinity Alternatives for Long-Term Sustainability, Fact sheet, *Nitrate Control Program*, available at: <http://www.cvsalinity.org/wp-content/uploads/2023/12/Nitrate-Control-Program-Brochure-final-11-14-23.pdf> (as of June 14, 2024); see generally Pacific Health Institute, The Human Costs of Nitrate-contaminated Drinking Water in the San Joaquin Valley (March 2011) pp. 34-35, available at: <http://pacinst.org/wp-content/uploads/2013/02/nitrate_contamination1.pdf> (as of July 23, 2024).

94 Nitrate Fact Sheet, supra.

95 The Human Costs of Nitrate-contaminated Drinking Water in the San Joaquin Valley, *supra*, pp. 34-35.

96 Nitrate Fact Sheet, supra.

97 *Id*.

nitrites from food or formula made with nitrate-contaminated water.[98] Pregnant women may also experience reduced oxygen-carrying capacity of the blood due to high nitrate levels. The most vulnerable groups are infants under six months and pregnant women, while healthy children and adults generally face the lowest risk of becoming ill.[99]

I. Ex Parte Meetings

After we decided to review the Dairy General WDRs on our own motion, a group that included representatives of the environmental and environmental justice organizations that had filed the petition, dairy industry representatives, and other interested parties requested that our staff share their preliminary technical recommendations and provide an opportunity for feedback before staff distributed a draft water quality order. They requested staff do so through a series of ex parte meetings between the group and a Board member, since our review of the Dairy General WDRs is subject to a special statutory provision for ex parte communications related to general waste discharge requirements.[100]

In petition proceedings, ex parte meetings generally are not a forum used to discuss technical issues and receive feedback before the distribution of a draft water quality order and the commencement of the formal public comment period. In this proceeding, however, there was a general recognition that having the meetings would be constructive, in light of the fact that many of the interested parties have familiarity and, in some instances, significant expertise, with the technical issues under consideration, including the variety of management practices to control dairy waste, operational or cost constraints of those practices, and water quality impacts to sources of drinking water associated with dairy discharges. Board Member Sean Maguire agreed to participate in each of the ex parte meetings.

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[98] *Id*.

[99] *Id*.

[100] See Wat. Code, § 13287, subd. (a) & (b) (providing that the ex parte provisions of the Administrative Procedures Act do not apply to specified board actions, including the adoption, modification, or revision of general waste discharge requirements).

From September 20, 2021, to May 16, 2022, Board Member Maguire and staff held 14 ex parte meetings. Attendees included petitioners and representatives of the dairy industry, the California Department of Food and Agriculture, the Central Valley Water Board, and environmental and environmental justice organizations. In accordance with the ex parte communication disclosure requirements of Water Code section 13287, the ex parte meetings are disclosed and posted (including topics discussed, written materials used or distributed, and the identity of all meeting participants), on our petition web page.[101] As requested, the meetings were used as an opportunity for staff to receive feedback from the representative stakeholder group to help inform the regulatory framework, including both conceptual and specific proposed requirements described in Section III, before the draft water quality order was distributed for public comment.

II. THE DAIRY GENERAL WDRS: ISSUES AND FINDINGS

The petition raises numerous legal issues concerning the Central Valley Water Board's adoption of the Dairy General WDRs, which we address here.

In this discussion, we first address two issues relating to the Dairy General WDRs' time schedule. Next, we address the Dairy General WDRs' compliance with the Antidegradation Policy. Lastly, we evaluate the Dairy General WDRs' consistency with other state laws, Water Code section 106.3, commonly referred to as the human right to water statute, and Government Code section 11135, the state antidiscrimination law.

The Dairy General WDRs were issued under the authority of the Porter-Cologne Water Quality Control Act (Porter-Cologne Act), specifically Water Code section 13263. Section 13263 requires the Central Valley Water Board to set waste discharge requirements that implement relevant water quality control plans.[102] The Dairy General WDRs must implement the Basin Plans, which identify the beneficial uses of the surface

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[101] The disclosed communications are at: <http://www.waterboards.ca.gov/public_notices/petitions/water_quality/wc_13287_disclosures.html> (as of June 13, 2024). All of the documents used during the ex parte meetings and disclosed on our petition web page are part of the administrative record for this proceeding. See fn. 53, *ante*.

[102] Wat. Code, § 13263, subd. (a).

waterbodies and groundwater in the region and identify the water quality objectives to be achieved to reasonably support the beneficial uses of those waters.

The Dairy General WDRs must also comply with State Water Board policies for water quality control.[103] Especially relevant to this proceeding are the Nonpoint Source Policy[104] and the Antidegradation Policy. Water Code section 13267 authorizes the Central Valley Water Board to require monitoring and reporting as a component of the Dairy General WDRs. The Nonpoint Source Policy additionally directs that any nonpoint source control implementation program incorporates monitoring and reporting requirements.

A. Compliance with the Water Code and the Nonpoint Source Policy

We begin our review of the petition with consideration of the Dairy General WDRs' consistency with the Water Code in light of the direction provided in the Nonpoint Source Policy as to how to effectuate Water Code requirements in the context of control of nonpoint source discharges.[105]

Water Code section 13260 requires persons "discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the state" to file a report of waste discharge. Dairy waste includes, but is not limited to, "manure, leachate, and any water, precipitation, or rainfall that contacts raw materials, products, or byproducts such as manure, compost piles, feed, silage, milk or bedding."[106] Dairy waste discharges that can affect the quality of groundwater include the application of dairy waste to dairy cropland, the discharge of dairy waste to land in production areas, and the discharge of dairy waste to waste retention ponds. Water

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[103] *Id*., § 13146, State Water Board Order WQ 2018-0002, p. 11.

[104] The Dairy General WDRs do not explicitly acknowledge that the Central Valley Water Board considered the Nonpoint Source Policy. (See Dairy General WDRs, Information Sheet, pp. IS-5 to IS-22 (recognizing generally that the Basin Plans must conform to statewide policies but not explicitly acknowledging that the Nonpoint Source Policy was considered).)

[105] The Dairy General WDRs are not NPDES permits and do not authorize discharges of dairy waste to waters of the United States. (*Id.*, p. 12, fn. 1; *id*., Information Sheet, IS-1.) The Dairy General WDRs contain various prohibitions against dairy waste discharges to surface waters. (*Id*., pp. 12-13, prohibitions A.3, A.10 – A.12.)

[106] *Id*., Information Sheet, p. IS-24.

Code section 13263 in turn directs a regional water quality control board (regional water board) to prescribe requirements for the discharge that "implement any relevant water quality control plans and policies that have been adopted, and that [. . .] take into consideration beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, and the need to prevent nuisance," as well as certain additional factors, including economic considerations. A regional water board may prescribe general waste discharge requirements to a category of discharges, such as milk cow dairy discharges, rather than issue individual waste discharge requirements to separate dairies.[107]

While waste discharge requirements require compliance with the water quality objectives specified in the water quality control plans, such compliance need not be achieved immediately. A time schedule for compliance with water quality requirements is explicitly permitted by Water Code section 13263, subdivision (c), which states that waste discharge requirements "may contain a time schedule subject to revision in the discretion of the [regional water] board."

The Nonpoint Source Policy provides guidance on the proper interpretation and implementation of the Water Code requirements, including sections 13263 and 13267, in the context of regulating nonpoint source discharges. The Nonpoint Source Policy generally anticipates the use of management practice implementation to control pollution from nonpoint sources, but specifies that a nonpoint source control pollution control implementation program must satisfy five Key Elements to meet the regional water board's obligations to protect water quality.[108]

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[107] Wat. Code, § 13263, subd. (i).

[108] Nonpoint Source Policy, p. 11; *Monterey Coastkeeper v. State Water Resources Control Bd. (2018)* 28 Cal.App.5th 342, 349. Nonpoint source implementation programs for pollution control must: (1) explicitly state the program's ultimate purpose which, at a minimum, must be to address nonpoint source pollution in a manner that achieves and maintains water quality objectives and beneficial uses, including any applicable antidegradation requirements; (2) describe the management practices and other nonpoint source control implementation program elements that are expected to be implemented and the process for ensuring their proper implementation; (3) include a specific time schedule and corresponding quantifiable milestones designed to measure

Key Element 3 of the Nonpoint Source Policy provides that where a regional water board determines time should be allowed for discharges to achieve water quality requirements, the regional water board must specify a time schedule to achieve those requirements, and corresponding quantifiable milestones designed to measure progress toward reaching the specified requirements.

In the two sections that follow, we discuss the Dairy General WDRs' time schedule for dairies to achieve the Groundwater Limitation and allowance for dairies to request an extension to the time schedule.

1. The Length of the 16-year Time Schedule

The time schedule provides up to 16 years[109] for dairies to comply with the Groundwater Limitation. An iterative process is used for individual or representative monitoring efforts to initially study the baseline water quality regarding existing management practices to control discharges from production areas, existing waste retention ponds, and land application areas. If, according to the six-year study's summary report, a dairy's management practices for any of the categories of dairy waste are determined to not protect groundwater quality, the dairy must identify additional, new or revised control requirements to comply with the Groundwater Limitation. The new or upgraded protective management practices must be implemented as soon as practicable, but not more than ten years from the Central

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progress toward reaching the specified water quality requirements; and (4) include sufficient feedback mechanisms to determine if the program is achieving its stated purpose. (Nonpoint Source Policy, pp. 11-14.) The fifth Key Element states, "Each [regional water board] shall make clear, in advance, the potential consequences for failure to achieve a nonpoint source control implementation program's stated purpose." (*Id*. at pp. 14.)

[109] Dairy General WDRs, p. 23, fn. 6, § F.1, pp. 28-29, § M. The 16-year timeframe is a rough approximation of the total time to implement the findings of the groundwater studies implemented by a representative monitoring program: six years of annual studies and reports followed by implementation as soon practicable but no longer than ten years of the executive officer's approval of the summary representative monitoring report. The 16-year estimated timeframe does not include the time in which the executive officer takes to review and approve a summary report and does not include any additional time needed if the executive officer disapproves the summary report.

Valley Water Board Executive Officer's approval of the individual summary report or the summary representative monitoring report.[110]

Petitioners contend the length of the time schedule is unlawful. Petitioners point out that the 16 years of continued degradation follows a continuous line of deferrals that have allowed the dairy industry to pollute the groundwater in the entire Central Valley region.

The Water Code and the Nonpoint Source Policy recognize there are circumstances where it will take time to achieve water quality requirements.[111] The Nonpoint Source Policy explains that a regional water board has the discretion to determine the length of the time schedule with consideration of the time necessary to achieve water quality requirements. It describes numerous tasks and circumstances that could reasonably require time, many of which are included in the time schedule's iterative process: the need to identify baseline water quality conditions, the sufficient collection of data to identify practices that would be protective of water quality, and implementation of those practices determined to be protective. However, a time schedule may be no longer than that reasonably necessary to achieve applicable water quality objectives.[112]

The Information Sheet accompanying the Dairy General WDRs explains the initial, six-year monitoring period is needed to determine the effectiveness of existing practices. Due to the time lags between surface practices and resulting effects in groundwater, the Central Valley Water Board determined six years was needed to develop an adequate data set for statistical evaluation and up to ten years for dairies to subsequently make necessary improvements and implement more protective management practices, if needed.[113] Together, these constitute reasonable interim actions and milestones, consistent with the Nonpoint Source Policy's Key Element 3.

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110 *Ibid.*

111 Wat. Code, §§ 13242, subd. (b), 13263, sub. (c); Nonpoint Source Policy, p. 13, Key Element 3.

112 Nonpoint Source Policy, p. 13, Key Element 3.

113 Dairy General WDRs, Information Sheet, p. IS-31.

We conclude that the 16-year time schedule for the actions dairies are required to take to comply with the Dairy General WDRs' Groundwater Limitation was reasonably justified and, therefore, is consistent with Key Element 3 of the Nonpoint Source Policy. In assessing the reasonableness of the time schedule's length, we must look forward to the effort required by the Dairy General WDRs—and not backwards to the missed opportunities as petitioners urge.

Looking forward in time to the development of the revised dairy waste discharge requirements, however, the CVDRMP's SRMR acknowledges that, based on its findings, implementation of its recommended near-term management practices will not result in compliance with the Groundwater Limitation and asserts that it is not realistic to achieve the Groundwater Limitation within the remaining ten years of the 16-year time schedule specified in the Dairy General WDRs. We discuss in greater detail at Section I.F the CVDRMP's rationale for its conclusion that meeting the Groundwater Limitation industry-wide will take a significant amount of time and will require, at a minimum, the development of a manure market at a sufficient scale that does not exist today. We also explain in Section III that we find these conclusions to be sound and agree that compliance must be phased in over time. Accordingly, as part of the regulatory framework for nitrogen discharges established by this order in Section III, we direct the Central Valley Water Board to adopt a time schedule that is consistent with the Nonpoint Source Policy and with CV-SALTS.

2. The Extension of Time Available to Comply with the Groundwater Limitation

The Dairy General WDRs' time schedule allows dairies participating in the representative monitoring program to request the Central Valley Water Board to grant an extension of time for any of the compliance dates, including the April 2029 final compliance deadline for members of the CVDRMP to meet the Groundwater Limitation (16 years from April 2013), upon a dairy demonstrating that meeting the deadline "is technically or economically infeasible."[114]

[114] *Id*., p. 23, fns. 6, 7 and accompanying text, p. 29, § M.

Petitioners express the concern that the Central Valley Water Board could reach a conclusion of "economic infeasibility" or "impracticability" in connection with dairies implementing management practices to comply with the Groundwater Limitation, particularly with respect to existing waste retention ponds. Petitioners' concern stems from the Central Valley Water Board's justification underlying its decision to rule out the immediate retrofitting of existing waste retention ponds with liners. In that instance, the Central Valley Water Board determined that immediate retrofitting would be cost prohibitive for most dairies.[115] In essence, petitioners suggest the extension available may be utilized by dairies to postpone implementation of liners in perpetuity, thus rendering the final compliance deadline impermissibly indefinite.

Pointing to the time schedule's iterative approach for the implementation of protective management practices, the Central Valley Water Board and dairy industry representatives respond that petitioners' argument is based on unfounded fears and assert that retrofitting or liner options for existing waste retention ponds could be required.[116] Indeed, the Dairy General WDRs make a finding that if it is determined that existing ponds are not protective of underlying groundwater they will be required to be upgraded or replaced.[117]

We find petitioners' contention has merit. In rejecting a requirement that existing waste retention ponds be immediately retrofitted with liners, the Central Valley Water Board already concluded, "[i]f forced to retrofit such lagoons, many dairy operations would likely go out of business."[118] While this statement related to immediate liner retrofits, there is no indication in the record that the liner retrofits are likely to become more economically feasible in the future. While other protective management practices for existing waste retention ponds could be devised and implemented during the time schedule's iterative process, liner requirements were the only treatment or control measures anticipated to meet water quality requirements identified in the administrative

[115] *Id*., p. 9, Finding ¶ 28.c; *id*., Information Sheet, IS-18 to IS-19.

[116] Note that these responses were filed prior to the CVDRMP's completion of its SRMR.

[117] *Id*., p. 9, Finding ¶ 28.c.

[118] *Id*., Information Sheet, p. IS-18.

record.[119] Thus, the future granting of long, or sequential, time extensions has a ring of inevitability. And given the CVDRMP's SRMR's subsequent conclusions about the feasibility and expense of tier 1 and tier 2 liners for existing waste retention ponds,[120] the petitioners' concerns appear to be well-founded.

Additionally, Key Element 3 of the Nonpoint Source Policy explicitly requires a *specific* time schedule be included when water quality requirements are not immediately effective.[121] The purpose of establishing a specific time schedule is to assure that water quality objectives are met by a date certain. As written (and regardless of whether the source of discharge is from an existing waste retention pond or some other dairy waste discharge location), the allowance for an extension to the time schedule is impermissibly vague and not specific. Purporting to limit the overall compliance deadline to 16 years and simultaneously providing that any of its compliance dates may be extended if the discharger provides evidence that meeting the compliance date is technically or economically infeasible, is effectively no deadline at all. While a regional water board may amend a revised time schedule or adopt a compliance schedule in an enforcement order, the Dairy General WDRs' inclusion of the broad extension opportunity in the time schedule without specifying the maximum duration of the allowable time extension is the sort of open-endedness rejected in *Monterey Coastkeeper v. State Water Resources Control Board* (2018) 28 Cal.App.5th 342.[122]

Accordingly, the time schedule suffers from a lack of specificity and therefore fails to comply with the Water Code and the Nonpoint Source Policy. We direct the

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[119] *Id*., Information Sheet, p. IS-18.

[120] CVDRMP Summary Representative Monitoring Report, pp. 58-59, § 2.8.

[121] The Central Valley Water Board has discretion to later determine whether a time schedule should be adjusted and "may make further amendments to the time schedule or issue an enforcement order that contains a compliance schedule." (Nonpoint Source Policy, p. 13.)

[122] In determining that the waiver for irrigated lands issued by the Central Coast Regional Water Quality Control Board, which we subsequently modified, failed to comply with the Nonpoint Source Policy, the Court explained that the Nonpoint Source Policy "*expressly* requires time schedules; the purpose is to assure that the water quality objectives are eventually met," and for the waiver "to delay, diminish, or dilute a requirement that is part of the [Nonpoint Source Policy] is improper." (*Monterey Coastkeeper,* 28 Cal.App.5th at pp. 369-370.)

Central Valley Water Board to ensure that all time schedules in the revised dairy general waste discharge requirements contain a specific time schedule for dairies to comply that is as short as practicable and is consistent with CV-SALTS and the Nonpoint Source Policy.

B. Compliance with the Antidegradation Policy

The Antidegradation Policy is a state policy for water quality control that establishes the requirement that discharges to high quality waters of the state shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the State.[123] "High quality water" is the best quality of the water since 1968, the year the Antidegradation Policy was adopted, or a lower level if that lower level was authorized through a permitting or other regulatory action consistent with the federal antidegradation policy, if applicable, and the Antidegradation Policy.[124] A permit authorizing a lowering of high quality water must contain certain findings to comply with the Antidegradation Policy.[125]

As noted in Section I.D of this order, the Dairy General WDRs rescind and replace the 2007 Dairy General WDRs and are intended to comply with *AGUA*.[126] *AGUA* held that because the dairy waste discharges to groundwater in the Central Valley region permitted by the 2007 Dairy General WDRs would degrade at least some high quality waters, the 2007 Dairy General WDRs must comply with the Antidegradation Policy.[127]

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[123] State Water Board Resolution No. 68-16, ¶ 1.

[124] *AGUA*, *supra*, 210 Cal.App.4th at p. 1270 (citing State Water Board management's directions to staff for implementing the state and federal antidegradation policies for the NPDES permitting program, Administrative Procedures Update, APU-90-004 (July 2, 1990), p.4 (State Water Board APU) and finding it instructive for comparing baseline water quality to water quality objectives to determine whether the Antidegradation Policy applied to the discharge).

[125] *AGUA*, *supra*, 210 Cal.App.4th at p. 1278.

[126] Dairy General WDRs, Information Sheet, IS-11.

[127] *AGUA*, *supra*, 210 Cal.App.4th at pp. 1279, 1284. *AGUA* concluded that at least some of the water affected by the 2007 Dairy General WDRs is high quality water because there was evidence that some groundwater nitrate levels in 1986 were below

In a 1995 staff guidance memorandum (Staff Guidance Memorandum), our staff explained that compliance with the Antidegradation Policy requires consideration of the following two-step analysis:

> The first step is if a discharge will degrade high quality water, the discharge may be allowed if any change in water quality (1) will be consistent with maximum benefit to the people of the State, (2) will not unreasonably affect present and anticipated beneficial use of such water, and (3) will not result in water quality less than that prescribed in state policies (e.g. water quality objectives in Water Quality Control Plans). The second step is that any activities that result in discharges to such high-quality waters are required to use the best practicable treatment or control of the discharge necessary to avoid a pollution or nuisance and to maintain the highest water quality consistent with the maximum benefit to the people of the State.[128]

In the Information Sheet accompanying the Dairy General WDRs, the Central Valley Water Board includes a discussion of the requirements of the Antidegradation Policy, a summary of the *AGUA* decision, related guidance, including that set forth above, and an analysis of the requirements to comply with the Antidegradation Policy for each of the primary sources of dairy waste discharges to groundwater.[129]

Petitioners assert the Central Valley Water Board's antidegradation analysis is insufficient concerning items one and three under the first step quoted above, the mandate that an authorized lowering of high-quality water be consistent with the maximum benefit to the people of the state, and that the lowering of high-quality water not result in water quality less than that specified by water quality objectives. We address those issues separately, below.

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the water quality objective of 10 mg/L. Thus, an antidegradation analysis was required if the 2007 Dairy General WDRs authorized discharges that would cause degradation of that high quality water. (*Id*., at p. 1271.)

[128] State Water Board Guidance Memorandum ("Questions and Answers" re Resolution 68-16) (Feb. 16, 1995) (Staff Guidance Memorandum); *AGUA*, *supra*, 210 Cal.App.4th at p.1278 (quoting the Staff Guidance Memorandum at p. 2).

[129] See discussion in the Dairy General WDRs Information Sheet, at pages IS-9 through IS-22.

1. Maximum Benefit

Petitioners contend the Dairy General WDRs fail to include the requisite complete analysis to support the Central Valley Water Board's finding[130] that degradation to high quality waters will be consistent with maximum benefit to the people of the State.

To evaluate whether a lowering of high-quality water quality will be consistent "maximum benefit to the people of the State," the Staff Guidance Memorandum explains that the

> determination is made on a case-by-case basis and is based on considerations of reasonableness under the circumstances at the site. Factors to be considered include … economic and social costs, tangible and intangible, of the proposed discharge compared to the benefits. … With reference to economic costs, both costs to the discharger and the affected public must be considered.[131]

The Central Valley Water Board asserts that its "maximum benefit" finding is sufficient, particularly considering that the Dairy General WDRs also contain the general finding that it is "designed to protect human health and ensure that water is safe for domestic use,"[132] and should be upheld. However, petitioners do not challenge the adequacy of the finding in and of itself. Petitioners challenge the adequacy of the analysis to support the finding. Petitioners argue that the analysis fails to consider the

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[130] The Dairy General WDRs' "maximum benefit" finding provides in relevant part,

> Consistent with the evaluation contained in the Information Sheet and considering the economic significance of the Central Valley dairy industry and the important role Central Valley dairies play in providing adequate milk supplies to the nation, the Central Valley Water Board finds that maintaining the Central Valley dairy industry is consistent with the maximum benefit to the people of the state. To maintain the industry and to prevent the loss of jobs and the impacts to the local economy that might otherwise occur, some degradation to high quality waters must be allowed. However, this degradation will be limited by this order so that there will not be long-term impacts to beneficial uses, thereby allowing the full utilization of the aquifer.

(Dairy General WDRs, p. 10, Finding ¶ 33.)

[131] Staff Guidance Memorandum, *supra*, fn. 118, at pp. 4-5.

[132] Dairy General WDRs, p. 11, Finding ¶ 38.

costs, tangible and intangible, to the affected public reliant on groundwater for drinking water supplies.

The Information Sheet to which the Dairy General WDRs' "maximum benefit" finding refers focuses solely on what the costs would be to the dairies and the dairy industry overall, and how those costs would have regional and statewide economic impacts, if existing waste retention ponds had to be immediately retrofitted with a liner. Specifically, the Information Sheet cites to two memoranda discussing the costs dairies would incur if required to immediately retrofit existing ponds with a liner option to conclude such a requirement would be beyond economically practicable for most dairies, so many dairies would close, and widespread economic impacts would occur, including loss of jobs and local economy benefits.[133]

Petitioners correctly point out that absent from the analysis is any consideration of potential costs to individuals reliant on the quality of the groundwater, the social costs to impacted communities, or the environmental costs associated with further lowering of water quality from ongoing discharges from the existing waste retention ponds. As examples, petitioners observe that the Dairy General WDRs lack any analysis of costs incurred by individuals, water providers, or the state to clean up or treat water contaminated by the discharges or to provide replacement water, or of health impacts suffered by individuals or the community at large from drinking contaminated water.

The Staff Guidance Memorandum was not developed in accordance with state rulemaking requirements, so it cannot be binding on the regional water boards on its own. And while *AGUA* quoted it at length, it did not rely on any unique provisions of the Staff Guidance Memorandum for any of its holdings or conclusions. Further, certain portions of the Staff Guidance Memorandum were taken directly from the federal antidegradation regulations applicable only to point source discharges. Nonetheless, we

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[133] *Id*., Information Sheet, p. IS-18 (citing Memorandum from John Schaap, Provost & Pritchard, to Theresa A. Dunham, Somach, Simmons & Dunn ("Costs to retrofit existing dairies that do not have tier 1 or tier 2 lagoons"), Aug. 5, 2013, and Memorandum from Annie AcMoody, Western United Dairymen, to Theresa A. Dunham, Somach, Simmons & Dunn ("Financial Impact to Retrofit Dairies that do not have Tier 1 or Tier 2 Lagoons"), Aug. 6, 2013). We need not determine whether the discussion in the memoranda support the corresponding conclusions in the Information Sheet.

agree with petitioners that any additional social or economic costs to impacted communities associated with degradation of high quality water from discharges of waste must also be considered in a maximum benefit analysis.[134] On remand, the Central Valley Water Board's maximum benefit findings in the revised dairy general waste discharge requirements must address any additional economic and social costs associated with the discharges of dairy waste from existing waste retention ponds to high quality waters.[135]

Finally, we note that the analysis in the Information Sheet only evaluates costs associated with dairies controlling discharges from existing waste retention ponds (with various types of liner options), and not from the other primary sources of dairy discharges to groundwater. The Central Valley Water Board's maximum benefit analysis should also encompass costs to the discharger and the affected public associated with lowering of high quality groundwater from the other principal sources of dairy discharges of waste to groundwater.

2. Water Quality Less than Applicable Water Quality Objectives

Waste discharge requirements subject to the Antidegradation Policy must be designed to ensure that "existing high quality will be maintained until it has been demonstrated to the State that any change … will not unreasonably affect present and

[134] Petitioners assert costs that may be incurred by individuals or water providers for treatment of contaminated water are within the proper scope of consideration and point out that such costs could be incurred where the authorized water quality is set to just meet water quality objectives. Petitioners reason that public water systems conduct treatment when the source water quality is at or just below water quality objectives to ensure fluctuations in the source water quality do not result in exceedances of water quality standards, and they incur extra monitoring costs when the source water exceeds 50 percent of the nitrate MCL. (Petition, p. 11, fn. 3.) We agree with petitioners.

[135] See, e.g., *Environmental Law Foundation v. State Water Resources Control Bd.* (2023) 89 Cal.App.5th 451, 496 as modified (Apr.13, 2023), review denied (June 14, 2023).

anticipated beneficial use of such water and will not result in water quality less than [water quality objectives]."[136]

Petitioners assert generally that the Antidegradation Policy requires that any authorized lowering of high quality water be accompanied with a demonstration that the lowering will not result in a violation of water quality objectives. Petitioners point to the time schedule as evidence that the Dairy General WDRs excuse the requirement to immediately comply with the Groundwater Limitation.

We addressed this issue, in part, in Order WQ 2018-0002 (*Eastern San Joaquin Watershed*). We explained there that that it was more appropriate to evaluate a contention regarding waste discharges resulting in water quality less than that specified in water quality objectives with respect to compliance with the Water Code[137] and the Nonpoint Source Policy,[138] rather than the Antidegradation Policy, because the underlying obligation to implement the water quality objectives derives from Water Code section 13263, as augmented by Key Element 1 of the Nonpoint Source Policy.[139] We also explained (as we did in Section II.A.1 above) that while waste discharge requirements must require compliance with applicable water quality objectives, such compliance need not be achieved immediately, or at each discrete point in time and space, due to different considerations including time schedules, mixing zones,

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[136] State Water Board Resolution No. 68-16, Resolved ¶ 1; Staff Guidance Memorandum, *supra*, fn. 118, at p. 6, no. 8 (explaining that "not unreasonably affect present and anticipated beneficial use of water" as used in the Antidegradation Policy means "at a minimum require compliance with the water quality objectives") and pp. 6-7, no. 9 (describing "water quality control policies" referred to in the Antidegradation Policy as including water quality objectives established in water quality control plans).

[137] See Wat. Code, § 13263 (directing the regional water boards to prescribe water quality requirements for the discharge that "implement any relevant water quality control plans" taking into account other considerations, including applicable "water quality objectives reasonably required for that purpose").

[138] See Nonpoint Source Policy, pp. 11-12, Key Element 1, stating:

> An NPS [nonpoint source] control implementation program's ultimate purpose shall be explicitly stated. Implementation programs must, at a minimum, address NPS [nonpoint source] pollution in a manner that achieves and maintains water quality objectives and beneficial uses, including any applicable antidegradation requirements.

[139] State Water Board Order WQ 2018-0002, pp. 12-15, § II.A.

averaging periods, or other strategies authorized by the Water Code and the Nonpoint Source Policy.[140]

We take this opportunity to elaborate on that concept as it relates to the Antidegradation Policy. Again, the Water Code does not require waste discharges to immediately implement water quality objectives. Water Code section 13263, subdivision (c), clearly authorizes a water board to establish a time schedule for waste discharges to eventually implement water quality objectives over a specified period of time that is as short as practicable if immediate implementation of the applicable water quality objectives is not feasible. If the waste discharge is to water that already exceeds applicable water quality objectives, like the groundwater beneath all of the dairies that were monitored by the CVDRMP's representative monitoring program, then the result of the time schedule is that those waste discharges will likely temporarily continue to cause or contribute to the exceedances of water quality objectives during the time schedule. If, however, there is no high-quality water affected by the waste discharge, the Antidegradation Policy simply does not apply to the situation.[141]

The Antidegradation Policy does come into play, on the other hand, if the waste discharge can affect high quality water. Even though it applies, the Antidegradation Policy's provision precluding changes to high quality waters that result in water quality less than the applicable water quality objectives does not require anything more than Water Code section 13263 already requires. Further, the Antidegradation Policy does not explicitly or implicitly override a water board's authority and discretion under the Water Code to determine how to structure waste discharge requirements to ensure the relevant water quality control plan's water quality objectives are implemented. Neither could it restrict the Water Boards' statutory authority to grant time schedules under the later-enacted Water Code section 13263, subdivision (c).[142] The result of a time

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[140] *Ibid*.

[141] *AGUA*, *supra*, 210 Cal.App.4th at p. 1278.

[142] While not relevant to disposition of this matter, we note that discharges pursuant to the federal Clean Water Act's NPDES permit program (33 U.S.C. § 1342) are subject to other limitations on compliance schedules. For NPDES discharges in California, the State Water Board has established a compliance schedule policy that authorizes and

schedule for a waste discharge to high quality water may well be a temporary lowering of the high quality water to a level less than that required to meet water quality objectives even where the Antidegradation Policy applies. The practical effect of granting a time schedule is that the waste discharge allowed to continue to degrade high quality waters may also cause those waters to temporarily exceed water quality objectives. While we would obviously prefer to be able to require immediate compliance, it simply is not feasible in all cases. We recognized this in 2004 when we adopted the Nonpoint Source Policy:

> Current land use management practices that have resulted in NPS pollution have a long and complicated physical, economic and political history. In addition to the need for resources, forging a new history of pollution control will take time and commitment, as well as a willingness to examine the use of practices that have resulted in current NPS pollution discharges and the barriers to change. Therefore, it is expected that it will take a significant amount of time for the RWQCBs to approve or endorse NPS control implementation programs throughout their regions, and even longer for those programs to achieve their objectives.[143]

With important limitations, a water board has authority to authorize a discharge that results in water quality worse than applicable water quality objectives for a reasonable amount of time. A key limitation is that no water board should sanction an interim lowering below water quality objectives unless there are assurances that actual uses of the water are reasonably protected or, at a minimum, that there are assurances that a "substitute" exists for the disruption to the state's waters being beneficially used.[144] In addition, as explained in Section II.A.2, Key Element 3 of the Nonpoint Source Policy requires that the time schedule to achieve water quality requirements be

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limits the circumstances in which compliance schedules are authorized. (State Water Board Resolution No. 2008-0025.) Similarly, provisions of water quality control plans and state policies for water quality control may further enable and limit the use of compliance schedules.

[143] Nonpoint Source Policy, p. 16.

[144] For example, the Central Valley Water Board's CV-SALTS program prioritizes providing safe and free drinking water for residents relying on well water with unsafe levels of nitrate as an interim solution, along with final deadlines for discharges to stop causing or contributing to exceedances of water quality objectives in the receiving water. (See generally Basin Plans, chpt. 4.)

specified, along with quantifiable milestones designed to measure progress toward reaching the water quality requirements.

For this reason, on remand, and consistent with the direction we provide in this order, the Central Valley Water Board may establish a time schedule for the revised dairy general waste discharge requirements that results in a temporary lowering of high-quality water consistent with the Antidegradation Policy.

C. Compliance with Other State Laws

1. The Human Right to Water Statute

Petitioners assert the Dairy General WDRs fail to comply with the human right to water statute, Water Code section 106.3. By its express terms, the statute applies to policies, regulations, and grants; it does not apply to the Central Valley Water Board's issuance of the Dairy General WDRs (or to the State Water Board's review of same).

In precedential orders, however, the State Water Board has recognized the appropriateness of addressing the human right to water when acting on water quality orders.[145] Additionally, in 2016, the State Water Board recognized the right and adopted it as a core value and top priority for the State Water Board to consider in activities that could affect existing or potential sources of drinking water.[146] In the introduction to Section III and in Section III.H, we explain that that the foundational objective of the new regulatory framework for nitrogen discharges established by this order, is to ensure dairy discharges cease to cause or contribute to concentrations of nitrate in groundwater that exceed water quality objectives, including safe drinking water limits. It should also be noted that, as discussed in the next section, we are making significant strides in administering programs to address the challenges faced by communities lacking access to safe drinking water.

On April 21, 2016, after the Central Valley Water Board adopted the Dairy General WDRs, it too adopted the human right to water as a core value and committed

[145] See State Water Board Order WQ 2018-0002, p. 62; State Water Board Order WQ 2013-0101, pp. 67-68.
[146] State Water Board Resolution No. 2016-0010, Resolved ¶¶ 1 & 2.

to consider the right when taking actions that could affect existing or potential sources of drinking water, including permitting decisions.[147] On remand, we expect the Central Valley Water Board will undertake any relevant actions described in Central Valley Water Board Resolution R5-2016-0018 to ensure the human right to water is meaningfully considered in the development of the revised dairy general waste discharge requirements.

2. The State's Antidiscrimination Law

Petitioners contend the Dairy General WDRs violate the state's antidiscrimination law because it disproportionately impacts low-income communities and communities of color already suffering from high levels of nitrates in their drinking water, inadequate access to health care, and inadequate drinking water supplies. The state's antidiscrimination law[148] prohibits a state agency program from discriminating based on race, ethnicity, national origin, and color, among other immutable characteristics.[149] Where a state law is facially neutral (i.e., not intentionally discriminatory), like the Dairy General WDRs, the law is nevertheless deemed impermissibly discriminatory if it has an adverse disparate impact on members of a protected class.[150]

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[147] Central Valley Water Board Resolution R5-2016-0018, Resolved ¶¶ 1 & 2. In Resolution R5-2016-0018, the Central Valley Water Board provided specific direction for its staff to undertake to further the realization of the human right to water, including, and as applicable to the Dairy General WDRs: when submitting a recommendation to the board implicating the human right to water, describe how the right was considered; as resources allow, meaningfully engage with communities that lack adequate, affordable, or safe drinking water, including providing community outreach; and evaluate the extent to which a proposed action pertinent to the right has been developed with meaningful engagement of impacted communities. (Central Valley Water Board Resolution, R5-2016-0018, Resolved ¶¶ 7-9.)

[148] Gov. Code, § 11135.

[149] *Ibid*. "Low-income" is not a class protected under the antidiscrimination law.

[150] *Guz v. Bechtel Nat'l, Inc*. (2000) 24 Cal.4th 317, 354, fn. 20. A disparate impact claim is analyzed by a burden-shifting framework: (1) the plaintiff has the initial burden to establish that the facially neutral practice causes a disproportionate adverse effect on a protected class; (2) the defendant may overcome that showing by justifying the practice; and (3) the plaintiff may nevertheless prevail by establishing less discriminatory practices. *Darensburg v. Metropolitan Transp. Com*. (9th Cir. 2011) 636

In support of their argument, petitioners cite generally to a report[151] and a research study[152] that explain that Latino and low-income communities are more likely to have contaminated drinking water in the Central Valley region, often due to groundwater nitrate contamination. Both cited documents were published years before the Dairy General WDRs were adopted and neither is particularly relevant to whether the Dairy General WDRs violate the state's antidiscrimination law. Petitioners do not present any argument nor provide any direct evidence that the Dairy General WDRs create a disproportionate, adverse impact on Latinos (or low-income) communities reliant on groundwater for consumption as compared with other residents reliant on the same groundwater for drinking water supplies.

The Central Valley Water Board and the interested parties assert that a recitation of facts of living conditions encountered by a population of residents does not provide the requisite evidentiary support for a claim of discriminatory effect. They also argue the Dairy General WDRs' purpose is to protect water quality, not effectuate a disproportionate adverse impact on communities of a protected class. We agree. The Dairy General WDRs aim to implement the Basin Plans to protect groundwater from ongoing and future discharges of dairy waste, and apply equally to all residents within the region reliant on groundwater supplies for drinking water.[153]

As we explained at the outset of this order, we are sympathetic to the facts asserted by petitioners. We remain focused on the impacts to disadvantaged communities reliant on groundwater supplies for drinking water and are taking substantial steps through administration of the Safe and Affordable Drinking Water Fund

F.3d 511, 519 (utilizing the parallel federal law as guidance to evaluate a state disparate impact claim under Government Code section 11135).

[151] Environmental Justice Coalition for Water, *Thirsty for Justice: A People's Blueprint for California Water* (2005), at <http://www.scribd.com/document/77576133/Thirsty-for-Justice-A-People-s-Blueprint-for-California> (as of May 6, 2024).

[152] Carolina Balazs, et. al, *Social Disparities in Nitrate Contaminated Drinking Water in California's San Joaquin Valley*, Environmental Health Perspectives (June 2011).

[153] This order's conclusions concerning the Dairy General WDRs' shortcomings do not affect the analysis of whether the Dairy General WDRs effectuate a disproportionate, adverse impact on a protected class.

and other programs to address the challenges faced by communities without access to safe drinking water.

For example, the Safe and Affordable Funding for Equity and Resilience Program (SAFER) is informed by the Final Policy for Developing the Fund Expenditure Plan for the Safe and Affordable Drinking Water Fund (often referred to as the Safe and Affordable Drinking Water Fund's Policy) and the Annual Fund Expenditure Plans.[154] The SAFER Program is designed to provide Californians who currently lack access to safe drinking water receive safe and affordable drinking water as quickly as possible, through providing assistance with interim drinking water supplies, emergency repairs, technical assistance, administrators, planning, operations and maintenance and construction projects via various funding sources.[155] Additionally, as we discuss in detail in Section III, this order remands the Dairy General WDRs to the Central Valley Water Board with direction to implement the new regulatory framework to ensure dairies cease causing or contributing to concentrations of nitrate in groundwater that exceed safe drinking water levels over time and, in the interim, provide replacement drinking water to those reliant on groundwater with unsafe nitrate levels.

III. THE NEW REGULATORY FRAMEWORK FOR NITROGEN DISCHARGES

We now turn to the new regulatory framework for nitrogen discharges that we are establishing for the Central Valley Water Board's development of the revised dairy general waste discharge requirements on remand, as well as for other regional water boards as we describe below. The regulatory framework is intended to complement, not supplant, other provisions of the revised dairy general waste discharge requirements. The regulatory framework applies to all dairies in the Central Valley region for which the

[154] The Safe and Affordable Drinking Water Fund's Policy and archived Annual Fund Expenditure Plans are available at: https://www.waterboards.ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/safer.html (as of July 30, 2024).

[155] The State Water Board's SAFER Dashboard has data from the 2023 Drinking Water Needs Assessment, which is available at: <http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/saferdashboard.html> (as of July 30, 2024).

Central Valley Water Board issues waste discharge requirements. In other words, the reach of the regulatory framework is intended to extend beyond the "existing" dairies that are subject to the Dairy General WDRs to all dairies in the Central Valley region currently in existence, all existing dairies that expand or consolidate with other dairies in the future, and any new dairies that are established in the future. In addition, some of the regulatory framework's requirements are precedential for all dairies that utilize manure collection and land application within the jurisdiction of all other regional water boards, as we specify in Section III.G. below.

The ultimate objective of the entire regulatory framework is for dairies to achieve a performance standard of ceasing to cause or contribute to concentrations of nitrate in groundwater that exceed water quality objectives, including safe drinking water limits. For the remainder of this order, we will refer to this performance standard as the "Nitrogen Discharge Limit." The Nitrogen Discharge Limit is very similar to the Dairy General WDRs' Groundwater Limitation, except that it applies only to nitrogen, and that it addresses the situation where a dairy is just one of multiple sources of nitrates in groundwater such that it is only *contributing* to the exceedance of the primary MCL for nitrate in groundwater. It applies to all dairy waste management practices, including but not limited to discharges associated with land application, waste retention ponds, and production areas. The Nitrogen Discharge Limit is:

> Discharges of dairy waste from any aspect of a dairy's operations shall cease causing or contributing to concentrations of nitrate in groundwater that adversely affect the beneficial uses of groundwater in accordance with the time schedule contained herein [or otherwise approved by the Regional Water Quality Control Board at a noticed public meeting.]

As described in detail in the sections that follow, the regulatory framework for nitrogen discharges consists of the Nitrogen Discharge Limit plus four components related to land application of dairy waste, three components related to waste retention ponds, and one component related to the provision of alternative water supplies. The Central Valley Water Board must incorporate the Nitrogen Discharge Limit and specific requirements that implement each of the components in the revised general waste discharge requirements. Collectively, the specific implementation requirements must be

designed to result in dairy operators complying with the Nitrogen Discharge Limit by the conclusion of a time schedule.[156]

For the Nitrogen Discharge Limit, the whole-farm nitrogen accounting component, and the alternative water supply component, we specify how they are to be implemented and incorporated into the revised dairy general waste discharge requirements. For the remaining land application components and the waste retention pond components, the Central Valley Water Board has some discretion to select the specific implementation requirements that will be incorporated into the revised dairy general waste discharge requirements. As we explain below, however, we have developed, or in some cases will develop, proposed implementation requirements for the Central Valley Water Board's consideration for most of the land application components and all of the waste retention pond components. We direct the Central Valley Water Board to evaluate our proposed implementation requirements along with a reasonable range of alternative implementation requirements, all of which must be designed to achieve compliance with the Nitrogen Discharge Limit. While we direct the Central Valley Water Board to treat our proposed implementation requirements as the preferred options for the purposes of evaluation, the Central Valley Water Board has the discretion to select alternative implementation requirements if it finds that those alternative implementation requirements will result in dairy waste discharges achieving compliance with the Nitrogen Discharge Limit within the revised dairy general waste discharge requirement's time schedule, discussed below at section III.A.2.

A. Land Application

Naturally, we are focused principally on the land application components of the regulatory framework because, as discussed previously, land application is the overwhelming source of dairy waste discharges to groundwater in the Central Valley. The CVDRMP's SRMR supports the conclusion that dairies have been significantly

[156] Due to the relatively low nitrogen loading from production areas, we leave the development of appropriate requirements that implement the Nitrogen Discharge Limit for production areas to the sound discretion of the Central Valley Water Board.

over-applying manure-nitrogen to crop fields.[157] Results of recent monitoring of dairies in the Central Valley indicate that the average concentration of nitrate in shallow groundwater beneath dairy operations was 48 mg/L, with a median of 35 mg/L.[158] Most monitoring well sampling results in the vicinity of dairies show nitrate in excess of the drinking water limit of 10 mg/L.[159] Given that the natural background concentration of nitrate is in the range of 1 to 2 mg/L,[160] the frequent elevated concentration of nitrate shows that historic and current dairy waste management practices have or are contributing to elevated nitrate in underlying groundwater.

In many respects, the application of dairy waste to dairy cropland is more akin to the land application of waste produced by domestic sewage treatment plants than to the application of nitrogen fertilizer for the business enterprise of growing crops in traditional agricultural fields that we discussed in Order WQ 2018-0002.[161] The principal business enterprise of dairies is the production of milk, cheese, and related commodities, not the production of crops. Dairy waste is a waste that is generated from producing these commodities. Dairy waste certainly has value in growing crops, including feedstocks for dairy herds, but it is still fundamentally a waste that a dairy must dispose of.[162] Similarly, biosolids from a sewage treatment plant can be applied to land to supply nutrients and add organic matter for growing certain types of crops. While biosolids have some value in this regard, they still retain their essential character as a waste. Further, unlike traditional agricultural growers who have to purchase fertilizers to apply to the land where they are growing crops, many dairies generate much more dairy waste than what is needed to grow feedstock.[163] Accordingly, there is a strong economic incentive for

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157 See CVDRMP Summary Representative Monitoring Report, p. 10, § 1.5.1.1.
158 *Id*., p. 6, § 1.4.1.
159 *Ibid.*
160 *Harter, Final Report, supra*, p. 63.
161 State Water Board Order WQ 2018-0002, p. 2.
162 See CVDRMP Summary Representative Monitoring Report, pp. 65-73, §§ 3.2-3.2.4 (evaluating different management practices to avoid subsurface loading of nitrogen, including exporting strategies of solid manure, diversion of liquid manure to solid storage and export, and expanding liquid manure infrastructure for distribution across all of a dairy's cropland).
163 *Ibid*.

dairies to over-apply the dairy waste that they have generated to their available cropland. The result is now clear: dairy waste has been and continues to be substantially over-applied to dairy cropland, such that the groundwater in the vicinity of dairies in the Central Valley often contains alarmingly high levels of nitrates.

1. Final Numeric Land Application Rates that Correlate Directly to the Nitrogen Discharge Limit

The most important component of the new regulatory framework for nitrogen discharges is enforceable final numeric dairy waste land application rates that directly correlate to the Nitrogen Discharge Limit. The final application rates will, upon full implementation, ensure that dairies' application of their waste to land does not cause or contribute to an adverse effect on beneficial uses, including drinking water uses. This is a substantial departure from the Dairy General WDRs' current requirement that land application generally not exceed a nitrogen A/R of 1.4, the value of which does not have a direct relationship with protecting groundwater quality and the implementation of which has been ineffective, according to the CVDRMP.[164]

As required by Water Code section 13263, all waste discharge requirements, including the Dairy General WDRs, are designed to protect the beneficial uses of waters of the state. But different waste discharge requirements use different frameworks for achieving this goal. In order to ensure that a safe drinking water supply is achieved in the future for all Central Valley communities reliant on groundwater as a source of drinking water, we believe that the regulatory framework must include an enforceable numeric nitrogen land application rate that is directly correlated to compliance with the Nitrogen Discharge Limit. The final land application rates may be phased in over time for existing dairies in accordance with time schedules described in the next section.

For the final numeric land application rates, we have developed a two-part conceptual proposed implementation requirement that we will finalize for the Central Valley Water Board's evaluation.

[164] *Id*., p. 38, § 2.2.4.

The first part of our conceptual proposed implementation requirement is a groundwater loading limit that is expressed as the maximum annual pounds of nitrogen that is allowed to leach below the root zone per acre per acre foot of water that reaches below the root zone. This groundwater loading limit must be designed to ensure that the concentration of nitrogen in the discharge beneath the root zone does not exceed the MCL for nitrate of 10 mg/L with a margin of safety (e.g., 8 mg/L), averaged across an appropriate area and time scale. The groundwater loading limit assumes that all nitrogen discharged below the root zone will eventually reach groundwater. The actual groundwater loading limit will vary depending on the volume of water discharged below the root zone (taking into account irrigation, precipitation, evapo-transpiration, etc.) and denitrification that occurs below the root zone. The groundwater loading limit is designed to identify the outer limit of the allowable amount of nitrogen that may reach below the root zone to ensure the dairy's land application complies the Nitrogen Discharge Limit.

The second part of our conceptual proposed implementation requirement is a multi-year land application rate formula that will be used to determine how much nitrogen can be applied to dairy cropland consistent with the groundwater loading limit. To develop the land application rate formula, we will start with the groundwater loading limit and back-calculate a final, multi-year, land application rate formula. The formula will take into account nitrogen applied per acre, crop uptake, denitrification in the soil above the root zone, and possibly other factors. The dairy operator will use the land application formula to determine how much manure can be land applied in a given year consistent with a multi-year land application rate. At the conclusion of a time schedule determined by the Central Valley Water Board, dairies would be required to comply with the final multi-year land application rates derived from the final land application rate formula.

As stated, our staff will take on the responsibility of developing both the groundwater loading limit and the land application rate formula. We will do so through academic consultation, with technical coordination with the Central Valley Water Board and the CVDRMP. The groundwater loading limit, and the land application rate formula will be a product of the application of sound scientific principles, without the influence or the appearance of influence of advocacy from agricultural, environmental, social justice,

or other interests, so we intend to provide only limited public involvement in the initial development. Although the external peer review requirements of Health and Safety Code section 57004[165] do not apply to water quality orders or waste discharge requirements, we intend to use a similar external peer review approach for both the groundwater loading limit and the land application rate formula to ensure that this recommended component of our regulatory framework is scientifically sound.

Upon our finalization of our two-part conceptual implementation requirement, we will forward it to the Central Valley Water Board for its evaluation as the preferred option to satisfy the final numeric dairy waste land application rates component of the regulatory framework.

2. Time Schedule for Compliance with Final Numeric Land Application Rates

It will undoubtedly take time for existing dairies to come into compliance with the final numeric nitrogen land application rates described above. Therefore, the next component of the regulatory framework is a time schedule for existing dairies to come into compliance with those final application rates. The Central Valley Water Board must establish one or more deadlines (e.g., for different categories of existing dairies) for existing dairies to achieve compliance with the final land application rates. The final time schedule shall reflect a realistic assessment of the shortest practicable time required to achieve compliance and the considerations we set forth below.

We recognize that, given the current realities as recounted by the CVDRMP's SRMR,[166] it will take significant time for the dairy industry and other relevant collaborators to develop the treatment and technological capacity and associated markets for exporting manure-nitrogen off dairies, and denitrification or other manure treatment technologies for existing dairies to progressively limit the amount of manure

[165] See Health & Saf. Code, § 57004 (requiring any California Environmental Protection Agency board, department, and office to submit for external scientific peer review the "scientific basis" and "scientific portions" of proposed rules).

[166] See, e.g., CVDRMP Summary Representative Monitoring Report, pp. 26-27, § 1.6.4.

land applied to cropland—particularly at a scale sufficient for industry-wide compliance with the Nitrogen Discharge Limit. The CVDRMP's SRMR concluded that exporting untreated liquid and solid manure may be cost-prohibitive for many dairies and potentially impracticable in terms of the current limited market demand for these waste products relative to the amount generated at dairies industry wide.[167] Manure treatment technologies can range from relatively high-technology processes such as anaerobic digestion to produce energy to relatively low-technology management practices such as composting. The resulting material from both of these processes can be more easily transported off the dairy and can be used for a wider variety of purposes than raw manure due to the weight and volume reduction in addition to the reduction in pathogens, but neither technology currently exists at sufficient scale. Additional treatment technologies, such as using vermiculture composting to denitrify liquid manure, may not be cost-effective unless a market for the resulting product is developed.[168]

The Nonpoint Source Policy highlights the challenges of reversing decades of practices that cause nonpoint source pollution and acknowledges the need for time:

> Current land use management practices that have resulted in NPS [nonpoint source] pollution have a long and complicated physical, economic and political history. In addition to the need for resources, forging a new history of pollution control will take time and commitment, as well as a willingness to examine the use of practices that have resulted in current [nonpoint source] pollution discharges and the barriers to change. Therefore, it is expected that it will take a significant amount of time for the [regional water boards] to approve or endorse [nonpoint source] control implementation programs throughout their regions, and even longer for those programs to achieve their objectives.[169]

[167] *Id*., pp. 65-70, §§ 3.2.1 to 3.2.2 (providing cost estimates to export solid and liquid manure).
[168] *Id*., pp. 12-13, § 1.5.2.
[169] Nonpoint Source Policy, p. 16.

Some existing dairy operators recognize the need to reduce manure-nitrogen loading and are employing new strategies to do so.[170] The CVDRMP's SRMR recognizes that dairy operators must stand ready to engage with all willing partners in government and academia to develop strategies to meet water quality requirements. We are encouraged by this recognition and commitment.

Bearing in mind the above considerations, the Central Valley Water Board is directed to establish the deadline for existing dairies to comply with the final numeric nitrogen land application rates consistent with CV-SALTS. That is, the Central Valley Water Board shall require each existing dairy to comply "within a term as short as practicable for each discharger or category of dischargers participating in the management zone but in no case longer than 35 years."[171, 172]

The same considerations do not apply equally to the Central Valley Water Board establishing compliance deadlines for new dairies that commence operations after the Central Valley Water Board adopts its final numeric dairy waste land application rates in the revised dairy general waste discharge requirements. Any new dairies should be designed to immediately comply with the final land application rates.

3. Interim Numeric Land Application Rates

It is critical that existing dairy operators start making measurable progress in reducing their land application, as soon as possible, and continue to make progress throughout the time schedule described above, culminating in compliance with the final

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[170] See CVDRMP Summary Representative Monitoring Report, § 3.22, pp. 68-70 (reporting that some dairy operators recognize there is excess nitrogen in liquid manure and are diverting nitrogen from liquid to solid storage for export).

[171] Central Valley Water Board Resolution R5-2020-0057 (Revisions to the water quality control plans for the Sacramento River and San Joaquin River Basins and the Tulare Lake Basin to incorporate revisions to CV-SALTS, included as attachment A to the resolution), at pp. 85-86, available at: <http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2020-0057_res.pdf> (as of Aug. 6, 2024).

[172] This direction satisfies the Nonpoint Source Policy's requirement that a nonpoint source control implementation program include a specific time schedule no longer than that which is reasonably necessary to achieve the program's water quality objectives. (Nonpoint Source Policy, p. 13, Key Element 3 and succeeding commentary.)

land application rates. Therefore, the imposition of enforceable interim numeric land application rates or other milestones and corresponding deadlines is a component of the regulatory framework.[173] We leave the determination of the specific interim rates or milestones and the corresponding deadlines to the reasoned judgment of the Central Valley Water Board, but we urge all due haste. However, we propose that one such interim milestone to be evaluated by the Central Valley Water Board as a preferred option be that all dairies must achieve whole-farm nitrogen balance, as generally described by the CVDRMP's SRMR[174] and discussed in the next section, no later than a deadline specified by the Central Valley Water Board.[175]

Lastly, the Central Valley Water Board should also consider whether other types of interim requirements related to land application are appropriate. For example, in addition to interim land application rates, the revised dairy general waste discharge

[173] This direction corresponds to the Nonpoint Source Policy's requirements that a nonpoint source control implementation program include "corresponding quantifiable milestones designed to measure progress toward reaching the specified requirements" and "sufficient feedback mechanisms so that the regional water board, dischargers, and the public can determine whether the program is achieving its stated purpose(s), or whether additional or different [management practices] or other actions are required." (Nonpoint Source Policy, p. 13, Key Elements 3 & 4.)

[174] CVDRMP Summary Representative Monitoring Report, pp. 10, § 1.5.1.1, pp. 51-51, § 2.4.3.

[175] This order puts all existing dairies, including dairies that may expand in the future, and potential new dairies on notice that they need to cease causing or contributing to exceedances of the nitrogen water quality objective in groundwater. As a result, existing dairies can start planning and taking action without waiting for the Central Valley Water Board to adopt its revised dairy general waste discharge requirements. Assuming that the Central Valley Water Board chooses to include whole-farm nitrogen balance as an interim requirement in its revised dairy general waste discharge requirements, we believe that it is likely that the dairies that are existing at the time the Central Valley Water Board adopts its revised dairy general waste discharge requirements would be able to achieve whole-farm nitrogen balance within approximately eight years of our adoption of this order if they start now. Similarly, we believe that new expansions and new dairies that commence operations after the date of this order but prior to the Central Valley Water Board's adoption of the revised dairy general waste discharge requirements should be designed to achieve whole-farm nitrogen balance immediately.

requirements could include interim requirements that apply to "outlier dairies"[176] or interim requirements to phase out the use of synthetic fertilizer products on dairy cropland that is also being used for land application within a certain number of years.[177]

4. Whole-Farm Nitrogen Accounting

The CVDRMP's SRMR states that evidence from individual dairies' reports suggests that many dairies are not properly accounting for all of the dairy waste that they are generating and that "[l]arge amounts of unaccounted-for nitrogen, combined with imprecision in measurement of applied nitrogen and irrigation water, can result in overapplication of nitrogen to crops and reduced [nitrogen use efficiency]."[178] Therefore, another component of our new regulatory framework is a more accurate nitrogen accounting method to measure compliance with the interim and final numeric nitrogen loading rates. For this component, we specify that the accounting approach must be based on the CVDRMP's SRMR's whole-farm nitrogen balance concept.[179]

The SRMR includes a series of recommendations which, through coordinated and likely phased implementation efforts, would achieve a "whole-farm nitrogen balance." According to the CVDRMP's SRMR, a whole-farm nitrogen balance approach requires all nitrogen generated at the dairy be accounted for (e.g., applied to land, exported from the farm, denitrified from the root zone, lost from pond seepage, and lost through volatilization from the waste retention ponds). According to the CVDRMP's

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[176] We described the general outlier concept in Order WQ 2018-0002. (State Water Board Order WQ 2018-0002, p. 52.) For the revised dairy general waste discharge requirements, the Central Valley Water Board has the discretion to define outliers as those dairies that apply substantially more dairy waste per acre of land than most other dairies, or by any other meaningful metric.

[177] The CVDRMP's SRMR recognizes that because some dairies do not have the infrastructure to distribute liquid manure to all their cropland, some dairy cropland receives only synthetic fertilizers. According to their cost estimates across several approaches, the savings in foregoing purchases of synthetic fertilizers may pay for the capital costs to improve the infrastructure to make better use of the manure nitrogen (assuming the dairy has excess liquid manure) within four to six years—while achieving a significant nitrogen loading reduction from the land application of dairy waste. (CVDRMP Summary Representative Monitoring Report, p. 71, § 3.2.3.)

[178] *Id*., p. 10, § 1.5.1.1.

[179] *Ibid*.

SRMR, achieving whole-farm balance requires dairies to apply manure nitrogen to crops at "proper" rates, which includes accounting for the differences of nitrogen in liquid and solid manure.[180] A dairy achieves whole-farm nitrogen balance when it applies nitrogen on crops at no more than appropriate agronomic rates. All excess nitrogen must be removed from the dairy (exported) or through other treatments (e.g., denitrified on farm). The CVDRMP's SRMR posits that, upon all dairies achieving whole-farm balance, dairy discharges to groundwater would not unreasonably affect beneficial uses.[181]

In Section III.A.3, we endorsed the development of land application limits based on the whole-farm-balance concept and strategy—but only as interim land application rates. Whether or not the Central Valley Water Board chooses to include whole-farm nitrogen balance as an interim milestone in the revised dairy general waste discharge requirements, we believe that the whole-farm nitrogen balance concept should be used, at least in the interim, as an *accounting* approach that dairies should use to quantify the amount of nitrogen in the dairy waste that they generate, and therefore must dispose of, as an alternative to developing an extensive monitoring system.[182] To develop a technically-sound whole-farm nitrogen accounting approach, we task the Central Valley Water Board with consulting with technical experts and dairy industry representatives and other stakeholders to obtain information and evaluate the technical issues pertinent to developing a whole-farm nitrogen accounting approach. Such technical issues include identifying a fixed amount of nitrogen generated per cow, based on the type of cow (e.g., age, sex, milking, etc.); the volatilization rate of nitrogen; and any other

[180] *Id*., p. 27, § 1.6.4. The CVDRMP's Summary Representative Monitoring Report does not explain what "proper" rates are, but it appears from the context that it may be referring generally to agronomic rates. Because agronomic rates are used for efficient crop production, they are not necessarily protective of groundwater quality. We believe that, in many cases, the application of dairy waste at agronomic rates would not comply with the Nitrogen Discharge Limit.

[181] *Ibid*.

[182] We expect that the nitrogen losses to groundwater from existing waste retention ponds would be based on actual, not estimated, pond leakage rates. The Central Valley Water Board may conclude that waste retention ponds that are constructed in accordance with the default pond construction requirement described in Section III.B.3 should be assumed to have zero leakage.

issues necessary for a technical accounting for all nitrogen inputs and outputs occurring on a dairy. In the interest of promoting the development of a scientifically sound whole-farm nitrogen accounting approach, we also require that the Central Valley Water Board have its whole-farm nitrogen accounting approach independently peer reviewed in a manner similar to that required by Health and Safety Code 57004.

Although it will take time to develop the whole-farm nitrogen accounting approach, we hereby direct the Central Valley Water Board to require dairies to begin reporting all available data necessary to evaluating whole-farm nitrogen balance upon its adoption of the revised dairy general waste discharge requirements. Such data includes, but is not limited to, the herd size, type of cows, amount of fertilizer application, amount of cropped acreage and types of crops, amount of manure exported or treated, the herd's total excreted manure in liquid and solid form, volatilization loss, the amount of milk produced in lactating cows, dry matter intake, concentration of crude protein of total ration provided to heifers, amount of acreage to which liquid and solid manure is applied, amount of acreage to which manure is applied by a third party, the amount of acreage applied to leguminous crops, the amount of nitrogen uptake in the various types of crops, the yield of the crops, and the amount of nitrogen in irrigation water and the volume of water applied.

This schedule assumes that peer review of the whole-farm nitrogen accounting approach will occur before the Central Valley Water Board adopts its revised dairy general waste discharge requirements. For that reason, we recommend the Central Valley Water Board initiate its consultation with technical experts and others regarding the whole-farm nitrogen accounting approach as soon as possible.

5. Additional Land Application Elements

The CVDRMP's SRMR identifies a package of technical recommendations for improving land application practices to be implemented in the near term. We generally agree with most of the CVDRMP's SRMR's recommendations. While the following elements are too specific and generally involve too much discretion to be identified as required components of the regulatory framework for nitrogen discharges, we direct the Central Valley Water Board to address the following specific near-term measures in its

revised dairy general waste discharge requirements consistent with our discussion of each near-term measure, below. The Central Valley Water Board may, of course, include any additional requirements in the revised dairy general waste discharge requirements as it deems appropriate.

a. Measures for More Accurate Whole-Farm Nitrogen Balance Accounting

First, measures and tools for collecting data to improve the accuracy of whole-farm nitrogen accounting are required. These include utilizing the specified sampling protocols for solid manure to estimate the amount applied to fields or exported[183] and installing electronic flow meters for liquid manure application to fields and related operational protocols.[184] These measures will improve the quantification of the herd's excretion rate, aid the partitioning of solid and liquid manure, improve sampling protocols for solid and liquid manure and improve estimates of the nitrogen in the harvest removed from fields.[185] These measures are critical for dairies to develop more accurate accounting of the amount of nitrogen they are generating, as well as its fate.

b. Continue Using the CVDRMP's Representative Well Monitoring Program

Second, the CVDRMP's representative well monitoring program, including any future adjustments determined to be appropriate by the Central Valley Water Board, should continue to be used. The well monitoring network monitors only a fraction of all the dairies (approximately 400 wells at 40 of the approximately1,600 dairies), but the process that the CVDRMP's used to select a representative subset of dairies to monitor was reasonably robust and scientifically sound. The process was peer reviewed and included input from academia. The number and placement of monitoring wells at each representative dairy (approximately 10 wells per dairy) provides for a reasonable assessment of conditions at each representative dairy. We have concluded that the

[183] *Id*., p. 53, § 2.5.1.
[184] *Id*., pp. 53-54, § 2.5.2.
[185] *Id*., pp. 54-55, § 2.5.3.

monitoring network appears to provide data that is sufficiently representative of nitrogen impacts to groundwater at the non-monitored sites.

c. An Increased Role for the CVDRMP

Third, the Central Valley Water Board should strongly consider an increased role for the CVDRMP. The CVDRMP proposes a role similar to that of an irrigated lands regulatory program third-party coalition to help with administering the CVDRMP's recommendations. As we explained in the Nonpoint Source Policy, third parties can help to leverage limited staff resources by interacting directly with the dischargers, including providing technical support and assisting with data collection and reporting.[186] Specifically, the CVDRMP's SRMR proposes to take on a broader role in analyzing its dairy members' submitted data, tracking the industry's performance, monitoring progress with respect to whole-farm balance and compliance with educational requirements, and continuing groundwater monitoring and reporting activities.[187]

There are, however, important differences between third parties for irrigated lands and third parties for dairies. As we explained above, dairies' historic and current land application of dairy waste has functioned primarily as a method of waste disposal, unlike traditional growers' land application of fertilizers primarily to grow crops. Further, the dairy industry has a history of regulation that includes direct reporting to the Water Boards, including in the Dairy General WDRs. For these reasons, unlike the third-party approach we described in our Order WQ 2018-0002, we have concluded that any form of anonymized reporting for dairies by the CVDRMP would be inappropriate.

d. Education to Improve Nitrogen Efficiency

The CVDRMP's SRMR recommends that the revised dairy general waste discharge requirements include a requirement that dairy operators complete a basic course on improving nitrogen uptake efficiency. The CVDRMP's SRMR requests that the course be developed by the California Dairy Quality Assurance Program working in collaboration with the CVDRMP, the Central Valley Water Board, the University of

[186] Nonpoint Source Policy, pp. 8-9.
[187] CVDRMP Summary Representative Monitoring Report, p. 33, § 2.1.2.

California Cooperative Extension, and other interested parties. The purpose of the course is to help dairies better understand how to calculate whole-farm nitrogen supply and demand, improve nitrogen use efficiency in forage crops used in land application, and learn strategies to manage and export solid and liquid manure.[188]

The CVDRMP's SRMR also recommends that additional educational opportunities be offered to dairies on a voluntary basis, all geared towards a more detailed understanding of increasing nitrogen use efficiency. The CVDRMP's SRMR identifies the following topics that it would develop into an educational program: various courses on the proper way to use flow meters, sample collection methods, and improved reporting mechanisms; proper manure and harvest sampling techniques; strategies for increasing irrigation efficiency and distribution uniformity; introduction of innovative irrigation systems; alternative strategies for manure management; and the availability of incentive programs (e.g., grant funding) and other related topics.[189] The CVDRMP's SRMR envisions that it and the California Dairy Quality Assurance Program will play an active role in leading these educational opportunities, working in concert with non-governmental organization partners, relevant government agencies, including the California Department of Food and Agriculture and the United States Department of Agriculture's Natural Resources Conservation Service, and trade organizations. We agree that these or similar opportunities will be beneficial.

e. Replace the Strict Field-By-Field Accounting with a Pragmatic Approach of Grouping Fields

The CVDRMP's SRMR states that the strict field-by-field accounting scheme for nitrogen inputs and outputs required by the Dairy General WDRs is ineffective and impractical, due primarily to challenges in accurately quantifying individual crop field liquid nitrogen manure applications.[190] The CVDRMP's SRMR explains that examples of these challenges include: multiple fields being irrigated and receiving manure applications simultaneously but without the ability to separately account for those

[188] *Id*., p. 19, § 1.5.4
[189] *Id*., p. 11, § 1.5.1.5, p. 19, § 1.5.4.
[190] *Id*., p. 32, § 2.

applications; tailwater runoff from one field being used as irrigation water for another field; and crops being harvested on an overlapping basis and not on a per-field basis. As a result, the CVDRMP's SRMR concludes that the A/R ratios reported by the dairies are estimates based on broad averaging schemes and do not represent accurate individual field calculations.[191]

In recognition of those practical difficulties, the CVDRMP's SRMR recommends dairies be allowed to group fields or portions of fields in a practical manner that provides flexibility to dairies. We agree that reporting for multiple fields should be permissible, but only to the extent that the reported area has the (1) same crop type, (2) the same fertilizer inputs, (3) the same irrigation management, and (4) the same land application practices. This is consistent with the approach we took in Order WQ 2018-0002.[192]

f. Irrigation and Nitrogen Management Plan Reporting Requirements

The CVDRMP's SRMR generally endorses many of the irrigation and nitrogen planning and reporting concepts we required in Order WQ 2018-0002. Those plans require data analysis with the broad goal of identifying actions that can improve efficiencies and performance in the following year's plan. We direct the Central Valley Water Board to require dairies to submit the appropriate elements of Order WQ 2018-0002's irrigation and nitrogen management plans via our GeoTracker database. These elements include, at a minimum, field-level irrigation and management practice implementation and nitrogen application and removal data, including reporting pounds of nitrogen applied minus pounds of nitrogen removed (A-R difference) as a 3-year rolling average.[193] The multi-year reporting can provide appropriate metrics in assessing trends in the magnitude of any over-application of nitrogen and measurable progress towards reducing the nitrogen loading to groundwater. The multi-year A-R difference

[191] *Id*., p. 37, § 2.2.2.
[192] State Water Board Order WQ 2018-0002, pp. 30-31, fn. 88 and accompanying text.
[193] The Central Valley Water Board may choose to also require the reporting of the multi-year ratio of nitrogen application to nitrogen removal (the "A/R ratio" that we discussed in Order WQ 2018-0002) if it determines that it would provide useful information.

information may also be compared to groundwater quality trend monitoring data to evaluate and verify conclusions about the methodologies of management practices.[194] Because standardized, comparable data reporting is so important to the success of our programs, we make this requirement precedential for the other regional water boards, too.

B. Waste Retention Ponds

While the ultimate objective of our new regulatory framework is for dairies to comply with the Nitrogen Discharge Limit for all sources of dairy waste discharges, the components of our regulatory framework to control waste discharges to groundwater from dairies' waste retention ponds are informed, in significant part, by the relatively low magnitude of nitrogen groundwater loading from existing waste retention ponds as compared to the loading from land application of dairy waste. The regulatory framework includes one component for each category of dairy waste retention ponds: (1) existing[195] ponds that do not have hydraulic continuity to groundwater, (2) existing ponds that may have hydraulic continuity to groundwater, and (3) new ponds and reconstructed existing ponds. For each of these three components, we have developed proposed requirements that we direct the Central Valley Water Board to evaluate as preferred options to implement the component.

The CVDRMP's SRMR observed that earthen waste retention ponds that do not have hydraulic continuity to groundwater and are properly managed to maintain the integrity of the ponds' containment, including the sealing layer that forms on the bottom of the pond over time, generally discharge much less dairy waste to groundwater via seepage compared to earthen waste retention ponds that do have hydraulic continuity to groundwater.[196] We recognize that retrofitting existing earthen waste retention ponds

[194] The A-R difference may also be used to inform a dairy's N application practices in relation to other similar farmers, and the information can be incorporated into subsequent N planning to adjust for future N application.
[195] A waste retention pond is "existing" within the meaning of the regulatory framework established by this order if it is in operation as of the date the Central Valley Board adopts its revised dairy general waste discharge requirements.
[196] CVDRMP Summary Representative Monitoring Report, pp. 56-57, § 2.7.

with liner systems can be more expensive and logistically difficult than constructing new ponds with liner systems because the existing ponds must be taken out of service for an extended period of time while the dairy waste continues to accumulate. We believe that it is reasonable to assume that any pond that has at least five feet of vertical separation between the floor of the pond and the highest groundwater elevation level does not have hydraulic continuity with groundwater.

Therefore, to determine which existing waste retention ponds may have hydraulic continuity to groundwater, we direct the Central Valley Water Board to use the best available existing data and information to identify all of the dairies that may have five feet or less vertical separation between the floor of the pond and the highest groundwater elevation level. For those dairies, within one year of our adoption of this order, the Central Valley Water Board shall issue a Water Code section 13267 order directing the dairies to demonstrate, if they can, that their existing waste retention ponds do not have hydraulic continuity with groundwater. Such a demonstration requires a dairy to submit data that shows that there is no hydraulic connection between the pond and the reasonably anticipated future high groundwater elevation mark, including the capillary fringe. All demonstrations must be confirmed by a professional engineer or professional geologist licensed in California.

If a dairy cannot demonstrate that there is no hydraulic continuity with groundwater for any of its existing waste retention ponds, those ponds will be subject to the component of the regulatory framework that applies to ponds that may have hydraulic continuity to groundwater.

1. Existing Waste Retention Ponds that do not have Hydraulic Continuity to Groundwater

We have developed a proposed interim requirement for the Central Valley Water Board's evaluation as the preferred option for implementing the regulatory framework's component for existing earthen waste retention ponds that do not have hydraulic continuity to groundwater. We did not develop any proposed final requirements for the Central Valley Water Board to evaluate, so the Central Valley Water Board is free to

evaluate and adopt any final requirements for these ponds that it determines are directly correlated to these ponds achieving compliance with the Nitrogen Discharge Limit.

Our proposed interim requirement is that existing waste retention ponds that do not have hydraulic continuity to groundwater be required to meet a seepage rate of 0.9 millimeters per day established by the U.S. Department of Agriculture, Natural Resources Conservation Service.[197] Performing a seepage rate test using a water balance approach requires the hydraulic isolation of the pond under evaluation by controlling operational inflows and outflows and understanding the overall local hydraulic conditions. The seepage rate is computed by measuring the lowering of the water level and subtracting evaporative losses from the water surface. The seepage rate would have to be confirmed by a licensed professional (i.e., a professional engineer or professional geologist licensed in California) and be performed every three years. We also recommend that the Central Valley Water Board determine the best way to schedule all dairies to complete the triennial seepage rate tests over time (i.e., staggering the dates), due to a limited number of available licensed professionals.

The Central Valley Water Board should consider imposing additional requirements in the revised dairy general waste discharge requirements to implement

[197] The Natural Resources Conservation Service (NRCS), Conservation Practices Standard (CPS), Code 313, applicable to agricultural waste storage impoundments, used to minimize or eliminate impacts to groundwater, provides that a liner for an impoundment in soil should meet or exceed the design standard specified in NRCS CPS Code 520. (NRCS, CPS, Code 313, p.313-CPS-3, available at: <http://www.nrcs.usda.gov/sites/default/files/2023-08/313_NHCP_CPS_Waste_Storage_Facility_2023.pdf> (as of July 30, 2024)). CPS Code 520 specifies that, unless applicable regulations specify a more restrictive rate, a liner for waste storage impoundments to reduce seepage rates should be established, at a minimum, in accordance with the rates specified in the National Engineering Handbook, Part 651, Chapter 10, Appendix 10D. (NRCS, CPS, Code 520, p.520-CPS-1, available at: http://www.nrcs.usda.gov/sites/default/files/2022-09/Pond_Sealing-Liner-Compacted-Soil-520-CPS-May-2016.pdf> (as of July 30, 2024). The permeability standard specified in Part 651, is 0.0028 feet per day, equivalent to 1x10-6 centimeters per second, which approximates to 0.85 millimeters per day. (NEH, Part 651, chpt. 10, appen. 10D, p.7, available at: <http://irrigationtoolbox.com/NEH/Part%20651%20AWMFH/awmfh-chap10-app10d.pdf> (as of July 30, 2024).) For our proposed permeability requirement, we round the 0.85 millimeters per day permeability standard to 0.9 millimeters per day.

this component of the regulatory framework if site-specific groundwater quality data indicates that the Nitrogen Discharge Limitation is not being met despite compliance with the seepage rate. We also recommend that the Central Valley Water Board consider requiring additional measures to be implemented if the seepage rate is not met initially, to ensure the seepage rate is ultimately met -- unless the dairy can demonstrate that the leachate seeping out of the pond does not exceed 8 mg/L nitrogen.

The rationale for this proposed interim requirement is that pond liners are expensive,[198] and ponds are responsible for a small fraction of nitrogen loading from dairies, as discussed in Section I.F.1.[199] This approach would allow dairies that are meeting the interim seepage rate to focus their efforts and resources first on reducing land application nitrogen loading.

We recognize that for some dairies, performing the seepage rate test may not be feasible. For example, while valves may be installed to shut off operational inflows, the test is not feasible for those dairies that have only one waste retention pond because generally dairy waste flows are constant over time. Seepage tests are also subject to inaccuracies in measurements due to changes in weather patterns such as precipitation and evaporation; timing and availability of professionals with expertise in performing seepage tests may prove to be cost prohibitive. Also, waste retention ponds with subsurface infrastructure may not be able to feasibly support redirecting flows (for example, to storage tanks) to be able to accurately measure seepage.

Therefore, we recommend that the Central Valley Water Board consider allowing dairies that cannot feasibly perform the seepage rate test to meet an alternative method to be developed by the CVDRMP, subject to approval of the Central Valley Water Board. Additionally, in anticipation of this eventuality, we recommend that the Central Valley Water Board consider requiring the CVDRMP to identify the general

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[198] Cost estimates to line, rebuild, or relocate existing waste retention ponds are included as an attachment to the Dairy General WDRs (see Memorandum from John Schaap and Steve Bommelje, Provost and Pritchard, to Theresa A. Dunham, Somach, Simmons & Dunn, *Costs to Retrofit Existing Dairies That Do Not Have Tier 1 or Tier 2 Lagoons* (Aug. 2013). See also CVDRMP Summary Representative Monitoring Report, § 3.2.5, pp. 75-77.

[199] CVDRMP Summary Representative Monitoring Report, p. 9, § 1.4.2.

characteristics of waste retention ponds for which the seepage rate test cannot be feasibly performed.

Because the seepage rate is not directly related to meeting the Nitrogen Discharge Limit, we emphasize that our proposed requirement to use the seepage rate is only an interim requirement. To fully implement this component, the Central Valley Water Board must develop final requirements and a corresponding time schedule for all existing waste retention ponds that do not have hydraulic continuity to groundwater to ultimately comply with the Nitrogen Discharge Limit.

2. Existing Waste Retention Ponds that May Have Hydraulic Continuity to Groundwater

For existing waste retention ponds where the dairy cannot make the demonstration that there is no hydraulic continuity with groundwater, our proposed requirement is for the dairy to implement the "default pond construction standard" described in the section that follows. We also recommend that these dairies must implement the default pond construction standard as soon as is practicable, but not later than three years from the date the Central Valley Water Board determines that the waste retention pond is in hydraulic continuity with groundwater.

3. New Waste Retention Ponds and Reconstructed Existing Waste Retention Ponds

This component applies to new waste retention ponds[200] and to reconstructed existing waste retention ponds. An existing waste retention pond is considered to be "reconstructed" if either (i) additional infrastructure that either increases the pond's capacity, or modifies the pond's footprint, is added to the existing pond, or (ii) there is a substantial disruption to the integrity of the containment system of the pond (e.g., by removing a significant portion of the sealing layer). Our proposed implementation requirements for this component include both a default pond construction standard and

[200] A waste retention pond is "new" within the meaning of this order if it is constructed or first becomes operational after the Central Valley Water Board adopts its revised dairy general waste discharge requirements.

an alternative pond construction standard. There should be no need for a compliance schedule to comply with the construction standards for new waste retention ponds or for planned reconstruction of an existing waste retention pond, but the Central Valley Water Board should consider either including a compliance schedule in the revised dairy general waste discharge requirements or using individual enforcement orders to establish compliance schedules for any unplanned (e.g., resulting from an accidental disturbance of the sealing layer) reconstruction of existing waste retention ponds.

Our proposed default pond construction requirement is a double synthetic liner with a leachate collection system. The leachate collection system would be subject to monitoring requirements, as determined by the Central Valley Water Board.

We also propose that the Central Valley Water Board retain the ability to approve single synthetic liners with electrical leak detection and vadose zone monitoring as an alternative to the default construction standard if the dairy can show that there is a vadose zone (which can be created, if necessary, by elevating the bottom of the pond or lowering the water table) and the dairy is able to repair any liner leaks by temporarily diverting the full contents of the pond and the future influent dairy waste stream into another appropriate waste containment unit (such as another pond or a tank).

We further recommend that, if a portion of an existing pond becomes subject to the default construction standard or alternative construction standard, the entire pond should be subject to the applicable construction standard to ensure liner integrity.

With respect to the liners required by the Central Valley Water Board (e.g., our recommended default pond construction standard's double liner requirement or an alternative single liner standard), the Central Valley Water Board shall consider requiring that all liners be installed on both the side walls and the bottom of the pond and be designed and constructed under the direct supervision of a California licensed professional engineer.

Pond liners can leak for a variety of reasons, including poor installation, punctures, or general wear from ultraviolet light. If the Central Valley Water Board includes a single liner alternative construction standard, the Central Valley Water Board shall consider requiring that any leak must be repaired. If the Central Valley Water Board includes a double liner construction standard, the Central Valley Water Board

shall consider adding a requirement that any leak in the uppermost liner above an appropriate threshold rate established by the Central Valley Water Board must be repaired. Finally, the Central Valley Water Board shall consider including appropriate monitoring requirements for waste retention ponds that are in compliance with the Central Valley Water Board's construction standard(s).

C. Provision of Alternative Water Supplies

As we have discussed, the disposal of dairy waste has resulted in groundwater exceeding the MCL for nitrate in some areas of the Central Valley. Because of the critical drinking water impacts associated with groundwater nitrate contamination, the final component of the regulatory framework for nitrogen discharges is that all dairies that are causing or contributing to exceedances of 10 mg/L nitrate in groundwater must provide alternative water supplies to any residents that rely on that groundwater.

With respect to dairies within the jurisdiction of the Central Valley Water Board, many dairies are already working as part of a collective with other permittees to participate in a management zone consistent with the requirements of CV-SALTS. Where groundwater within a management zone exceeds the nitrate drinking water standard, the management zone participants are required to ensure safe drinking water to all residents within the management zone who are adversely affected by discharges of nitrates. Accordingly, for those dairies currently participating in a management zone, the requirement to provide alternative drinking water supplies is satisfied. However, for any dairy that is causing or contributing to an exceedance of the nitrate drinking water standard that is not participating in a management zone, whether the dairy is located within or outside of the prioritized groundwater basins and sub-basins, the Central Valley Water Board shall promptly require the dairy to provide alternative water supplies to residents reliant on domestic wells for drinking water.

Additionally, this requirement to provide safe drinking water supplies shall be precedential statewide for dairies that utilize manure collection and land application.[201] That is, any such dairies that are causing or contributing to exceedances of 10 mg/L

[201] The specific management practice of land application, which serves as the condition triggering the precedential nature of this order, is detailed in Section III.G.

nitrate in groundwater must implement short-term and long-term alternative water supply solutions to provide safe drinking water to any residents reliant on affected domestic wells. We hereby direct the regional water boards to implement this component promptly, and no later than the deadline specified in Section III.G. The regional water boards shall take into account the information and experience gained by the CV-SALTS program and the SAFER program, and work with our staff to ensure dairies are notified of their obligation to comply with this requirement, domestic wells impacted by nitrates from dairy operations are identified and tested, and residents reliant on affected water are provided with safe replacement water.[202]

D. Antidegradation

As we discussed in detail at Section II.B, above, the Antidegradation Policy establishes the requirement that discharges to waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state. The regulatory framework for nitrogen discharges established by this order provides programmatic-level direction and recommendations for the Central Valley Water Board to ensure that the revised dairy general waste discharge requirements carry out the requirements of state policy and law as reflected in the Water Code, the Nonpoint Source Policy, the Antidegradation Policy, and the applicable Basin Plans. The regulatory framework is intended to enhance water quality and represents a foundational step in the Central Valley Water Board's ongoing effort to ensure all dairy discharges will eventually comply with water quality requirements. Over the long term, the reissued dairy general waste discharge requirements' inclusion of specific implementation requirements consistent with the new regulatory framework will have a significant impact on dairies' waste management, will result in major reductions in nitrogen loading to groundwater, and will have positive health and economic implications for communities reliant on groundwater for drinking water. Because the new regulatory framework for nitrogen discharges is programmatic in nature and leaves substantial discretion regarding the specific implementation requirements to the Central

[202] We recently extended a similar obligation to irrigated agricultural dischargers in the Central Coast region in Order WQ 2023-0081, pp. 24-25.

Valley Water Board, it would be premature for us to conduct an antidegradation analysis at this juncture. The Central Valley Water Board shall conduct an antidegradation analysis at the time that it adopts the revised dairy general waste discharge requirements.

Because the revised dairy general waste discharge requirements will include one or more time schedules for existing and expanded dairy discharges to comply with the Nitrogen Discharge Limit, which will be determined by the Central Valley Water Board consistent with CV-SALTS—a schedule that is as short as practicable but in no case longer than 35 years, the Central Valley Water Board should presume that some of the discharges that it is authorizing may temporarily degrade high quality waters. Therefore, the Central Valley Water Board should evaluate the extent to which allowing the temporary degradation of any high-quality groundwater in the interim is consistent with the maximum benefit to the people of the State, given the economic and social benefits of allowing the discharges versus the water quality impacts and costs to individuals reliant on the receiving groundwater for drinking water, not unreasonably affect present and anticipated beneficial use of such water, and not result, after the expiration of the time schedules, in water quality less than that prescribed by the applicable water quality control plans. Further, the Central Valley Water Board must find that the specific implementation requirements in the revised dairy general waste discharge requirements constitute the best practicable treatment or control.

E. The Human Right to Water

We are mindful of one of our core goals in protecting the quality of waters of the state. We recently recognized the ten-year anniversary of our state's codification of the human right water.[203] Our adoption of Resolution 2016-0010 cements our commitment to considering this right in our actions that involve sources of drinking water. The new regulatory framework for nitrogen discharges is designed to ensure dairy discharges meet the Nitrogen Discharge Limit over time. Ultimately, our goal is to help ensure a safe drinking water supply exists for everyone who relies on groundwater that may be

[203] Wat. Code, § 106.3.

impacted by dairy discharges. We find that the adoption of this order supports the human right to water for consumption, consistent with State Water Board Resolution No. 2016-0010.

F. The California Environmental Quality Act

Under the California Environmental Quality Act (Pub. Res. Code, § 21000 et seq.) (CEQA), a public agency must prepare an environmental impact report for "discretionary projects" it proposes to "approve[]" so long as the agency action is not exempt from CEQA.[204] The Central Valley Water Board was the agency that acted on the Dairy General WDRs, which it adopted in 2013. The benchmark for the Central Valley Water Board's CEQA analysis was its consideration of the environmental baseline, the "'description of the physical environmental conditions in the vicinity of the project at the time … environmental analysis is commenced.'"[205] The Central Valley Water Board determined the receipt of permit applications from "existing dairies," due by October 17, 2005, for reports of waste discharges, provided the physical description of the dairies (including herd sizes) as they existed as of that time and constituted the environmental baseline for the CEQA analysis for the dairy general waste discharge requirements issued in 2007.[206] The Central Valley Water Board concluded that the Dairy General WDRs issued in 2013 supplemented the regulatory requirements already imposed on the existing dairies pursuant to the 2007 Dairy General WDRs, were designed to enhance protection of groundwater resources, did not authorize the expansion of those dairy facilities and did not provide for coverage for new dairies.[207] As a result, the Central Valley Water Board concluded the Dairy General WDRs issued in 2013 were exempt from the provisions of CEQA in accordance with several categorical exemptions.[208]

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[204] Cal. Pub. Res. Code, § 21080, subd. (a).

[205] Dairy General WDRs, p. 4, Finding ¶ 19 (quoting Cal. Code Regs., tit. 14, § 15125, subd. (a)).

[206] *Id*., p. 4-5, Finding ¶¶ 19-20.

[207] *Id*., p. 5, Finding ¶ 20.

[208] *Ibid*.

The regulatory framework established by this order charts out a programmatic-level general strategy for the Central Valley Water Board to implement in its revised dairy general waste discharge requirements to ensure dairies eventually comply with the Nitrogen Discharge Limit for the maintenance and protection of groundwater resources. This order is intended to guide the Central Valley Water Board's reissuance of the revised dairy general waste discharge requirements for all dairies in the Central Valley region.[209]

As discussed in detail above at Section III.A, the regulatory framework's establishment of the Nitrogen Discharge Limit will require eventual compliance with groundwater receiving water requirements and certain nitrogen accounting and reporting requirements and includes specific proposed requirements for the Central Valley Water Board's evaluation as preferred options as it considers adopting the revised dairy general waste discharge requirements.

While the regulatory framework will require dairies to make improvements to their dairy waste management to achieve compliance with the Porter-Cologne Water Quality Control Act and applicable policies for water quality control, the specific implementation requirements will be established by the Central Valley Water Board in the revised dairy general waste discharge requirements. Without knowing the actual implementation requirements or the timeframes for implementing them, any analysis of potential environmental effects at this stage, even at a programmatic level, would be premature and speculative.

The Central Valley Water Board is required to comply with CEQA for its development and issuance of the revised dairy general waste discharge requirements.[210] To the extent that the Central Valley Water Board develops requirements for dairy waste discharges that are not already encompassed by the Dairy

[209] The discussion in this section similarly applies to other regional water board to the extent that they are required to implement the precedential requirements identified in the next section.

[210] We acknowledge that this will be a significant undertaking, so we pledge to assist the Central Valley Water Board with additional funding for this work.

General WDRs,[211] and therefore not accounted for in a prior CEQA analysis, the Central Valley Water Board's environmental analysis shall evaluate any significant direct, indirect, and cumulative effects of regulatory requirements imposed by the revised dairy general waste discharge requirements to be adopted. To be clear, our expression of proposed requirements as preferred options in this order does not in any way restrict the Central Valley Water Board's consideration of a full range of alternatives and mitigation measures that address environmental issues identified through the CEQA process.

G. Precedential Nature of this Order

As we explained at the beginning of Section III, the entirety of this order's regulatory framework for nitrogen discharges applies to all dairies within the jurisdiction of the Central Valley Water Board. In addition, the Nitrogen Discharge Limit, the four land application components, the requirement to report INMP data via GeoTracker, and the alternative drinking water supplies component are precedential for all dairies that utilize manure collection and land application within any of the other regional water boards' jurisdiction. A dairy "land applies" for purposes of triggering the precedential application of this order if the dairy collects raw manure from the corrals and/or milking barns and distributes the manure on land owned or operated by the dairy. Land application does not include pasture-based dairy operations. If the manure is applied by traditional growers that are not affiliated with a dairy on land that is subject to the Irrigated Lands Regulatory Program, then the land application of manure shall be accounted for in the growers' Irrigation and Nitrogen Management Plan.

Specifically, in addition to the Nitrogen Discharge Limit, the regulatory framework's components that are precedential statewide for other regional board's waste discharge requirements for dairies that collect the manure that they generate and apply it to land are (1) the final land application rates in Section III.A.1, (2) the time schedule requirements for compliance with the final land application rates in Section

[211] *Id*., p. 5, Finding ¶¶ 20(a)-(c) (citing California Code of Regulations, title 14, sections 15031, 15032, and 15304, as applicable categorical exemptions).

III.A.2, (3) the interim land application rates in Section III.A.3, (4) the whole-farm nitrogen accounting approach in Section III.A.4 (but without the need to conduct a peer review if the Central Valley Water Board's peer reviewed approach is used), (5) the submission of field-level irrigation and management practice implementation and nitrogen application and removal data, including reporting pounds of nitrogen applied minus pounds of nitrogen removed (A-R difference) as a 3-year rolling average via our GeoTracker database in Section III.A.5.f, and (6) the requirement to provide alternative drinking water supplies to any residents that rely on affected domestic wells for any such dairy that is causing or contributing to exceedances of 10 mg/L nitrate in groundwater in Section III.C. The other regional water boards also have the discretion to incorporate requirements that are similar to some or all the additional elements in Section III.A.5, as appropriate and subject to the direction that we provide therein.

The other regional water boards for which this order is precedential shall update their dairy waste discharge requirements to include the Nitrogen Discharge Limit and the precedential components no later than three years after the Central Valley Water Board's adopts its revised dairy general waste discharge requirements. To the extent that we afford discretion to the Central Valley Water Board in determining the specific implementation requirements for the precedential components, the other regional water boards are afforded the same discretion, subject to the same obligation to evaluate our proposed requirements as the preferred options as they consider adopting revised waste discharge requirements for dairies.

H. Public Outreach

As we have stated throughout this order, discharges of dairy waste have had very significant impacts on many communities, including disadvantaged communities. As the Central Valley Water Board moves forward with developing its revised dairy general waste discharge requirements consistent with this order, we call attention to the public outreach requirements of Water Code section 189.7. We expect that the Central Valley Water Board will work directly with leaders and representatives of potentially impacted communities to ensure that the Central Valley Water Board is engaging in truly equitable and culturally relevant community outreach to promote meaningful civic

engagement with those communities at all stages of its development of the revised dairy general waste discharge requirements.

IV. ORDER

IT IS HEREBY ORDERED that, for reasons discussed above, the Dairy General WDRs are remanded to the Central Valley Water Board with direction to initiate the development of revised dairy general waste discharge requirements consistent with this order.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on _____.

AYE:

NAY:

ABSENT:

ABSTAIN:

_____

Courtney Tyler
Clerk to the Board