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SUMMARY OF SUBMITTED COMMENTS ON DRAFT REPORT

Comments and questions are grouped into topics as much as possible. Parentheses indicate which commenters made which points, when not otherwise stated.

Note: The document from Ashley Zellmer (State Water Board) should be looked at thoroughly, because it contains 10 pages of line-by-line comments and questions about specific points. It is not included in this summary. The Advisory Committee's questions (listed below) should also be gone through by the Panel.

From the Advisory Committee

It would be helpful for the Expert Panel to provide constructive technical recommendations/tools/approaches in response to the questions posed by the State Water Board. In particular, on the following specific points:

- a. Where data gaps exist or information is not available, it would be helpful for the Expert Panel to provide a roadmap for moving forward.
- b. Key Point 'I' regarding Application of Management Practices needs clarification on the deep percolation of irrigation and rainfall water.
- c. Key Point 'R' regarding Application of Management Practices discusses inconsistencies in terminology; it would be helpful for the Expert Panel to provide guidance on the development of common terminology for N application.
- d. Key Point 'S' regarding Verification Measures would be more helpful if the Expert Panel were to elaborate on which metrics could be or should be used.

General Agreements with Draft Report

- A new paradigm is necessary, especially focusing on education, management plans, and concise reporting (Chessman, Mercer)
- The recommendations create a good dialogue about regulation (Mercer)
- Growers and the water boards have different goals when it comes to irrigation and nutrient planning, and the recommendations take both into consideration (Mercer)
- Reducing the volume of deep percolation water and matching available nitrogen to plant needs are both key to reducing nitrate transport from the crop root zone to the aquifer. [Key Point I] (Creedon)
- Agriculture is a contributor to nitrates in groundwater. (Creedon)
- It is important to track total loading of fertilizer/nitrogen. (Creedon)

General Criticism of Draft Report

- The report is too critical and not constructive enough (Thomas)
- Panel should make specific recommendations regarding existing Orders and programs (Thomas, Creedon)

- Eight environmental groups hired their own expert from Santa Barbara (Mark Kram) to write his own 27-page report of recommendations, calling for strict and detailed reporting and monitoring requirements, as well as the implementation of many new technologies. (Shimek)
- Panel should offer milestones/time frames associated with each aspect of recommended future practices (Mercer, Harris)
- Liability concerns have not been addressed (Mercer)
- The Panel didn't specifically answer the original questions and outline "indicators, methodologies, and targets" (Clary)
- The Panel does not contain members knowledgeable in groundwater issues, and a new panel should be convened with groundwater experts (Clary)
- The report is not specific enough about: (Clary)
 - Where data gaps exist
 - Recommendations about current Orders and programs, especially the Central Valley's Management Practice Effectiveness Program
 - Verification measures
 - Why first encountered groundwater should not be monitored
 - Alternatives to applied water volumes to fields
- Organic farming is better and agriculture in general needs to be restructured; California should turn to dry farming (Hoekstra)
- The "paradigm shift" refers to programs already in place in the Central Valley (Dunham)
- Requests clarification on the statement that regional boards are "over-taxed by their legislative charge to protect beneficial uses of groundwater in the context of the IRLP and other agricultural orders" (Dunham, Creedon)
- Panel should not base recommendations on the limited resources of Regional and State boards (Siegfried)
- Regional Boards could be given a hierarchy of tasks for newly forming coalitions (Schmidt)
- The report does not contain enough technical recommendations, and offers too much social and policy-level commentary. Technical recommendations are requested (Harris)
- Requests "a more thorough analysis and long-term statewide recommendations" regarding indicators, methodologies to determine risk, targets, and the use of monitoring to evaluate practice effectiveness, specifically: (Harris)
 - Tools and methods to measure or estimate:
 - harvested nitrogen for a wide variety of crops
 - performance of irrigation and nutrient management practices
 - nitrogen mass fluxes below the root zone
 - Templates for nutrient balance determinations and nitrogen budgets
 - Nitrogen Application Target(s)
 - Nitrogen needs for crop types and growth cycles
- "The Central Valley Water Board urges the Expert Panel to reconsider its proposal and instead focus on making recommendations that are consistent with the regulatory foundations that have been in development for years." (Creedon)
- The draft Report includes multiple statements implying that the boards have standards or requirements that are not contained in the Orders. This sets up a series of false contrasts, which are then used to justify a voluntary/educational approach. (Creedon)

Topic-Specific Concerns/Recommendations

Vulnerability/Risk

Agreements:

- Agrees with the conclusions regarding Vulnerability/Risk and Verification Measures (Abrams)

Concerns:

- Not prioritizing areas of high vulnerability will spread resources too thin (Thomas)
- The Central Valley already has methods for determining high risk and vulnerability and those should not be abandoned (Dunham)
- Disagrees with combining areas with similar soils as units, because of complexity. Argues that “the influence of areas of high hydraulic conductivity in governing irrigation frequencies and amounts and the variation in the proportions of these areas in fields mean any similarity in irrigation characteristics between fields is purely random.” (Siegfried)
- The Panel needs to make more specific recommendations about vulnerability, after reviewing more scientific information about groundwater nitrate pollution (Bell)
- Areas of high risk should still be identified (Brown, Hammett)
- Q 1-4: A new panel of experts should be convened to identify high vulnerability/risk areas (Harter)
- Page 19, 3.2.1.ii needs clarification where it says “Therefore, to effectively assess these risks, they need to be separated.” (Mercer)
- Page 19, 3.2.1.ii needs clarification where it says “However, risk level may be considered in the administration of responsibilities of growers to the coalitions.” (Mercer)
- Page 23, 3.2.1.ii needs clarification on what “internal (private) review and assessment” means (Mercer)
- Final report should include set of definitions for vulnerability and risk with respect to answering the first four questions (Harris)
- The Panel appears to believe that all growers should have the same performance standards and requirements, regardless of the vulnerability or risk designation [Key Point B]. If the Expert Panel truly is recommending that the Boards not take into account the hydrogeologic setting where a discharge occurs (contrary to every other regulatory program that the Boards administer), the Panel should state so plainly, rather than make an oblique criticism in an extended discussion regarding vulnerability and risk. (Creedon)
- The CV Board disagrees with the Panel’s suggestion to abandon the concepts of high and low vulnerability, since there are important policy implications associated with the concepts. The distinctions allow the board to focus attention in the high vulnerability areas and require those that pose a greater risk to or impact on water quality to do more. (Creedon)
- The Panel expressed confusion regarding the high vulnerability definition. More guidance is given to the Coalitions in the Orders beyond the brief definition (Creedon)
- Two Coalitions (Rice and the East San Joaquin) have been able to successfully evaluate groundwater vulnerability in their Groundwater Quality Assessment Reports, suggesting there is sufficiently clear guidance in the Orders. (Creedon)
- On page 19, the Panel indicates that “risk level” should be considered in prioritizing, but does not suggest a tool to use. The Panel should consider clarifying that establishing priorities is useful to focus regulatory efforts, not primarily for education and extension efforts, as the report seems to suggest. (Creedon)

Groundwater Monitoring

Agreements:

- Monitoring of first encountered groundwater and nitrogen mass balances are not very useful (Thomas, Dunham, Mercer)
- Trend monitoring should occur to track general aquifer conditions. (Creedon)
- Groundwater quality data alone is a poor indicator of current land use activities (Bell)
- Tracking trends over multiple years is the most beneficial (Taylor-Silva, Delihant, Brown, Hammett)

Concerns:

- Groundwater monitoring is of use to assist regulation and enforcement (Thomas)
- Q 9-10: “We therefore disagree with the Ag Expert Panel that the imprecision that is intrinsic to hydrologic measurements with a heterogeneous aquifer or soil system leads to useless results.” (Harter)
- Report contains unsubstantiated hydrogeologic generalizations, such as point D on page 21 (Harris)
- Both shallow and deep groundwater monitoring are essential, and not doing this endangers public health. (Harris)
- Effective groundwater monitoring programs need to be designed on a case-by-case basis, suited for regional or localized conditions (but this is beyond the charge of this Panel) (Harris)
- The Panel apparently discards a role for groundwater monitoring in evaluating management practices [Finding 3]. The Panel could focus on the conditions under which such monitoring could provide valuable information (e.g., short aquifer response times to changes on the land surface; cropping patterns that have been consistent over a number of years), rather than discarding meaningful monitoring and groundwater studies altogether. (Creedon)
- Finding number 4 states that what will be seen in the Tulare Basin in the next 20 years, on the average, are the results of historical practices. There is no technical analysis or justification for such a sweeping statement for such a large area. The Panel should consider that the time lag between surface practices and underlying aquifer impacts makes it even more important for the CV Water Board to evaluate the nitrate loading of current practices, since we could be creating the legacy issues of tomorrow. (Creedon)
- Finding number 6 states that data on nitrate levels in groundwater comes from data sources of poor quality. Since much of the data comes from public water systems or studies conducted by agencies using certified labs, the basis of this statement is not clear. The data are more likely to be of generally high quality, although interpretation for certain purposes (e.g., above ground practice effectiveness) may be problematic. (Creedon)
- Page 32 – the Panel suggests that current groundwater quality conditions should not trigger reporting or regulation of above-ground activity. The CV Water Board’s statutory and regulatory obligations, including the State Water Board’s Anti-Degradation Policy, do not allow us to ignore the conditions of the water body receiving waste from the discharger. The Panel should remove this statement and any recommendations it has based on that statement. (Creedon)
- “If the Expert Panel were willing to revisit its conclusion that groundwater monitoring is not reliable, effective, or practical, the Expert Panel might then determine that [the Central Valley Water Board]’s current approach towards groundwater monitoring is both reasonable and cost-effective.” (Creedon)

NHI

Agreements:

- The NHI is a poor proxy (Mercer)

Concerns:

- The Nitrogen Hazard Index is the best tool available (Thomas)
- The NHI coupled with a groundwater assessment “is an entirely suitable and applicable methodology to achieve compliance with ILRP regulation”, and the Panel did not provide a better alternative. (Bell)

Reporting Requirements

Agreements:

- Common terminology and recommendations should be used. [Key Point R] (Creedon)
- A “reporting unit” could be defined as an individual field or include multiple fields with similar characteristics and practices. [Key Point Z] (Creedon)
- Third-party/coalition data collection and reporting of grower data can serve a valuable purpose in facilitating data collection and analysis. (Creedon)
- Water quality data from water supply wells can provide an indicator of the condition of the aquifer, but do not necessarily provide information that can be used to assess whether current practices on the land surface caused a water quality problem. (Creedon)
- Simplified reporting requirements are good (Dunham, Mercer, Brown, Hammett)
- Data collected should be useful (Bell, Mercer)

Concerns:

- Collecting and reporting applied water and DU is uncertain and costly, and may raise issues with salinity management, conjunctive use and water rights (Thomas)
- Regulation should use pesticide use reports, satellite multispectral imagery, and farm gate water delivery reporting (Siegfried)
- The Central Valley monitoring program is already in place (Dunham)
- Only lands in high vulnerability areas should be required to report to coalitions (Dunham)
- DU should not be required (Dunham, Taylor-Silva)
- All farm gate water deliveries should be reported directly to DWR, and ET can be computed from LandSAT images; this should be used instead of DU values (Siegfried)
- Requirements for all growers should focus only on basic nitrogen and irrigation applications (Taylor-Silva)
- Irrigation volume and efficiency is not known precisely by most growers, and installing meters or other measurement methods would be very expensive and difficult to implement (Bell)
- The recommendations would require mapping and spatial analysis efforts by coalitions on top of their many other regulatory tasks (Bell)
- The statement “Just collecting data does not necessarily improve or help clarify a situation” is easily misinterpreted, because data collection is necessary to identify trends and issues (Wolfe)
- The statement that “nitrogen balances are very difficult to construct” (item 7, pg 14) oversteps the Panel’s tasks and implies that nutrient balances are unnecessary and overly burdensome (Wolfe)
- The Panel oversteps its mandate with the recommendation that certain data “be used for education...and not enforcement” (bottom of pg 36), because enforcement is sometimes necessary (Wolfe)

- Two statements about drinking water wells on page 20 (beginning with “sampling and reporting of nitrate concentrations...” and “this [i.e., drinking water well sampling]...” appear contradictory (Wolfe)
- Report contains unsubstantiated hydrogeologic generalizations, such as point D on page 21 (Harris)
- The report acknowledges data gaps, but does not propose alternatives to address or overcome them (Harris)
- The Panel’s concerns regarding excessive data collection [Key Point J] have apparently led it to recommend minimal data collection [Key Point Y] that will not provide the Board with a method for determining whether or not particular management practices are sufficiently protective of groundwater and surface waters. (Creedon)

Nitrogen/Nitrate Calculations

Agreements:

- The clarification between concentration and load is good (Schmidt)
- The acknowledgement that there are differences in input management for perennial and annual crops is appreciated (Taylor-Silva)
- Using an N-balance approach is problematic (Bell)
- Total nitrogen applications by crop type and acreage can be used to identify high risk areas Harris)

Concerns:

- Reporting nitrate applied will ignore nitrogen needs that are factored into nitrogen ratios (Thomas)
- Nitrogen requirement and removal data are not always available; crop nutrient demand information should be developed by agencies or universities (Chessman)
- The statement that the California standard of MCL of 10 mg/L is incorrect (Hoekstra)
- During drought, plants remove less nitrate (Hoekstra)
- Switching to drip irrigation does not affect nitrate leaching (Siegfried)
- Fertilizer sales are not a good indicator of nitrogen application (Siegfried)
- “Signal attenuation” does not identify variations in total load (Siegfried)
- The following items need clarification: (Taylor-Silva)
 - Residual nitrogen in the soil
 - The table of expected inputs for the year (too difficult to create)
 - The list of improvements to be made in the coming year
- The report contains no recommended actions or performance measured that would improve the ability to document nitrogen uptake by crops. Nitrogen balance ratios are valuable to growers. (Harris)
- The reporting of only total nitrogen application is too simplistic. The following questions should be answered: (Harris)
 - How could total nitrogen reporting enable growers or the Water Board to effectively evaluate the performance of agricultural management practices?
 - After 5 years of Total Nitrogen reporting, how could this number provide sufficient information to confirm nitrogen loading to groundwater was minimized?
- Pages 32-34 – the Panel suggests only reporting total nitrogen applied. The Panel also indicates the point of reporting is not enforcement, but increasing awareness. First, it is not clear how merely reporting total nitrogen applied will serve as a proxy for a grower’s potential impact on groundwater quality. We suggest the Panel reconsider the work that has already been done in this area and review where there may be areas for improvement or further research to provide a more complete picture of residual N that may be discharged to groundwater. (Creedon)

Management Plans

Agreements:

- Nitrogen and Irrigation Management Plans are important at the grower level (Brown, Hammett)
- Informed and enforced planning for all farmers is likely the most effective option (Bell)
- Well-developed management plans should be standard, and should include estimates of nitrogen required, nitrogen applied from all sources, nitrogen removed, DU, and volume of applied and infiltrated water (Harris)
- Having an irrigation water management plan and nitrogen management plan are fundamental to reducing deep percolation and minimizing excess nitrogen application. [Key Point K] (Creedon)
 - Successful development and implementation of such plans requires that the “developers” and “implementers” be properly trained. [Key Point K]
 - Irrigation water management and nitrogen management plans should include estimates of key parameters (e.g., nitrogen required, distribution uniformity). [Key Point M]
 - Farmers should keep records of key irrigation management/nitrogen management parameters.
 - Management plans must identify actions to be taken to improve performance, if such actions are needed. [Key Point N]
 - Farmers must adopt and implement the plans within a specified time period.
 - The qualifications of plan developers and basic plan requirements should be established by the Water Boards. [Key Point O]
 - Meaningful education and training programs are needed. [Key Points P & Q]
 - The developer of the plan is not responsible for the failure of the grower to properly implement the plan.
- The Water Boards need a metric to evaluate/verify the effectiveness of management practices in protecting water quality. [Key Point S] (Creedon)
- Directly measuring the effectiveness of management practices on all farms would be difficult and costly. (Creedon)
- Compliance will be low unless there are enforceable requirements. (Creedon)
- The “4-Rs” approach to fertilizer management should be employed by growers. (Creedon)

Concerns:

- The format and content requirements for nutrient management plans should be clearly defined, and consistent across the state (not region-specific) (Chessman)
- Management practices must be combined with monitoring and adjustment (Hoekstra)
- “We would be concerned with a nitrogen management plan requirement in the Central Valley WDRs that includes irrigation management” (Dunham)
- Nitrogen management plans must be complemented with research to ensure that the actions identified in the plans are effective (Dunham)
- The Central Valley already required management plans, but not the certification (Dunham)
- Crop nitrogen uptake should not be a standard component of management plans (Taylor-Silva)
- Q 5-6: Farm management strategies were developed by several expert panels in the past (cited) (Harter)
- Q 7, 12: Supports recommendations by previous Task Force and the Central Valley’s 3-tiered monitoring approach; disagrees with Panel’s focus on applied nitrogen, and believes the Panel is discouraging innovative and research; estimating potential N loading is both possible and important for regulators (Harter)
- The use of “Nitrogen” in the INMP is confusing and may be difficult for growers to compute (Mercer)
- The term “irrigation schedule” should be defined and is difficult to compute (Mercer)

- Yields are difficult to report (Mercer)
- The idea that knowing total nitrogen applications will spur growers to make changes is unrealistic (Harris)
- Key Point N suggests management plans must identify actions to be taken to improve performance. However, the report does not appear to make any recommendations on how to determine whether performance needs to be improved or how to determine (through direct or indirect measurements) whether such improvements have benefited water quality. (Creedon)
- In Finding number 13, the Panel expresses its opinion that there are no currently available direct or indirect measures that can be used to separate good from bad practices, and that the current regulatory approach basically constitutes a wasted information collection effort. The CV Water Board does not believe this opinion rests on a solid foundation or is supported by evidence. (Creedon)

Education/Training

Agreements:

- Education is important (Thomas, Delihant, Mercer, Harter, Harris)
- Mandatory education is a good idea (Schmidt)

Concerns:

- Standardized training materials and planning tools are important (Chessman)
- The Central Valley already has farmer education programs (Dunham)
- Mandatory education is not viable (Dunham)
- Education should be targeted at the people involved in day-to-day operations, not landowners (Dunham)
- Enforceable standards are more important than education (Siegfried)
- Structured classroom education is not helpful for kinesthetic learners; the usefulness of distance learning is also questioned. Training like UC Cooperative Extension Field Days is better
- Education needs to be region- or commodity-specific (Taylor-Silva)
- Instructor qualifications are questioned (Taylor-Silva)
- Lists suggestions for effective training (Taylor-Silva)
- An overreliance on education without timelines, meaningful objectives, targets, and management practice effectiveness monitoring and reporting will fall short of goals (Harris)

Consultants/Certification

Agreements:

- A well-managed coalition can be effective in assisting growers in complying and providing needed information to the board. (Creedon)
- Coalitions are important (Schmidt, Taylor-Silva, Delihant)

Concerns:

- Final responsibility for plan implementation should specifically lie with grower/manager rather than consultant/planner/CCA (Chessman)
- Certification programs other than Crop Advisor exist, but good consultants are hard to find. A massive effort will be needed to educate all growers in California (Mercer)

Surface Water

Agreements:

- Agrees with surface water monitoring discussion (Taylor-Silva)
- Identification of surface water quality problems can be effectively carried out through monitoring of downstream points in drains and streams. [Key Point BB] (Creedon)

Concerns:

- Elissa Callmen requests the following clarifications from the Panel:
 - Which Key Points and recommendations apply only to nitrate issues in groundwater, and which can be applied to other constituents
 - More information about recommendations regarding High Vulnerability Areas Methodology (Question 4.d – solids loading to surface water)
 - Clarify that vulnerability/risk discussion (Section 3.2.1) is only about groundwater and remove applicability to Questions 3 and 4, as well as present vulnerability/risk determinations for surface waters
 - Clarify that Key Point J is applicable only to nitrate programs and remove applicability to Question 4 regarding surface waters
 - Requests that Panel add their input about monitoring, using the Sacramento River Watershed Order's Monitoring and Reporting Program as an example
- Growers shouldn't be required to individually monitor fields unless prior secondary upstream sampling identifies that field as contributing to impairment (Schmidt)
- Tile drains should not count as discharge to groundwater (Schmidt)