Water quality: What's next and how to prepare for the coming challenges and opportunities

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California Dairy Sustainability Summit
Sacramento, CA

Today's take-home messages

- Changes in water quality regulations are in the works for Central Valley dairies in 2019-2020, driven by a convergence of many factors
- Some of those changes are intended to make compliance with extraordinarily strict state water quality laws easier to achieve
  - *'Easier' is relative*
- There appears to be more emphasis on the practical, 'bigger picture'
  - *Whole-farm nutrient balance*
  - *Practical education for dairy operators*
  - *Being part of the solution for communities with impacted drinking water supplies*
- Soften the blow by planning ahead for infrastructure, management changes on your dairy where they are needed

Major themes to expect in 2019

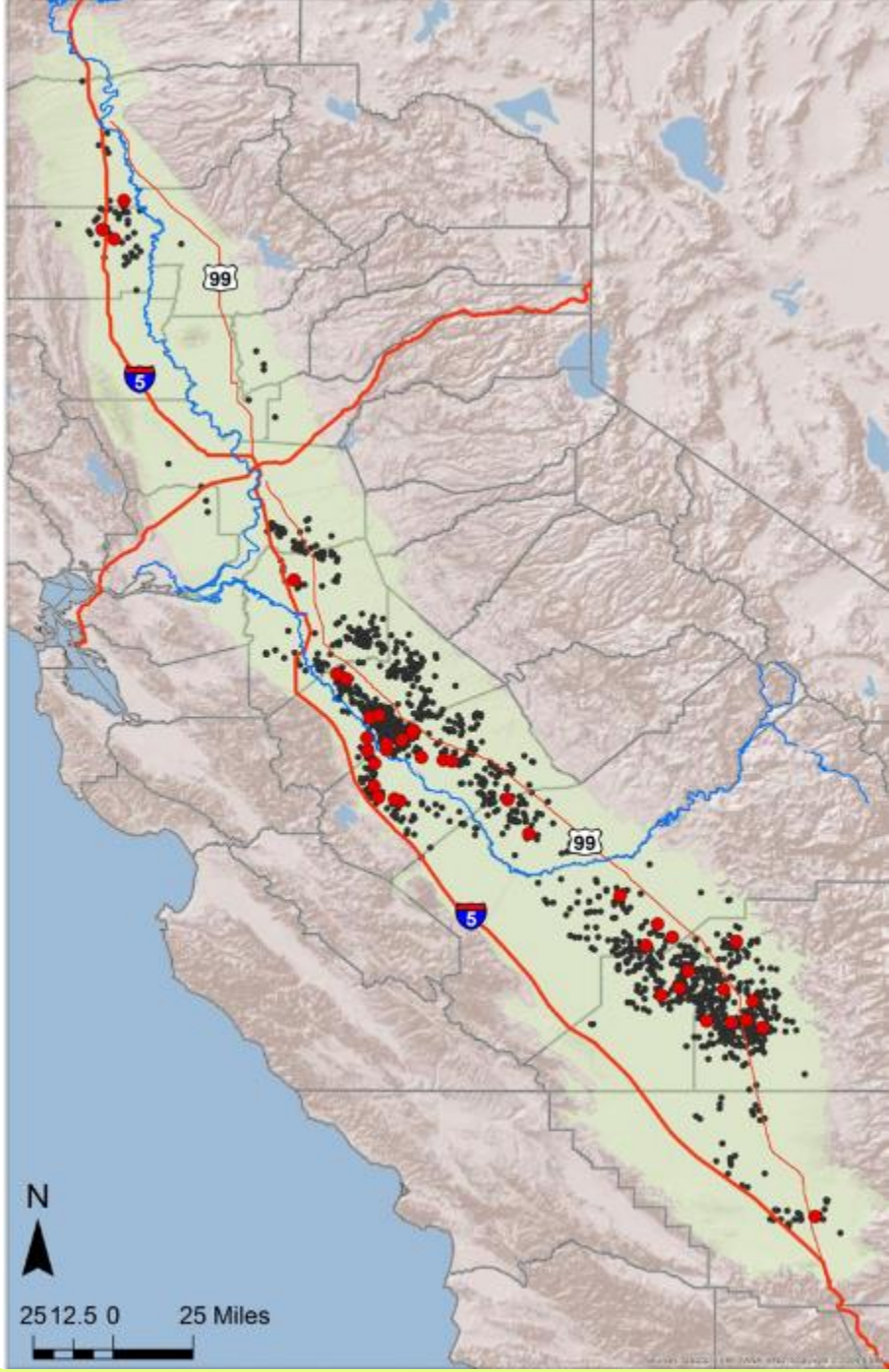
- State Water Resources Control Board scheduled to consider new regulations for a Salt and Nitrate Control Plan
  - *If adopted, will allow more flexible compliance pathway for stringent nitrate objectives*
  - *Dischargers will need to participate in group efforts (Management Zones) to provide drinking water where needed within their areas*
  - *Nitrate-impacted areas 'first in line'*
- 2013 Reissued Dairy General Order calls for a "summary report" and recommendations from industry by April 2019
  - *To be prepared by Central Valley Dairy Representative Monitoring Program*
  - *Must recommend actions to reach compliance with water quality objectives*
- Regional Water Quality Control Board (Central Valley) also interested in aligning dairy regulations with other programs (ILRPs)

CVDRMP will play a major role in 2019

- 2019 will be a year of major discussion of how California dairies are regulated, with emphasis on:
  - *How dairies can participate along with other dischargers in providing drinking water where needed*
  - *What dairies can do to reduce their impacts on groundwater quality (and in some cases, surface water quality)*
- A major voice in the discussion will be the Central Valley Dairy Representative Monitoring Program (CVDRMP), a non-profit association of 1,100 Central Valley dairies that is governed by dairy owners and operators elected by its members.
- On behalf of its members, CVDRMP has conducted groundwater monitoring and numerous technical studies over the last several years to better inform its recommendations.
- CVDRMP's goal is to find the most efficient and practical ways to assist its members in complying with the law, while minimizing costs and maximizing cost-effectiveness.
- CVDRMP's recommendations are just that, and subject to final approval by regulatory authorities (and in some cases, by the courts).

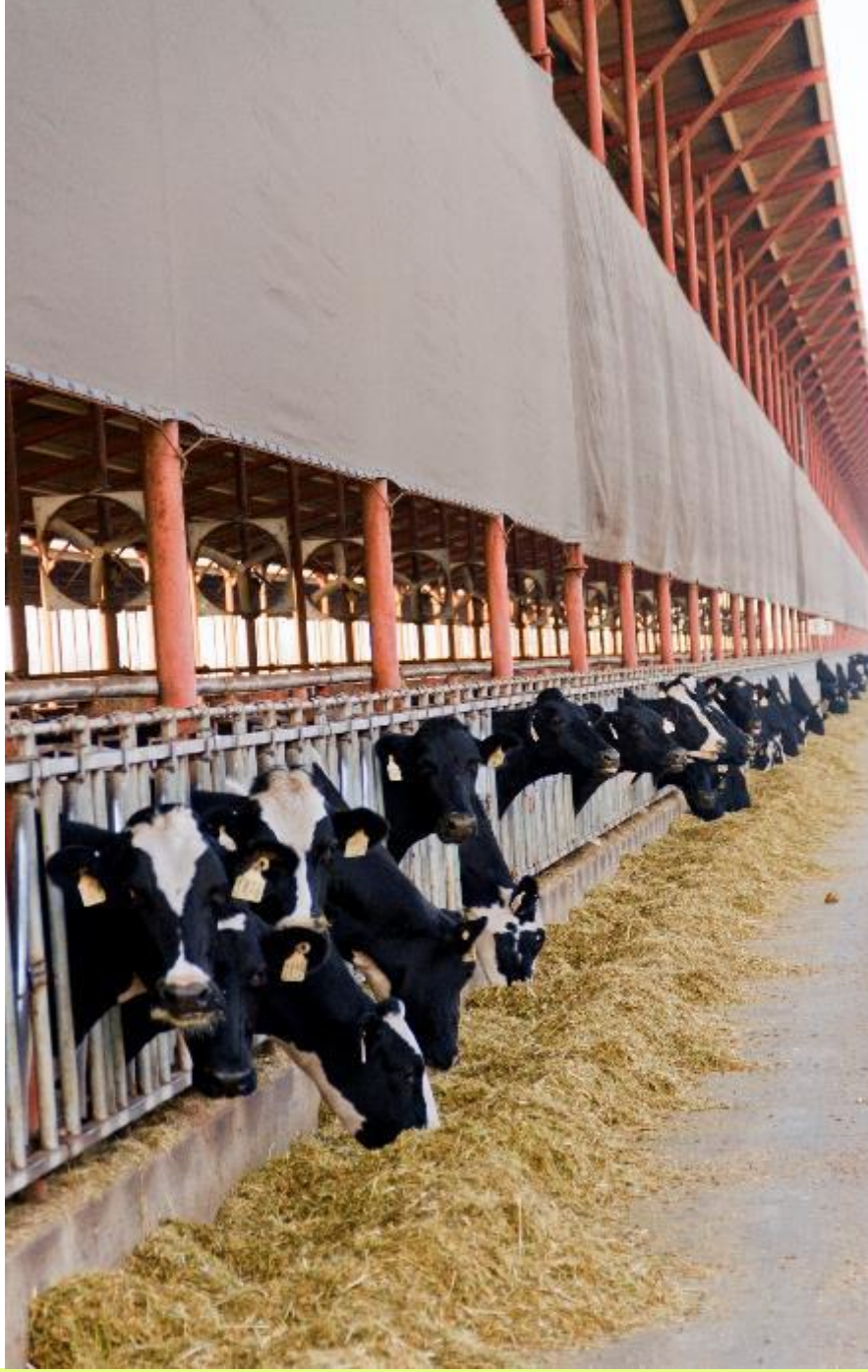
CVDRMP background and purpose

- A regulatory compliance monitoring program
- Alternative to site-by-site monitoring of ~1,100 dairies
- Collects data on a subset of dairies representative of the industry and pertinent site conditions
- 42 monitored dairies, 443 dedicated monitoring wells at 279 well sites
- Phased approach started Jan. 2012 (18 dairies)
- Fully implemented Jan. 2013 (+24 dairies)
- Monthly GW level monitoring
- Groundwater quality monitoring
  - quarterly: 9 constituents
  - annual: 22 constituents



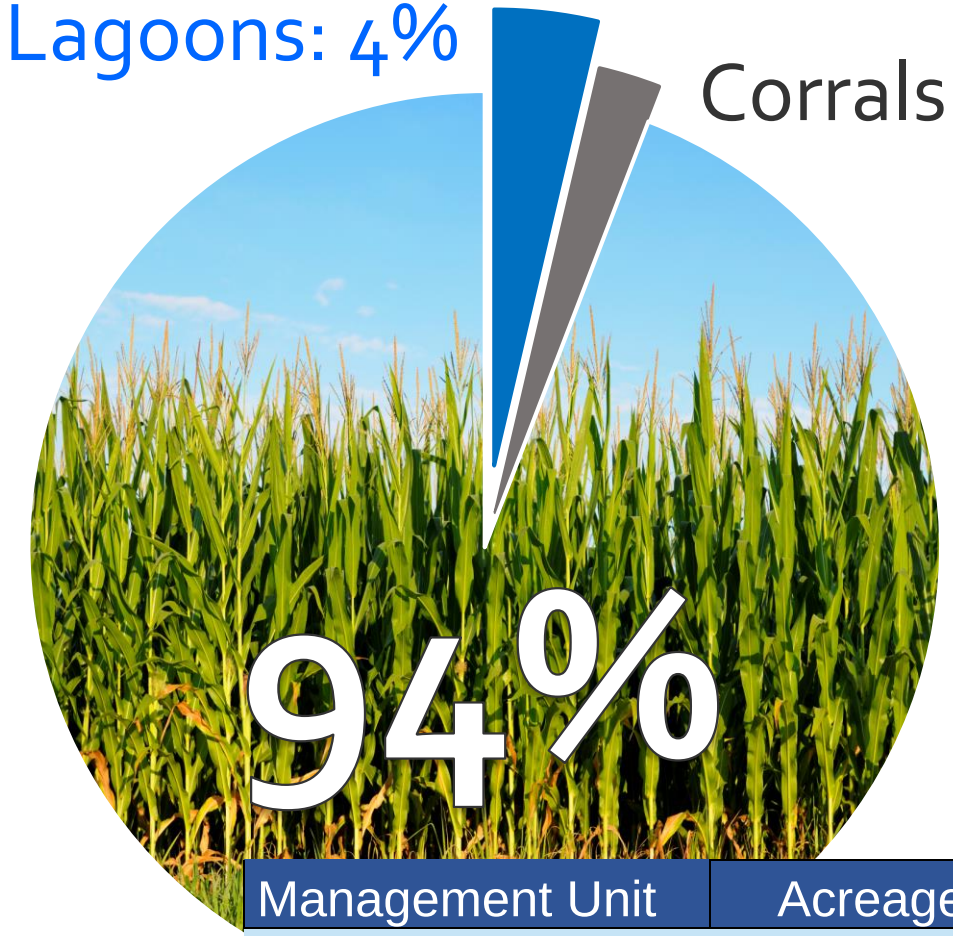
April 2019 Summary Representative Monitoring Report (SRMR)

1. Identify management practices (MPs) that are protective of groundwater quality for the range of conditions found at dairies covered by the RMP
   - RWQCB: protective = meeting drinking water quality objectives; for nitrate as N, 10 mg/L
2. If currently required/used MPs are found not to be protective of groundwater quality, propose solutions and upgrades that will result in compliance
3. Provide implementation schedules for MPs that are as short as practicable, supported with appropriate technical or economic justification, not to exceed 10 years from SRMR approval



Plan's guiding principle

- **CENTRAL/GUIDING GOAL:** Improve groundwater quality by working toward whole-farm nutrient balance and increasing nutrient use efficiency industry-wide
- **WHY?** *Bang for buck.* Measures aimed at improving whole-farm balance and increasing nutrient use efficiency offer most benefits (water quality, improved yields, potential revenue streams) at least cost.



Management Unit	Acreage (ac)
Corrals	30,254
Lagoons	5,877
Manured Fields	429,424

Acreages from: Harter, Dzurella, Kourakos, Bell, King, Hollander. 2017. Nitrogen Fertilizer Loading to Groundwater in the Central Valley. FREP report. October 2017.

Plan walk-through (highlights)

- Build capacity to export/transform excess manure N to positive uses through focused, collaborative partnerships and consistent effort over a reasonable time frame
- Education requirement for dairy operators + greatly increased education offerings
- Flow meters required for manure process water
- Technical improvements to refine nutrient estimates and measurements at different scales
- Improved N accounting to identify unaccounted-for nutrients toward targeting them for export/transformation

Plan walk-through (highlights)

- Continue representative groundwater monitoring as needed to meet requirements and monitor trends
- Coalition general order, similar to ILRPs, in addition to continuing with a modified general order for individuals (under negotiation)
- Range of expanded duties for CVDRMP/coalition around reporting on industry trends in exporting excess N, progress toward achieving necessary technologies, markets and incentives, and providing practical assistance to members

Plan specifics – build exports

- **Recommend that dairy industry (including but not limited to CVDRMP), government, academia and others work together to create conditions needed to achieve industry-wide increased manure N exports, toward achieving an average whole-farm balance after exports**
  - *Requires addressing several interlocking challenges:*
    - ***Markets*** *(understand and develop markets and demand for manure and manure-based products to facilitate export of excess N)*
    - ***Research and development*** *(develop and advance appropriate technologies to process manure in a way that facilitates exports of N in an environmentally beneficial and profitable or cost-effective manner)*
    - ***Incentives/funding*** *(develop incentives and funding that encourage investment in necessary infrastructure and operational changes to facilitate export of N and/or manure products or transformation of N)*
    - ***Outreach and education*** *(Continuous, to promote understanding of solutions as they become available and keep operators on top of the latest information)*

Plan specifics – increase education

- Modify general order to require a minimum amount of dairy operator or key dairy staff education in area of reducing N leaching (via UCCE, CDQAP or other approved outlet); curriculum approved by CDQAP/CVDRMP with input from RB5
- Ramp up educational offerings for dairy operators; focus on NUE, facilitating exports, familiarizing producers with solutions, existing technology and research. *Serve in advisory role as to what/how much needed.*
- As solutions, programs and funding become available, get this information to producers quickly and efficiently

Plan specifics – enhanced technical requirements

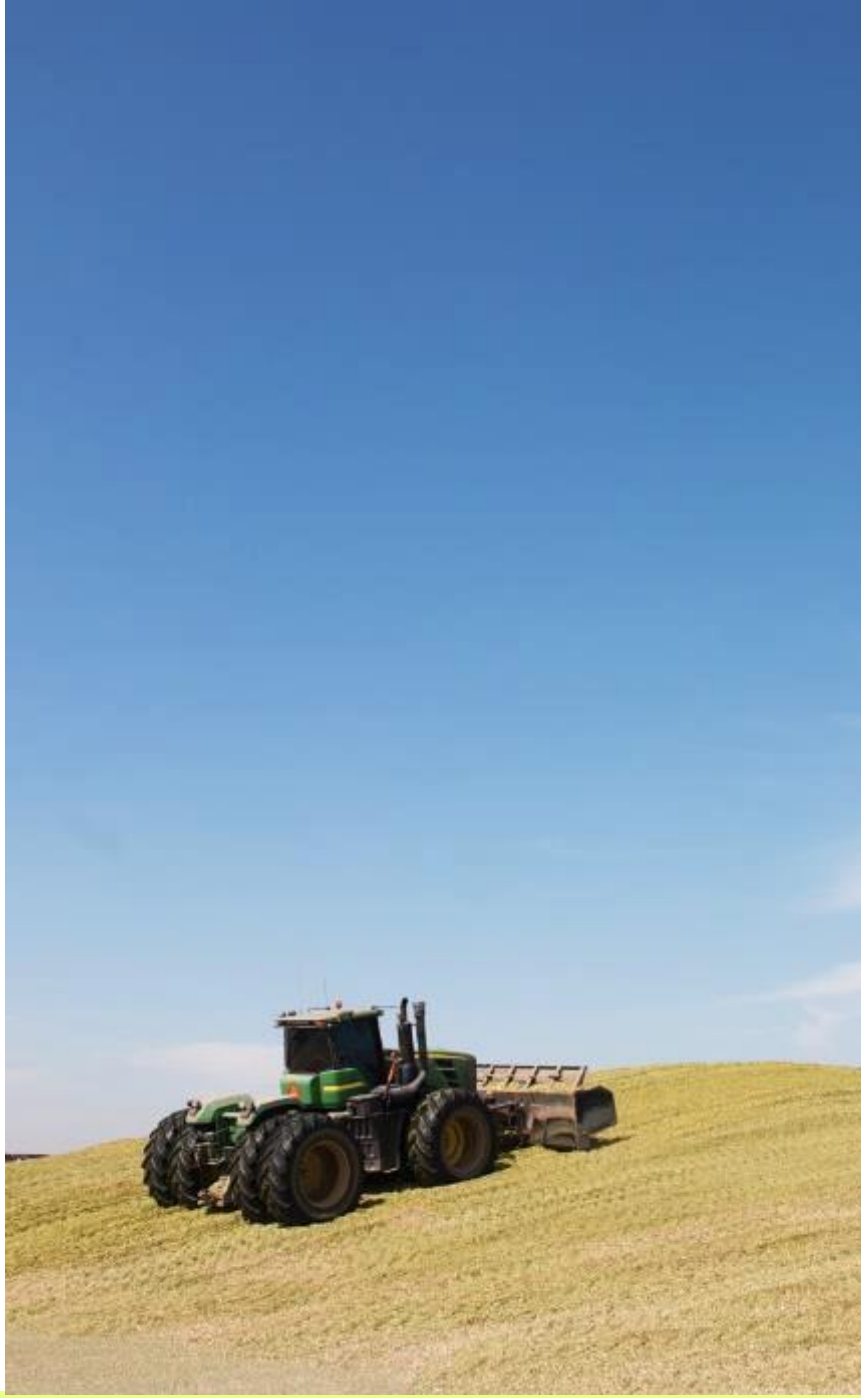
- Improve accounting of excreted/applied/exported manure N per UC recommendations
- Utilize new, streamlined forms for annual reports
- Require use of flow meters to measure liquid manure applications
- Modify testing requirements for manure samples, irrigation water, plant tissue to minimize laboratory testing, and maximize use of real-time field testing (take advantage of lessons learned since 2007 Order)
- Recommend allowing single liners for new lagoons (still developing recommendation related to existing lagoons)

Plan specifics – new coalition organization and responsibilities

- Add a 'coalition general order' as a compliance option while keeping a modified general order for individual reporting where needed (under negotiation)
- Continue to offer representative groundwater monitoring for members to the degree needed to meet ongoing requirements and track trends
- Possible coalition role related to accepting annual reports and relaying key information to RB (under negotiation)
- Coalition would track and report on groundwater data trends, manure N exports and other key indicators
  - Status and availability of technologies, practices and markets to facilitate manure N export
  - Latest research and development
  - Statistics on adoption of technologies and practices
  - Status of funding and incentives

Plan specifics – coalition responsibilities

- Supplement/modify CVDRMP staff to add agronomy, on-farm technical expertise to assist in analyzing member reports, tracking progress. Main duties would be to assist in preparing annual report to RB and providing assistance to members on identifying solutions and funding
- As part of its ongoing annual review, CVDRMP/coalition will consider the development and availability of solutions to facilitate export; and determine whether to adopt minimum standards for whole-farm nutrient balance for members



Preliminary reaction to CVDRMP recommendations

- Support for whole-farm nutrient balance approach
- Support for alternative compliance pathways when nitrate objectives are exceeded
- Questions about timelines and targets for future performance
- Level of detail and transparency in reporting
- Situation remains fluid until (and to some degree beyond) April 2019 deadline
- ***Significant discussions remain ahead – revised Dairy Order must make it through Regional and State Board approval, and possible court challenges***

Regional Board agenda going forward

- Aligning the dairy order to include surface water monitoring (individual or via coalition)
- How to regulate/prohibit retention ponds that intersect the water table
- CVDRMP report due to Regional Board April 2019
- State Board considering other regulatory changes related to nitrates, salts in April/May 2019, allows alternative compliance for salinity and nitrogen permitting if adopted
- Possible adoption of new dairy order in late 2019 or early 2020

What can dairy operators do to prepare?

- Know your nutrient balance: Consult your agronomist and work to find a home off your farm for excess manure nitrogen wherever possible/feasible
- If you need to export more manure N than you are able to use agronomically on your crops today, consider infrastructure changes that make it easier to export excess manure, such as mechanical collection (instead of flush) of manure coupled with windrow drying and export
- Funding available through the Alternative Manure Management Program (AMMP), which targets methane reductions, up to $33 million in FY 2018-19
  - *Some projects that reduce methane can also facilitate export of excess nitrogen*
- Consider retrofitting lagoon if intersecting groundwater (consult with your consultant/trade group regarding funding) – don't wait for enforcement
- Support your industry groups' efforts to identify additional incentives and funding for producers and toward research and development and pilot-testing new manure management technologies in CA

Discussion