ATTACHMENT A - SUMMARY AND RESPONSE TO COMMENTS RECEIVED DURING 60-DAY COMMENT PERIOD

1. Sara Grantham, Beyond Pesticides

Comment no. 1: While we appreciate that this proposal incorporates improved methodology for assessing groundwater pollution, as well as the inclusion of degradation products for consideration, Beyond Pesticides asserts that these actions do not fully consider health impacts associated with water contaminants and therefore do not adequately protect drinking water and public health.

Response: The Department of Pesticide Regulation (DPR) is required to establish the Groundwater Protection List (GWPL) under the Pesticide Contamination Prevention Act (PCPA) to help prevent pesticide pollution of California's groundwater aquifers that may be used for drinking water supplies. The GWPL includes a list of pesticide active ingredients and their degradation products that have the potential to pollute groundwater. DPR also conducts human health risk assessments and includes groundwater evaluations in its registration and continuous evaluation processes. DPR holds public hearings under PCPA to further evaluate and mitigate risk from pesticides that are detected in groundwater and are determined to be from legal agricultural use.

The scope of the proposed regulations updates the GWPL with pesticides that have the potential to pollute groundwater; removes pesticides unlikely to pollute groundwater; replaces the specific numerical values for determining what pesticides have the potential to pollute groundwater with a new multivariate method; specifies which pesticides have had a hearing as described in Food and Agricultural Code (FAC) section 13150(b); and makes aligning changes to operator identification number and pesticide use reporting requirements. Evaluation of health impacts is considered as a part of DPR's broader registration and evaluation program and is outside of the scope of the proposed regulations.

Comment no. 2: Clean water is essential for human health and yet water is being polluted at unprecedented rates with chemicals, nutrients, metals, pesticides, and other contaminants that pose severe health threats. Of further concern is that mixtures, synergisms, and breakdown products are not considered or being studied for water contaminants. Exposure to chemicals does not occur solitarily; exposure to a myriad of substances occurs simultaneously, with the potential for synergistic effects that increase toxicity and potential harm.

Response: DPR acknowledges this comment. Please see response to comment # 1.

Additionally, pesticide degradation products are routinely considered during DPR groundwater registration evaluations, multivariate leaching value (MLV) and GWPL determinations, and analytical method development.

Comment no. 3: Chemicals, including pesticides, contaminate surface water, groundwater, and drinking water throughout the U.S. Rain or snow melt carries pesticides from agricultural fields, golf courses, parks, and residential properties through storm drains and into local water reservoirs, endangering wildlife and adding stress to water treatment facilities. Improperly disposed pesticide products in unlined landfills can also contaminate groundwater and end up in the water supply.

Response: DPR acknowledges this comment. Please refer to response to comment # 1.

Comment no. 4: The occurrence of particular pesticide compounds and degradates in groundwater shows variance across different regions of the country and state. These variances are due to a variety of local factors, including: particular regional agricultural pesticide uses and protocols; proximity to non-agricultural sources of pesticide use (e.g., golf courses or other managed turf); local hydrological dynamics; and the nature of the local/regional soils, among others.

Response: DPR acknowledges this comment. Please refer to response to comment #1. Pesticides and their degradation products that are identified as having potential to pollute groundwater are added to the GWPL and are subject to further scrutiny with high level, predictive models that account for soil conditions, climate, and grower management factors. Furthermore, these pesticides and their degradation products become candidates for targeted groundwater monitoring studies by DPR's Groundwater Protection Program (GWPP). Detections of pesticides or their degradation products in groundwater are further analyzed to determine the source of contamination and whether the detections are determined to be from legal agricultural use of the pesticide.

Comment no. 5: Pesticide movement into waterways is a national and international reality with a wealth of research proving contamination and subsequent effects. As Beyond Pesticides has reported, a study of groundwater that feeds public drinking water supplies finds pesticides in 41% of supply wells, as well as a handful of freshwater springs. Two-thirds of that 41% contain pesticide compounds per se, and one-third contain pesticide degradates—compounds resulting from biotic (or abiotic) transformation of pesticides into other compounds.

Response: DPR acknowledges and appreciates this comment. Please refer to response to comment # 1.

Comment no. 6: There is considerable research covering not only the health and environmental impacts of pesticide exposures but on the issue of pesticide migration into groundwater and waterways. Beyond Pesticides maintains that organic practices in land management, and especially in agriculture, are the solution to the contamination of waterways and groundwater. Such practices, widely adopted, would have enormous salutary effects on human health and the health of ecosystems and their inhabitants.

Response: DPR acknowledges and appreciates this comment. Please refer to response to comment # 1.

Comment no. 7: Approximately four in ten private wells in the state of Wisconsin reveal toxic pesticides and pesticide metabolites, according to findings released from a 2023 survey, entitled Wisconsin Agricultural Chemicals in Wisconsin Groundwater, conducted by the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) in partnership with U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS). These findings in Wisconsin exemplify a larger pesticide leaching issue, experienced around the world and in California (see below), that continues to affect both surface water and groundwater and imposes adverse health and environmental impacts on communities.

Response: The MLV procedure is specific to California. The model development set of "leacher" and "non-leacher" chemicals resulted from their response to climate, soil conditions, and grower management practices. California has unique circumstances in terms of potential groundwater pollution such as the combined factors of high density of pesticide use, managed crop water inputs, shallow groundwater, and leaching vulnerable soils.

However, when appropriate, DPR will review detections outside of California to inform our decision-making processes.

Comment no. 8: The U.S. Geological Survey (USGS), in a 2023 study published in *Environment International*, found that nearly half (45%) of U.S. tap water is contaminated with perfluoroalkyl and polyfluoroalkyl substances (PFAS) chemicals, also known as "forever chemicals." Researchers note that, at the time, USGS could only detect 32 of the more than 12,000 different types of PFAS and PFAS breakdown chemicals, thus indicating the number was most likely higher. The pervasiveness of these hazardous chemicals throughout the environment threatens the health of all organisms. These substances need to be properly regulated in groundwater and drinking water to protect human health while we transition to safer land management practices that eliminate the sources of this pollution.

Response: The proposed regulations are focused on registered pesticide active ingredients and degradation products that could potentially pollute groundwater, regardless of their status as a PFAS. Regulating other chemicals would be outside of DPR's legal jurisdiction and are outside of the scope of the proposed regulations. Pesticides are included on the proposed GWPL if they, or their degradation products, have the potential to pollute groundwater according to their MLV. For MLV calculation, the pesticide must be currently registered in California and have the relevant environmental fate data available. PFAS categorization is not one of the criteria for MLV calculation. It should be noted that the five factors that make up the MLV calculation are related to a chemical's mobility and persistence in the environment. DPR conducts thorough, chemical-specific reviews of all pesticides, including active ingredients and full formulations, to evaluate environmental persistence and inform registration decisions.

Comment no. 9: A study in *Water Research* notes that water is "an increasingly precious resource in California as years of drought, climate change, pollution, as well as an expanding population have all stressed the state's drinking water supplies." The research highlights the increasing concerns regarding regulated and unregulated contaminants that are "linked to a variety of human-health outcomes particularly in socially disadvantaged communities with a history of health risks." Results of tap water samples throughout California revealed mixtures of regulated and unregulated contaminants with "[m]ultiple exceedances of enforceable maximum contaminant level(s) (MCL), non-enforceable MCL goal(s) (MCLG), and other health advisories combined with frequent exceedances of benchmark-based hazard indices."

Response: The exceedances referenced in this comment are non-pesticidal compounds. None of the pesticides analyzed in the referenced study exceeded any human health benchmark.

Comment no. 10: The study states that California residents "rely on drinking water from both surface-water and groundwater sources, with relative sourcing depending on the region of the state, water needs, resource availability, and climate. Of the 39 million people in California, 95% receive their water from Federally-regulated public water supplies (PWS), with the remainder (~ 2 million people) relying on generally unregulated private wells or small water systems." With the documented contaminants within these water sources, and the subsequent chronic human health effects seen with even low-level exposure, this creates a public health threat of great concern.

Response: DPR's groundwater monitoring program routinely prioritizes sampling domestic wells in vulnerable aquifers with high pesticide use. Domestic wells are typically shallower than large-scale public supply wells or agricultural irrigation wells, which makes those domestic wells more susceptible to pesticide pollution. Evaluation of health impacts is considered as a part of DPR's broader registration and evaluation program and is outside of the scope of the proposed regulations.

Comment no. 11: Further highlighting the risks to Californians, particularly in communities of color, a 2024 study finds PFAS contamination in public supply wells following pesticide applications. The study asserts that "PFAS monitoring in groundwater is limited and fails to consider pesticides found to contain PFAS as a potential contamination source." The results show community water systems "that serve a greater proportion of Latinx and non-Latinx People of Color residents experience a greater areal density [greater accumulation] of PFAS applied and greater likelihood of PFAS application near their public supply wells," which showcases the role of agroecosystems in water contamination.

Response: Please see response to comment # 8.

Comment no. 12: The extensive research on PFAS, especially as a threat to groundwater and drinking water with their pervasiveness, supports the need for inclusion of all PFAS chemicals in risk assessments. The number of pesticides currently on the proposed Groundwater Protection

List does not include even half of the chemicals on the PFAS-pesticide list from Donley et al. 2024.

Response: Please see response to comment # 8.

Comment no. 13: As shared in Beyond Pesticides latest comments to the U.S. Environmental Protection Agency (EPA) regarding proposed registrations, we urge that all PFAS be banned, and no new products should be registered in order to eliminate the threats to public health, biodiversity, and the environment that these "forever chemicals" cause. PFAS are of particular concern as these persistent, bioaccumulative, endocrine-disrupting chemicals have become omnipresent and are found in plastic containers, non-stick cookware, cleaning/personal care products, food packaging, pesticides, and other consumer products.

Response: This comment is out of scope of the proposed regulations. The proposed regulations are focused on registered pesticide active ingredients and degradation products that could potentially pollute groundwater, including consideration of environmental persistence, regardless of their designation as a PFAS. Please see response to comment # 8.

Comment no. 14: Because of their ubiquitous use, studies report that PFAS compounds are detectable in infants, children, and pregnant women. Furthermore, pregnant women can readily transfer compounds to the developing fetus through the placenta. PFAS residues are persistent in food and drinking water, with over six million U.S. residents regularly encountering drinking water with PFAS levels above the EPA health advisory of 70 ng/L. Therefore, PFAS are detectable in almost all the U.S. population—disproportionately afflicting people of color communities18—and have implications for human health.

Response: Please see response to comment # 8.

Comment no. 15: It is evident that EPA and other federal regulators have been behind the curve in preventing and responding to the threats posed by PFAS compounds. Despite evidence on the dangers of PFAS stretching as far back as the 1950s, federal agencies effectively sat on the sidelines as the plastics industry continued adding the material to new products. Now we are seeing the same expansion of use with the registration of pesticides in the PFAS group as there have been four PFAS proposals so far this year. This makes action at the state level as important as ever for the protection of their residents.

Response: DPR conducts thorough, chemical-specific reviews of all pesticides, including active ingredients and full formulations, to evaluate environmental persistence and inform registration decisions before a pesticide can be sold or used in California. DPR continually evaluates, creates, and updates data on a pesticide's transport, persistence, and fate in the environment to protect Californian aquifers from pesticide pollution. Please see responses to comments # 1 and 8.

Comment no. 16: As research shows, the detection of any level of PFAS is cause for concern. Drinking water health advisories issued by EPA show PFAS levels as low as .02 parts per trillion (ppt) have the potential to cause adverse health effects for public health. From widespread presence in farm fields and sewage sludge (biosolids) to contaminated water bodies throughout the U.S., PFAS have made their way into the environment and human bodies. PFAS are even present in remote environments like the Arctic, Antarctica, and Eastern European Tibetan Plateau. The Centers for Disease Control and Prevention (CDC) determined that almost all Americans have some level of PFAS in their bloodstream which highlights PFAS as a chronic danger to people that demands urgent action.

Response: Please see responses to comments # 1 and 8.

Comment no. 17: PFAS are but one type of pesticide that contaminates water and threaten both public health and environmental justice. While the current proposed actions for the Groundwater Protection List represent improvements, they still fall short of protecting California residents. California DPR has the opportunity to not only enhance standards for analyzing water contaminants but to also model the implementation of holistic, systems-based change. With the goal of eliminating the use of petrochemical substances that are contributing to daily health threats, biodiversity collapse, and the climate emergency, we urge California DPR to consider all toxic pesticides and synthetical fertilizers that are adversely impacting residents through various exposure routes, including, but not limited to, groundwater.

Response: Please see responses to comments # 1, 8, and 15.

Comment no. 18: Organic agriculture offers a long-term solution to pesticide contamination. Under the *Organic Foods Production Act* (OFPA), organic producers are prohibited from using petrochemical fertilizers and biosolids, often contaminated with PFAS. The law defaults against synthetic pesticides, requiring a rigorous review of exceptions under the National List of Allowed and Prohibited Substances provision, a review framework overseen by the National Organic Standards Board (NOSB). As the only agricultural system with a requirement for a farm plan, inspections, and certification for compliance with organic standards, and rigorous public oversight, organic farming promotes sustainable, cost competitive, and profitable practices that enhance soil health and biodiversity. Organic practices are successfully mitigating the escalating public health, environmental, and climate crises and can reduce groundwater contamination.

Response: DPR acknowledges the benefits of certain farming practices, such as organic or regenerative farming, but it is beyond the scope of the proposed regulations.

Comment no. 19: Beyond Pesticides urges a solution that keeps pesticides out of the water, rather than trying to regulate or clean them up after they enter our waterways and drinking water supply. This solution, a just and rapid transition to organic and regenerative agricultural practices, will address a huge proportion of this problem of pesticides contamination of groundwater—and ultimately, of drinking water supplies. We urge California DPR to consider

these alternative practices, as well as the need to include additional chemicals in groundwater assessments, to adequately protect human health and the environment.

Response: Please see response to comment # 18.

2. Renee Pinel, Western Plant Health Association

Comment no. 20: WPH appreciates DPR's significant efforts to update the current Specific Numerical Value (SNV) based approach to a Multivariate Leaching Value (MLV) based approach for identifying potential groundwater contaminants and has provided detailed technical comments on the proposed update below. Any systems used to update the groundwater protection list must rely on sound, risk-based science through a process. We are concerned that there is significant information missing from DPR's proposed rulemaking and publicly available information about the MLV process to comprehensively inform stakeholder understanding of this approach.

Response: In the "Documents Relied Upon" section in the Initial Statement of Reasons (ISOR), are the MLV report, the scientific peer review, DPR's response to the peer review, and the values used in determining the GWPL. This information serves as the basis for the proposed regulation.

Comment no. 21: We also believe that significant additional work and discussion should occur prior to implementing the MLV approach to revise the GWPL. WPH respectfully recommends that this proposed rulemaking should separate the revisions to the GWPL from the update to the MLV process. DPR did not engage with registrants of pesticides on the proposed GWPL prior to the proposed rulemaking, and there is insufficient information provided by DPR for registrants to understand the basis for the proposed GWPL listing. As such, additional information and engagement is needed prior to proposing revisions to the GWPL.

Response: Prior to the publication of the Notice of Proposed Regulatory Action concerning this rulemaking, DPR engaged with several external stakeholders on the MLV model that includes discussions of replacing the SNV with the MLV to update the GWPL. Stakeholders included, but not limited to, Western Plant Health (WPH) and its members, pesticide registrants, consultants such as Exponent, academia, and regulatory agencies such as State Water Resources Control Board. DPR also presented the MLV methodology at the following public venues:

- Pesticide Registration and Evaluation Committee
- Western Plant Health Regulatory Conference
- Western Plant Health Water Quality Committee
- American Chemical Society

In addition, DPR published a report of the MLV methodology on DPR's website (Troiano et al., DPR 2024) that was peer reviewed by Dr. Ghezzehei at the University of California, Merced, Dr. Gómez-Hernández at the Technical University of Valencia, Spain, and Dr. Tropha at the University of North Carolina, Chapel Hill. The MLV methodology was also presented at the

Pesticide Contamination Prevention Act Subcommittee Consultation on October 28, 2024. The peer review and DPR's responses to the peer review are included in the documents replied upon.

DPR further engaged with Western Plant Health and other stakeholders after the proposed rule was published, and upon request, DPR also extended the comment period concerning this proposed action to provide additional time for the public to review the rulemaking documents and the documents relied upon.

Comment no. 22: While WPH appreciates that DPR is working to update its groundwater monitoring and assessment program with a more accurate approach to screen for pesticides and potential degradates that may have the potential to leach to groundwater, WPH is concerned that the proposed approach is not the appropriate tool to inform the GWPL. DPRs approach of categorizing pesticides into "leachers" and "non-leachers" based on the chemical characteristics of the pesticide is a helpful screening tool for evaluating which pesticides may require more detailed evaluation by the DPR's Groundwater Protection Program, but is not appropriate for solely determining inclusion on the GWPL. Specifically, other factors including soil composition, depth to groundwater, weather conditions, and application rates, and pesticide fate and transport processes are not adequately reflected as part of the MLV. For example:

- The partitioning of pesticides in soils can vary depending on the properties of both the soil and the pesticide as well as their physiochemical interactions.
- Groundwater in California occurs at a range of depths, from just a few feet to over a hundred feet. The likelihood of chemicals leaching into groundwater depends on the depth to groundwater.
- Irrigation, rain and runoff conditions, including the frequency and duration of rain events affect infiltration of rainfall into groundwater and can vary considerably from north to south and the seasonal timing of different pesticide applications.

Response: As with the existing SNV model that has been in effect and been used to update the GWPL since 1991, all agricultural use pesticides that are subject to PCPA data requirements will be subject to the MLV model. They are both screening models that identify agricultural use pesticides for placement on the GWPL based on the potential to pollute groundwater. The PCPA was specific with respect to utilizing only chemical-specific properties with the SNV model. USEPA and EU regulators widely utilize screening models such as the GUS index and SCI-GROW, both of which use chemical-specific properties—the latter uses some generic non-chemical specific fixed input values. These types of models are used to focus and prioritize further investigatory activities such as environmental fate modeling and groundwater monitoring. They are not used exclusively to make registration decisions.

Consistent with the current SNV approach and as mandated by the PCPA, if a registered agricultural use product containing an active ingredient, or one of its degradation products, is identified as a potential groundwater pollutant by the MLV model then it will be added to the GWPL, The current regulations include 6800(a) and 6800(b) lists. The proposed regulations will further split the existing 6800(b) list to create the 6800(c) list, which does not impose additional restrictions on use of the 6800(c) listed pesticides but is used by DPR for analytical method development and monitoring prioritization. DPR considers other factors such as soil

composition, depth to groundwater, and application rates over time when designing and conducting focused groundwater monitoring studies and when evaluating detections.

In general, if a pesticide on the GWPL list or its degradation products are detected in groundwater, DPR will conduct further analysis to determine the source of contamination and whether the detections are determined to be from legal agricultural use, and if additional monitoring or mitigation is necessary.

Additions or deletions of pesticides or their degradation products to the GWPL are due to the updated MLV methodology, the inclusion of degradation products, and the fact that the GWPL was last updated in 2014. Of all the additions to the new GWPL, 24% have been registered since the last time the GWPL was updated (Bergin, 2024).

Comment no. 23: Additionally, the MLV model training dataset does not represent a full spectrum of reasonably expected environmental and application conditions. As such, the results are not applicable statewide from a hydrogeological perspective, and the proposed method (MLV) will not accurately reflect the potential of these active ingredients and degradates to leach to groundwater. The MLV method may work well as a screening tool and is, in fact, more accurate than the current SNV screening approach, but is not appropriate for determining the GWPL.

Response: Similar to the current SNV screening approach, the MLV model is used to update the GWPL and has improved accuracy. The MLV model categorizes pesticides and their degradation products based on their potential to pollute groundwater. Whether or not a pesticide pollutes groundwater, and under what conditions, is the function of DPR's modeling, monitoring, and legal agricultural use determination processes. The PCPA recognizes that some pesticides can have the potential to pollute groundwater and empowers DPR to make that determination using relevant environmental fate data.

Additionally, please see response to comment # 22.

Comment no. 24: Overall, it is critical that DPR provide additional clarity regarding what studies are considered in the MLV calculation. For example, it is unclear if the soil adsorption coefficient and aerobic soil metabolism half-lives are derived from all data or only for California-relevant data. The data source issue highlights how critical it is that registrants are provided with an opportunity to engage with DPR regarding the study selection especially if DPR intends to utilize the MLV approach to determine listing on the GWPL.

Response: DPR engages with registrants throughout the registration and evaluation process. In general, there are multiple sources of studies and data that DPR may use in its evaluation. For example, environmental fate data comes from registrant submissions during product registration. The values used in the MLV model development are documented in the MLV report. As described in the MLV report, when multiple values are available, DPR uses median values for both the soil adsorption coefficient (Koc) and aerobic soil metabolism half-life in the MLV

calculation. Where data are not normally distributed or when outliers are common, such as in environmental fate data, the median is a reasonable representative value.

The data used to calculate MLVs for pesticides or degradation products added to the GWPL are included in the documents relied upon (Bergin, 2024) and they come from three primary sources: DPR's Pesticide Chemistry Database (PestChem), the University of Hertfordshire's Pesticide Properties Database (PPDB), and the European Food Safety Authority (EFSA) pesticide evaluations. Another source of data, if available, is from DPR registration evaluations by either the Chemistry or Groundwater programs. If data are unavailable, then DPR may review other sources such as USEPA registration documents, global pesticide registration evaluations, and other databases like the United States Department of Agriculture-Agricultural Research Service Pesticide Properties Database. Please see the following document relied upon, in the ISOR, for data values and sources: Bergin, R. 2024. Memorandum: Creation of the New Groundwater Protection List. Environmental Monitoring Branch, Department of Pesticide Regulation. Sacramento, California.

Comment no. 25: Additionally, experimental values of aerobic soil degradation half-life and/or soil adsorption coefficients are often not generated for degradation products for US submissions. It is unclear to us how DPR will select endpoints for MLV assessment when there is no experimental data for soil half-life or soil adsorption coefficient. WPH requests clarification from DPR as to how these endpoints will be determined in lieu of changing data requirements, which currently do not require these endpoints for degradation products. Without a clear process on establishing endpoints, MLVs should only be utilized as a screening tool that may indicate a need for additional data, but should not be utilized as a basis for listing on the GWPL.

Response: It will not be possible to calculate MLVs if input data do not exist. Lack of chemical-specific input data is also a limiting factor for the SNV model that is currently in effect as mandated by the PCPA.

Updates to the PCPA in 2015 mandated DPR to consider the pollution potential of pesticide degradation products in California groundwater. This update necessitated DPR to conduct modeling of degradation products to assess their potential to pollute groundwater. Accordingly, upon request, registrants have provided available environmental fate data for some degradation products. Other environmental fate data have been sourced from global registration evaluations.

Additionally, please see response to comment # 24.

Comment no. 26: In addition, the MLV procedure combines estimates of three quantum molecular scale calculated properties (i.e., dipole moment, EHOMO, MaxElPot) with two empirical macro scale experimentally derived endpoints (aerobic soil half-life, soil adsorption) in one multivariate equation. The molecular scale predictors, which are stated to inform molecular soil adsorption and reactivity/degradation, may be redundant as their effects are incorporated into the macro-scale experimentally derived results. Statistical procedures were utilized by DPR to exclude correlated variables in their model, but we believe further explanation from DPR,

especially observed or theoretical correlation between the molecular and macro scale variables in the final MLV equation is warranted.

Response: As indicated in the MLV report, researchers have identified soil adsorption and reactivity/degradation relationships with the three molecular variables used in the MLV model. However, this was not statistically significant in DPR's analysis as evident from correlation coefficients and probability analysis in Table 4 of the MLV report. From a qualitative perspective, the direction of the correlations indicated by the sign of the coefficients are consistent with a hypothetical correlation. For example, lower soil adsorption coefficient normalized for organic carbon content of soil (Koc) is consistent with higher dipole and higher maximum electrostatic potential (MaxElPot) values with respect to increased leaching potential. Similarly, a higher aerobic half-life is consistent with a lower energy of highest occupied molecular orbital (EHOMO) with respect to increased leaching potential. Nevertheless, due to the lack of statistically significant correlation the molecular properties were retained in the model.

Comment no. 27: Furthermore, the MLV methodology does not account for ionization of pesticide active ingredients or their degradation products. It is not uncommon, especially for degradation products, to be weak acids or bases with ionization constants (pKa) in an environmentally relevant range (e.g., pH 4-10). These compounds will exist to some or complete extent in soil solution environments in ionized form (anion or cation). Molecular property values calculated using Spartan may vary considerably for the ionized form versus the neutral (uncharged) form.

Response: The MLV model was developed with a training set of chemicals, several of which are considered to have a partial or weak charge. For example, these pesticides included atrazine, simazine, pendimethalin, linuron, iprodione, alachlor, tebuthiuron, bentazon, norflurazon, and imidacloprid. The model development set of chemicals also included several degradation products, some of which likely have partial or weak charges. These include 2,3,5,6-tetrachloroterephthalic acid, aldicarb sulphone, deethylatrazine, deisopropylatrazine, and metolachlor ethanesulfonic acid. All these pesticides and degradation products were correctly classified as "leachers" or "non-leachers", respectively, by the MLV model. DPR identified that potential misrepresentation of partial or weakly charged chemicals by the molecular parameter values used in the model were more than displaced by the empirical derived parameters used in the model. For example, the potential charged effects of a chemical on soil adsorption would be intrinsically represented by Koc. Supporting this assumption, and as indicated above, the standardized coefficients for the parameters used in the MLV model are significantly higher for Koc and soil aerobic half-life than for the molecular variables indicating their greater influence in the MLV model. In Appendix V of the MLV report, it is noted that the estimated discriminating power of the two empirical parameters is between 76% and 86%.

Comment no. 28: In our review, it appears chemical property estimates are being calculated only for the neutral molecule following the DPR procedure. As a result, inaccurate MLV scores and misclassification of ground water contamination potential could occur. We believe our comments

regarding ionization are broadly applicable to pesticides and degradation products, not targeted just towards a specific class of compounds, e.g., quaternary amines, which have a permanent charge regardless of pH. While we understand that DPR has briefly considered ionization in the MLV training set, more robust assessment is warranted.

Response: The model will likely not work well for fully charged chemicals, but such chemical pesticides are not considered common. A charge can be applied to chemicals in Spartan and modeled to derive the values for molecular variables, but the values could be outside the values used to develop the model. A chemical failing the MLV process with molecular variable values well outside the range of those used to develop the model due to its ionic state would likely render the MLV result invalid. Accordingly, the MLV analysis would likely not identify the chemical for placement on the GWPL.

Additionally, please see response to comment # 27.

Comment no. 29: If a compound is identified as a potential leacher using the MLV procedure, then higher tier deterministic leaching model should be conducted by DPR for a refined assessment of ground water leaching potential, which is relevant not only to the pesticide active ingredient but also to the degradation products.

Response: Please see responses to comments # 4 and 22.

Comment no. 30: WPH requests clarification if a degradation product identified as a potential concern using the MLV method is not observed to form or forms at low levels in relevant Terrestrial Field Dissipation (TFD) trials and DPR's groundwater modeling confirms that it is not likely to leach to groundwater. Will DPR consider this to be confirmation that the degradate is not a groundwater leaching concern?

Response: Please see response to comment # 22.

Comment no. 31: Again, while WPH can appreciate DPRs intention of developing a clearer or more transparent methodology to identify potential "leachers," the MLV is a simplified statistical attempt to understand complex chemical transport of pesticides and degradants in the environment and oversimplifies the diverse agricultural landscape of California. The MLV may be appropriate for screening, but not for regulatory listing on the GWPL.

Response: Please see response to comment # 22.

Comment no. 32: Even if this binary approach was appropriate, the reported accuracy of the model is based only on the subset of pesticide data used to derive the MLV equation. It is yet undetermined whether the MLV is similarly effective at binning the additional pesticides evaluated. Clearly, DPR performed numerous statistical tests to optimize the included parameters

and accuracy of the equation for the binary binning (leacher or non-leacher), but it does not appear that DPR performed a sensitivity analysis regarding the MLV input parameters to assess the precision of this model. If such analyses were conducted, it is critical that they be transparently communicated to stakeholders.

Response: DPR has been mandated by the PCPA to use a binary-type approach for identifying pesticides with the potential to pollute groundwater. Screening models like the MLV model are often based on subsets of data such as developmental and validation. For example, the SNV and GUS index models both followed this approach. These models are used for screening pesticides for their potential to pollute groundwater. The SNV model has been used by DPR since 1991. The GUS index is extensively used by U.S. EPA, European Union member states, researchers, and industry since the late 1980s.

The main purpose of conducting the Leave-one-out (LOO) and Leave-pair-out (LPO) validation analyses was to test the MLV model at binning model-development-independent chemicals. These analyses systematically rendered each chemical or pair of chemicals independent from the model development set of chemicals. The independent chemicals were then classified as predicted "leachers" or "non-leachers" and compared to their known leaching status. Results indicated very low misclassification rates of the independent chemicals. For the five-parameter MLV model that was eventually selected, no increase in misclassification of the independent chemicals compared to the model development set of chemicals was observed in the LOO analysis. Only a minor increase in misclassification of the independent chemicals compared to the model development set of chemicals was observed from the LPO analysis, which was expected considering that two chemicals were simultaneously made independent for testing of the MLV model.

The relative sensitivity of the specific model parameters is indicated in the standardized coefficients for each model evaluated. Table IV-7 in the MLV report illustrates the standardized coefficients for the selected five-parameter MLV model. The CDA procedure standardizes the data for each variable to zero mean and unit variance. Standardized coefficients are generated from these data. The absolute magnitude of each standardized coefficient is a relative measure of its sensitivity in the model. The sensitivity of the input parameters in the MLV model on predicted leaching status is indirectly indicated by the strong discriminatory power of the model where the "leacher/non-leacher" reclassification error was less than 5%.

Considerable variability in Koc and soil aerobic half-life measurement data is typical for pesticides [Spurlock, F. 2008. Distribution and variance/covariance structure of pesticide environmental fate data. Environmental Toxicology and Chemistry, Vol. 27, No. 8, pp. 1683-1690]. DPR focused on using representative values for both Koc and aerobic soil metabolism half-life in the MLV calculation. Where data are not normally distributed or when outliers are common, such as in environmental fate data, the median is a reasonable representative value. The robustness of the model to correctly classify over 95% of the chemicals as "leachers" or "non-leachers" despite this inherent parameter variability relates to the model's multivariate nature and capability to accommodate parameter variability.

The LOO and LPO analyses are also indicative of model output sensitivity. As indicated above, this process systematically renders each chemical independent from the model development set of chemicals. During a systematic iteration procedure, each independent chemical was evaluated for its predicted leaching status based on an MLV model that was reconstructed from the remaining chemicals. Predicted leaching classification of the independent chemicals was largely consistent with their known leaching classification despite the inherent variability in their chemical parameter values. Detailed results of LOO and LPO procedures are given in the MLV report.

Comment no. 33: Finally, DPR's proposal does not include any discussion of MLV impacts on classification. MLV model input parameters can have significant variability. For example, Koc is sensitive to pH, temperature, and different types of organic matter, and in different soils across California may vary for the same chemical. Additionally, aerobic half-life depends on soil type, temperature, moisture, the presence (biomass) of microorganisms, nutrients required for microorganism growth, and application history. Without a more robust evaluation of the MLV performance for realistic ranges of parameter uncertainty, the accuracy of the MLV methodology appears to be quite fragile to model input imprecision.

Response: Please see response to comment # 32.

Comment no. 34: Overall, the application of the MLV method on degradation products in order to inform listing of a pesticide on the GWPL is problematic.

Response: Please see responses to comments # 24 and 25.

Comment no. 35: As stated above, experimental values of aerobic soil degradation half-life and/or soil adsorption coefficients are often not generated for degradation products for US submissions. It is unclear to us how DPR will select endpoints for MLV assessment when there is no experimental data for soil half-life or soil adsorption coefficient. WPH requests clarification from DPR as to how these endpoints will be determined in lieu of changing data requirements, which currently do not require these endpoints for degradation products. Any data that are available may not be appropriate for California regulatory decision-making, further highlighting the importance of engaging with registrants prior to implementation of the MLV to inform the GWPL, especially based on degradation products.

Response: Please see responses to comments # 24 and 25.

Comment no. 36: It is unclear how DPR is going to handle monitoring common degradates among the pesticides products on 6800(c). WPH asks DPR to clarify how it intends to identify common degradates that could be detected from multiple pesticides. While this may not present a problem during the product registration process, we remained concerned that if utilized as part of

DPRs groundwater monitoring and assessment program, use of the MLV method could result in products being added to the 6800 new (b) or (c) lists.

Response: Please see response to comment #22. The 6800(c) list does not have additional restrictions on use but is used by DPR to help inform our analytical method development and groundwater monitoring prioritization. In DPR's Annual Well Sampling Report we describe how we prioritize pesticides for monitoring. This prioritization enables DPR to focus limited resources on pesticides that present the greatest contamination risk. Pesticides, and their degradation products on the 6800(c) list would be prioritized for analytical method development and groundwater monitoring pursuant to FAC section 13148**.** Regulation of pesticide use based on detections of degradation products would only occur subject to the PREC subcommittee process, a decision by the director of DPR, and if a connection between the parent and degradation products is established.

Identifying common degradates that could be detected from multiple pesticides already occurs with pesticides on the GWPL (simazine/atrazine is an example where two pesticides share common degradation products). DPR uses pesticide use records, amongst other factors, to make the connection between parent and degradation products during our monitoring studies and legal agricultural use determinations, if possible.

Comment no. 37: Additionally, it is critical for stakeholders to understand what data are being used by DPR to inform the additions to 6800(c), include which analytes are relevant to the proposed listing (i.e., active ingredient or specific degradate). We strongly believe this must be communicated to registrants by DPR prior to any proposed listing. Some data may not be appropriate for use in regulatory decision-making, and registrants must have the opportunity to independently validate DPR's conclusions prior to DPR moving to list a product as a "groundwater leacher" or include additional reevaluation actions.

Response: Please see response to comment # 24. Registrant-submitted data is reviewed during registration evaluations and that review is communicated back to the registrants. Opportunity to comment on the regulatory listing of pesticides in section 6800 occurs during rulemaking.

Comment no. 38: WPH is concerned about the requirement for the molecular computational software that will be utilized by DPR, Spartan. Spartan requires in-depth knowledge of chemistry in order to utilize its quantum molecular property calculations. While established registrants may have the resources to access this costly program, they don't have the experience with the software to be able to accurately use it in accordance with DPR's proposed approach. WPH is concerned that small registrants entering the marketplace with new technologies will not be able to afford this program or have the expertise to use it. As a result, independent verification or proactive determination of a pesticide's relevant MLVs is expected to be inaccessible for many, which reduces transparency of the process. Additionally, changes in molecular estimates with different versions of Spartan could conceivably occur. It is unclear how DPR will implement and communicate version control for the software used in their assessments.

Response: Specific, stepwise directions to generate each of the three chemical-specific molecular-based property values in Spartan are given in Appendix VI of the MLV report. Utilizing these directions ensures each chemical is evaluated in a consistent and standardized manner. In addition, the chemical-specific values for each of the molecular-based properties are also provided in the report appendices and can be used by registrants or others for comparison and testing purposes when generating their own values. DPR derived the molecular variables in two versions of Spartan, namely Spartan '18 and Spartan '20. Both versions produced similar values for each of the three chemical-specific molecular-based variables.

Comment no. 39: WPH requests clarification regarding 6800(b), which is cited below. Please clarify the intention of 6800(b) and identify DPRs intended process to engage registrants prior to the determination of the director to move directly to mitigation.
"While AIs have historically only been added to section 6800(a) as a result of the PCPA process, there is also the potential that the Director can bypass another PCPA hearing and move straight to mitigation for an AI on the new proposed section 6800(b) list (Food and Agricultural Code section 13152(a)(2): If the department determines that there is new science or data that could impact the validity of a finding described in paragraph (1), the director shall either mitigate the threat presented by the pollution or subject the pesticide again to the Section 13150 review process."

Response: DPR proposes to add a new section 6800(b), which lists all active ingredients and/or their degradation products, including their salts and esters, detected pursuant to FAC section 13149(a). These active ingredients and/or their degradation products have undergone FAC section 13150 review, but do not warrant use modifications as they have not polluted, or threaten to pollute, groundwater in California. This subsection is intended to distinguish these pesticides that have undergone FAC section 13150 review from pesticides that have either:

- use modifications (6800(a)) or,
- are placed on the GWPL due to their MLV scores (6800(c)).

Pursuant to FAC section 13152(a)(2), in the event DPR determines that there are new science or data that could impact the validity of a FAC section 13150(d) finding, DPR will either mitigate the threat or subject the pesticide to the FAC section 13150 review process. Any mitigation DPR imposes will be in compliance with all applicable process requirements, including the Administrative Procedure Act (APA).

Comment no. 40: WPH believes it is important to note on record concerns raised by the three peer-review scientists that seemingly does not appear in the proposed rulemaking package.

Response: These concerns are addressed in the "Documents Relied Upon" section of the ISOR. See this citation for the full discussion: Clayton, M., Troiano, J. 2024. Memorandum: Response to the External Scientific Peer Review Comments on DPR's 'Revision of the Statistical Method to Identify Pesticide Chemicals with Potential to Move Through Soil to Groundwater in California.' Department of Pesticide Regulation, Environmental Monitoring Branch.

Comment no. 41: *"There are two important shortcomings that can potentially weaken the multivariate model analysis and cross-validation. First, the report does not consider uncertainties of the chemical properties. Each chemical was represented by a single value in each of the eleven dimensions considered (Tables provided in Appendix II). These values are presumably the means, at least for the empirical properties. The potential sources of uncertainty for the quantum/chemical properties are also not addressed. Propagation of these uncertainties to the CDA and cross-validation would likely increase misclassification. I recommend conducting an error-propagation analysis if parameter uncertainties can be obtained. Otherwise, clearly discuss the shortcomings and pitfalls of the proposed thresholds."*

Response: Please see response to comment # 40. Reprinted from Clayton, M., Troiano, J. 2024: "Reviewer discusses uncertainty in the empirically-derived parameters. Uncertainty of the empirical properties was considered during model development. For example, 1) median values are utilized in the model as opposed to mean values to reduce the effect of extreme or unusual values sometimes associated with physicochemical properties data, 2) as stated in the report, for the two correlated variables of soil aerobic half-life and terrestrial field dissipation half-life, the former was selected because it is laboratory derived and is generally considered a more stable and repeatable measurement compared to the latter, which is field derived. The review also stated that potential sources of uncertainty for the quantum properties was not addressed. However, generation of the quantum properties using the Spartan '20 software was found to be invariant. This fact was stated in the report. Overall, the study of variance between measurements within each physicochemical property for every chemical was beyond the scope of this evaluation and wasn't considered necessary to support the revision of the SNV process. As suggested by the reviewer the shortcomings and pitfalls of the proposed empirical values as they relate to their potential variance was acknowledged in a revision of the report."

Comment no. 42: *"Second, several of the empirical parameters are dependent on the soil properties and environmental conditions (e.g., moisture and temperature). Specifically, the two empirical variables retained in the final Model 7 are subject to such influences. Soil adsorption coefficient depends on organic matter (which is accounted for) and soil mineralogy (Thompson and Goyne, 2012). Laboratory-derived soil aerobic half-life also depends on moisture and temperature conditions (which can potentially be standardized) and the soil chemical and biological composition of the soils for laboratory testing."*

Response: Please see response to comment # 40. Reprinted from Clayton, M., Troiano, J. 2024: "The two empirical properties included in the model, which are soil absorption standardized to the organic carbon content of the soil tested (Koc) and laboratory soil aerobic half-life, are derived from protocols that tend to minimize variability. The range of soil adsorption coefficients (Kd) from which Koc is calculated can be large. Standardizing the Kd to the organic carbon content of the soil tested greatly decreases the variability between soils and provides a stable measure for comparison across chemicals. For laboratory-derived soil half-life, values are derived according to U.S. EPA protocol under specific conditions. There was a high correlation between laboratory-and field-derived soil dissipation half-life values. Laboratory-derived soil

half-life values were selected for the modeling analysis because of greater standardization and reproducibility in laboratory studies."

Comment no. 43: *"The authors adopt a classical cross-validation approach for the model validation, the leave-one-out procedure. Basically, new canonical equations are computed using only 41 of the 42 chemicals available. This results in 42 new models, for which MLV equations and MLT values are computed and used to see the efficiency of each new canonical equation. Of the three models retained as most promising (the ones with five, four, and three properties), the model with five properties is the one that consistently performs best, and it is the one retained.*

Remark. A question remains that is why the authors did not choose model 4 or model 10 in Table 8 as the final proposed model, since both models only fail to classify the Methomyl chemical, as opposed to the rest of the models and the model itself based on the 42 chemicals that misclassify two chemicals (Methomyl and 1,3-D)."

Response: Please see response to comment # 40. Reprinted from Clayton, M., Troiano, J. 2024: "The 42 LOO models were reruns of the standard CDA Models 7 listed in Table 7, with each rerun containing only 41 of the 42 leacher and non-leacher model development set of chemicals. Selecting a LOO model as the final proposed model where a specific chemical was removed from the model development dataset would reflect a form of raw data censorship. The function of LOO was for validation purposes and not for manipulation of input data."

Comment no. 44: *"The biggest concerns expressed above resides and with the expected external accuracy of this model as it has been developed with relatively small dataset and not all major OECD requirements to the regulatory QSAR model development and validation have been followed. To summarize the recommendations outlined above, it would be prudent to employ alternative chemical descriptors and QSAR approaches that can make use of all available compounds and data; and it would help to include additional complementary data from other regions in the US to see if the dataset expansion could improve the predictive power of the model with respect to chemicals tested in California."*

Response: Please see response to comment # 40. Reprinted from Clayton, M., Troiano, J. 2024: "Data for physicochemical variables used in the model are required to be submitted by registrants to U.S. EPA prior to registration of the chemical. Registrants of pesticide chemicals are aware of U.S. EPA protocols to produce the data needed for registration. Prior to registration for use of a chemical in California, the data are also required for submission to DPR's Registration Branch. Therefore, empirically derived data required for the proposed multivariate analysis can be obtained from DPR's Registration Branch. Adding internet links and experimental guidance for testing procedures would therefore be redundant."

"As discussed in the report on the proposed multivariate analysis, data generated from monitoring studies conducted within California are the most reliable due to inspection and resampling of wells, diligence in review of accompanying QA/QC laboratory data, and analysis of pesticide use and the landscape surrounding detections. The defined domain of applicability

for the model is sufficiently large because the dataset of leachers and non-leachers contains chemicals representing a broad range in molecular structure. The OECD QSAR report referenced earlier by the reviewer explains that many QSAR studies use 'local sets' of data. Local sets were defined as relatively small collections of chemicals consisting of singular or closely related chemical structures. The OECD report further indicates that the approach should have a 'Defined Domain of Applicability'. With respect to referenced QSAR mechanistic studies, chemicals on the leacher and non-leacher lists represent a broad range of pesticide classifications from relatively small molecules such as soil fumigants to larger more complex molecules such as triazines. Application to a large range in chemical structures provides another indication of potential robustness of the proposed multivariate model with respect to determining leaching potential of chemicals."

Comment no. 45: WPH requests that DPR provide its response to these concerns raised by the reviewers.

Response: Please see responses to comments # 40, 41, 42, 43, and 44.

Comment no. 46: Because the frequency and method of pesticide application, and the environmental conditions during and after application can impact the transport and fate of a pesticide as well as its likelihood to reach groundwater, the degree to which the MLV method incorporates any of these other factors would be inherent to the dataset used for the observations of "leachers" and "non-leachers." Because of these important limitations to the use of numerical and/or threshold methods for identifying the potential for pesticides to pollute groundwater, WPH recommends that DPR instead look at some of the modeling utilized by USEPA. WPH recommends that DPR consider using existing Leaching Estimation and Chemistry Model-Pesticide deterministic and probabilistic modeling procedure, including use of TFD half-live trials and Koc studies, to further investigate potential for leaching prior to placing any compound on the GWPL.

Response: Please see response to comment # 22.

Comment no. 47: DPR has repeatedly stated that the MLV is a screening tool. Because of the MLV limitations, WPH recommends that the MLV be applied only as an initial screening tool. It should not be utilized as a trigger to include a pesticide to the GWPL. Any action by DPR to include a product to the GWPL or require additional studies should not occur until a formal process of engagement with the registrant has taken place where additional data demonstrates a need to consider listing.

Response: Please see response to comment # 22.

Comment no. 48: It appears registrants were not notified in advance of the changes and additions to the GWPL. There was no scientific evaluation provided for each respective active ingredient

and/or degradants, which would include in detail the data that was used for the assessment. WPH strongly recommends that DPR should provide registrants with the respective scientific evaluation justifying the modification of the GWPL and a mechanism not only to inform registrants before making any regulatory changes on their respective active ingredient, but also a period for registrants to provide comments. Because of the lack of opportunity for registrants to actively engage in this process, we request that DPR pause its current plan to add new AIs to the GWPL until an adequate period has been provided for registrants to engage with DPR in a more thorough evaluation of their products under consideration. This will help ensure there is transparency in the process.

Response: Please see responses to comments # 20, 21, 22, and 37.

Comment no. 49: To further provide transparency to the process, WPH recommends that DPR establish fair and adequate timelines in its notification for inclusion of new pesticides to the GWPL. Currently, registrants are not notified that their product is under review until a recommendation reaches the director leaving registrants at most four months to respond to a multi-year process DPR has been conducting to determine that their product was detected in groundwater due to LAU.

Response: Commenter may be misinterpreting between two separate processes: the GWPL determination proposed in this regulatory action and the formal review process, pursuant to FAC section 13150, that occurs after legal agricultural use (LAU) determination as described in FAC section 13149. GWPL determination occurs during regulatory updates in compliance with the APA and DPR provided the minimum required 45-day notice under this regulatory update. For these proposed regulations, DPR also extended the comment period an additional 15 days. The LAU determination occurs, after extensive monitoring, as a prelude to the FAC section 13150 hearing and is outside the scope of this regulation. The timeline for the formal review process is specified in the statute. While there is sufficient notification and time for the registrant to review and respond under both processes, DPR strives to ensure transparency and continuous improvement. Statewide groundwater monitoring data, including data collected by DPR, is posted to DPR's website annually as part of the Well Inventory Database and the Annual Well Sampling Report.

Comment no. 50: Hearings must be held within 180 days, but may be scheduled much sooner, potentially creating an unreasonably short preparation period. Registrants need adequate time to defend their product's continued use, examine DPR's analysis and sampling files, research mitigation options, conduct scientific analysis, scrutinize DPR's findings, and develop solutions—tasks that cannot be completed effectively under such compressed timelines.

Response: This comment is referring to the FAC section 13150 hearing and is thus outside the scope of these proposed regulations.

Comment no. 51: We ask that DPR establish a system where earlier and more frequent communication with registrants be incorporated into the process, particularly given the expanded scope that now includes active ingredient degradants. WPH supports changes recommended by a coalition of organizations and requests that the process be amended so that registrants and commodity organizations representing crops registered for these materials be notified within 30 days when any of the following DPR actions occur:

- Initiation of additional groundwater monitoring based on preliminary results.
- Decisions whether to further expand studies beyond first round of monitoring.
- The process to determine LAU based on the data collected is initiated.
- Recommendations are made to the Executive Team.

We believe the increased level of communication and formal notifications to registrants will result in the more timely resolution of concerns by DPR as registrants will have greater ability to accurately provide input to DPR regarding potential leaching concerns.

Response: This comment refers to other DPR processes outside of GWPL listing proposed in this regulatory action and is thus outside of the scope of the proposed regulations.

Comment no. 52: Utilizing the studies USEPA has adopted for their initial review will assure that all registrants have access to software. As USEPA must register all pesticides prior to any state registration, all registrants will have already incorporated the above outline studies and assessments into their groundwater safety assessment programs. We believe this will provide consistency in scientific approaches required of registrants, and increase DPRs goal of synergy between DPR and USEPA efforts.

Response: Please see response to comment # 24.

Comment no. 53: WPH strongly believes that because this is the first opportunity for stakeholders to comment on this proposal, this comment period should be utilized as an opportunity for DPR to evaluate comments as a way to inform its approach. While DPR has evaluated the use of MLVs internally and provided a presentation to the Pesticide Registration and Evaluation Committee, we are unaware of any workshops that actively engaged registrants. In addition, we are unaware of any discussions with stakeholders where the use of MLV would serve as a trigger for listing on the GWPL.

Response: Please see response to comment # 21.

Comment no. 54: WPH appreciates the efforts DPR has made to address statutory requirements to update its GWPL processes. However, we must state once more that this comment period represents stakeholders' first opportunity to comment on this proposal. Given its potentially significant impact on the registration process and the groundwater monitoring program, final decisions should be made thoughtfully rather than rushed simply because the MLV methodology is now complete. The proposal is a complex and dramatically different system to assess potential

pesticide leaching to groundwater. As a result, we believe this should not serve as the only opportunity for stakeholders to engage on this proposal.

Response: Please see responses to comments # 21 and 22.

<u>3. Craig Riddle, PG, California Rice Commission</u>

Comment no. 55: The Rice WDR has a robust water quality program with the groundwater monitoring consisting of nitrates and specific constituents. Groundwater monitoring for pesticides is not a requirement of the Rice WDR because the CRC supports DPR as the only agency that has the authority to regulate the use of pesticides. Therefore, the DPR Groundwater Monitoring Program fulfills the requirement for monitoring pesticides in groundwater.

Response: Comment noted; no response needed.

Comment no. 56: We agree the use of specific numerical values (SNVs) to determine leaching and runoff need updating due to the numerous non-detections of pesticides from the groundwater monitoring program. Since the development of the SNVs in 1991, a more effective approach was necessary to better utilize resources for identifying and monitoring pesticides with the potential to pollute groundwater (Troiano, et al, DPR 2024).

Response: Comment noted; no response needed.

Comment no. 57: The multivariate leaching value (MLV) methodology is a procedure that appears to be a positive change with better utilization of resources in the monitoring program. One possible concern with the MLV is the modeling for determining the pesticide leaching potential, which creates a learning curve while utilizing the process. We understand the DPR staff are utilizing MLV modeling during the pesticide registration process and this regulation change will formalize the procedure. Please reach out to the CRC for questions when using the MLV for rice pesticide registrations. The CRC is the best resource for responding to both technical and practical use of a pesticide in rice fields.

Response: Comment noted; please see response to comment # 38.

Comment no. 58: The CRC stresses the need for outreach and communication when DPR staff are modeling a rice pesticide, since our knowledge extends to water use. Leaching is often an assumption when the rice crop is grown in water (UCCE/UCANR 2020). The fact the crop is grown in water demonstrates minimal leaching and low percolation as found in the nitrate assessment prepared for the Central Valley Water Board (CRC, et al 2022). Refining the MLV for rice is an area the CRC can engage and provide useful feedback. Our request might seem like

adding time to the process by reaching out to a stakeholder. However, engagement upfront will lessen the time factor after the process is complete.

Response: Comment noted; no response needed.

Comment no. 59: What will be the process to remove pesticides from the GWPL? The proposed regulations are removing and adding pesticides to the list of potential groundwater contaminants. We realize additions and deletions will require regulatory changes. Will a timeline or process be in place to further review and assess the pesticides? We realize monitoring of degradates is nothing new from the DPR Groundwater Monitoring Reports (CDPR 2009). Creating the requirement to monitor degradates is new to the process.

Response: Pesticides could be removed from the GWPL through a rulemaking action if they are no longer actively registered in California and/or new environmental fate data changes the MLV so that it is less than the multivariate leaching threshold (MLT). The GWPL will be periodically updated as new pesticides are registered and new information becomes available. DPR has routinely monitored for pesticide degradation products in our groundwater studies for decades.

Comment no. 60: The CRC is unlike other commodity organizations, so please use the Commission as a resource when evaluating rice pesticides. We appreciate the use of a subcommittee to the Pesticide Registration and Evaluation Committee (PREC) per citation in the Food and Agricultural Code (FAC) and added though the DPR proposed regulation change, citing FAC §13150(b) to evaluate and determine findings on the pesticide(s) in question. Reading the FAC §13150 in the entirety allows for consideration of the Director to modify agricultural uses. This is an area the CRC has expertise and would be invaluable for providing feedback. We assume no toxic effects from the pesticides registered on rice due to the rigor of the review process at both the U.S. Environmental Protections Agency and DPR. Therefore, the CRC takes seriously the positive environmental message the rice growers have so diligently strove to achieve. Please allow transparency to the CRC when evaluating findings on rice pesticide detections in the DPR groundwater monitoring program.

Response: Comment noted; no response needed.

Comment no. 62: The CRC is supportive of updating the pesticide selection process from the SNV to the MLV procedure. We would like to see more transparency in the process to add and remove pesticides from the GWPL. Please utilize the CRC as a resource for rice pesticides. We realize the laws and regulations do not include the agricultural industry as a stakeholder. Perhaps the CRC could act in a case-by-case basis as an ad hoc to the PREC per FAC §13150(b). The rice growers have been adaptable to changes in management practices that eliminate negative environmental impacts.

Response: Comment noted; no response needed.

Comment no. 63: The CRC appreciates our positive relationship with the DPR staff through management of pesticide and water quality programs. We value the opportunity for providing comments to the regulatory changes in the GWPL. Please realize not all commodity groups offer the same level of engagement and expertise as the CRC. We request you contact the CRC for anything relative to rice.

Response: Comment noted; no response needed.

4. Allison Johnson, Natural Resources Defense Council

Comment no. 64: NRDC supports the general direction of the proposed regulations, including updating the assessment methodology to reflect advances in detection and analysis since 1991, with the improvements identified in comments from Clean Water Action et al. that NRDC joins. However, to carry out the purpose of the Pesticide Contamination Prevention Act (PCPA) to prevent pesticide pollution of groundwater that may be used for drinking water, DPR should make several changes to the proposed regulations.

As detailed below, the final regulations should: clarify applicability of the regulations to neonicotinoids used as seed treatments; provide more detailed direction for review of pesticides identified in groundwater, including appropriate weighting of limited sampling data and analysis of cumulative impacts; reinforce ongoing monitoring requirements for pesticides that have been found in groundwater; and improve transparency in the listing methodology.

Response: The first three areas noted in this comment are outside the scope of the proposed regulations. These proposed regulations are focused on registered pesticide active ingredients, and their degradation products, that could potentially pollute groundwater, regardless of their status as a seed treatment. These proposed regulations are about determining the GWPL and not DPR's detection response or product registration processes. Every pesticide proposed for GWPL inclusion has at least one labeled agricultural use.

The proposed MLV model is a screening tool used to determine pesticide groundwater pollution potential using environmental fate data. Chemicals identified as having potential to pollute groundwater would be subject to further scrutiny with high level, predictive modeling and targeted groundwater monitoring studies.

Relative to improving transparency in the listing methodology, see responses to comments # 20, 24, 26, 27, and 32.

Comment no. 65: The proposed regulations correctly continue to include four major neonicotinoids used in agriculture – imidacloprid, clothianidin, dinotefuran, and thiamethoxam – on the Groundwater Protection List. However, to fully capture the risks and impacts of these chemicals and other similarly harmful pesticides to California's drinking water supplies, the final

regulations must assess and address all threats posed to groundwater by neonicotinoids and other harmful pesticides, especially when used as coatings on crop seeds known as "seed treatments."

Response: Please see response to comment # 64.

Comment no. 66: Neonicotinoids are persistent and highly mobile insecticides that are known leachers and water pollutants. Neonicotinoids are broadly used in California and the most widely used insecticides in the United States. While DPR does not currently track the use of pesticide-treated seed in California, seed treatments account for the vast majority of neonicotinoid use nationwide, and recent analysis shows that the use of neonicotinoid seed treatments in California may be larger than all other tracked neonicotinoid uses combined. DPR has acknowledged that, when used as seed treatments, more than 90% of neonicotinoids applied typically end up in water, soil, and non-target plants, posing a threat to California's drinking water.

Response: Comment noted; no response needed.

Comment no. 67: When neonicotinoids contaminate source water for drinking water, the likelihood of human exposure is high because typical drinking water treatment does not remove neonicotinoids. For example, a 2021 study found that 92% of imidacloprid entering California wastewater treatment plants went through the plant untouched. This means that where neonicotinoids appear in groundwater used as a drinking water source, human exposure to these chemicals will be a near certainty.

Response: DPR routinely monitors groundwater for pesticides on the GWPL, including some neonicotinoids. DPR maintains the Well Inventory Database (WIDB) of wells sampled for pesticides by DPR and other agencies. The PCPA requires DPR to summarize results of groundwater sampling for pesticide residues and actions taken to prevent pesticides from migrating to groundwater in the Annual Well Sampling Report. DPR uses these data to evaluate and guide DPR's groundwater protection, monitoring, and research activities. The WIDB and Annual Well Sampling Report are available at DPR's website. In 2021, imidacloprid was entered into DPR's pesticide detection response process based on groundwater detections and DPR held a public hearing with the PREC subcommittee as required by FAC section 13150. The subcommittee and DPR's director determined imidacloprid currently does not pollute and does not threaten to pollute the state's groundwaters and that DPR will continue to monitor groundwater for imidacloprid. As a part of this rulemaking proposal, imidacloprid will be placed on the new 6800(b) list. Also, a 2024 DPR Risk Characterization Document on non-agricultural uses of imidacloprid identified no risks to drinking water from groundwater sources, including monitoring at municipal water facilities.

Comment no. 68: That exposure threatens Californians' health, especially that of children. Neonicotinoids have been linked to developmental, neurological, and reproductive harms, as well as poisoning incidents, including some classified as severe and some fatalities. In laboratory

studies, prenatal exposure to the neonicotinoids in test rodents increases risk of adverse effects in brain development, including thinning of the brain cortex.

Response: Comment noted; no response necessary.

Comment no. 69: While neonicotinoids' harms and threats to drinking water sources are well known, other pesticides present similar risks driven by similar traits—including toxicity, persistence, and migratory ability. Risks to groundwater can be especially high with the use of these pesticides as seed treatments, as most of the pesticide coatings remain in soil and are buried at a depth where they may be more likely to persist and are physically closer to groundwater sources.

Response: Comment noted; no response necessary.

Comment no. 70: However, the current and proposed regulations do not make clear how pesticide pollution from seed treatments will be adequately assessed or mitigated. First, it is not clear whether updates to the proposed formula for identifying pesticides to include on the Groundwater Protection List account for the unique use patterns associated with treated seed and their heightened potential to contaminate groundwater.

Response: Please see response to comment # 64.

Comment no. 71: More importantly, the current and proposed regulations fail to clarify how impacts and threats from pesticide seed treatments will be addressed, given that DPR has not historically regulated treated seeds as "pesticides." Under the PCPA, when sampling detects a pesticide in groundwater or at certain soil depth, DPR must determine whether that detection resulted from legal agricultural use. An affirmative determination triggers review, and where the pesticide is determined to pollute or pose a threat to groundwater, mitigation or cancellation is required. However, while the PCPA defines "agricultural use" as the "use of any pesticide or method or device for the control of plant or animal pests," DPR has previously stated that it considers treated seeds to be outside the definition of "pesticide" under the California Food and Agriculture Code (FAC), and thus, outside the scope of its regulatory authority.

Response: Please see response to comment # 64.

Comment no. 72: This position creates confusion regarding whether DPR believes it has the authority under the PCPA to mitigate pesticide pollution coming from the use of treated seeds (perhaps as a "method" or "device") or not. Even where mitigation is pursued, it may be further complicated by DPR's historic stance on the status of treated seeds. The PCPA's remedial mechanism for eliminating harmful groundwater pollution is the modification or cancellation of DPR-registered pesticide products. However, as DPR has recognized, many seeds in California are currently treated with non-DPR registered products. A 2021 DPR survey of California

Department of Food and Agriculture inspection data found that the majority of seeds inspected were treated with products not registered by DPR for seed treatment.

Response: Please see response to comment # 64.

Comment no. 73: Pursuant to the terms of a recent settlement agreement, DPR will propose regulations addressing pesticide-treated seed by February 2026. These regulations may clarify DPR's position as to the status of pesticide-treated seeds under the FAC, and whether treatments for seeds planted in California will be limited to only those that are registered by DPR for that purpose. Regardless, DPR should clarify in this PCPA rulemaking that its new regulations will account for, and provide an avenue for appropriate mitigation against, any relevant risk or harm to California's groundwater coming from the use of neonicotinoids and other harmful pesticides as seed treatments.

Response: Please see response to comment # 64.

Comment no.74: The final regulations should include detailed direction on how groundwater monitoring data is analyzed in section 13150 review to ensure accuracy, transparency, and reliability, and, ultimately, that the process is sufficiently rigorous to protect groundwater.

Response: Please see response to comment # 64.

Comment no. 75: As noted above, when a pesticide from legal agricultural use is detected through monitoring, the detection triggers a formal review process pursuant to section 13150. The registrant must meet certain section 13150 criteria; if these criteria are not met, the pesticide "shall" be canceled.

Response: Comment noted; no response needed.

Comment no. 76: As part of the section 13150 review, a subcommittee of the Pesticide Registration and Evaluation Committee (PREC) and DPR must make findings regarding the extent to which the pesticide pollutes or threatens to pollute groundwater. Although they must ultimately weigh these findings against other factors, the initial analysis of the groundwater detection data can strongly influence the outcome of these reviews. Sound and comprehensive analytic practices are essential in this analysis, and DPR should ensure the process appropriately weights data and considers cumulative impacts.

Response: Comment noted; no response needed.

Comment no. 77: DPR should recognize, and account for in the final regulations, that pesticide detections are likely indicative of even higher levels of contamination, and high points in the data

are more likely accurate reflections of contamination than outliers. Routine water monitoring that relies on "grab samples" typically underestimates peak concentrations – potentially by several orders of magnitude. It has been recommended that during runoff periods, samples should be taken at least 10 times monthly to get results near the peak. Additionally, the movement of pesticides through particular aquifers may vary and contamination levels may fluctuate significantly over time. Further, the degradation of chemicals into breakdown products may result in further limitations on detections.

Response: Please see response to comment # 64.

Comment no. 78: The section 13150 review of imidacloprid highlights the need for clearer analytic guidance. DPR detected imidacloprid above the reporting limit in 16 wells in Fresno, Santa Barbara, and Tulare counties from 2014 to 2021, with concentrations ranging from 0.022 to 5.97 ppb. Rather than acknowledging the likelihood that most of these samples underestimated contamination levels, the PREC subcommittee and DPR ignored the highest detection sample due to its "anomalous nature." Indeed, sampling since the DPR assessment indicates that imidacloprid remains a serious groundwater contamination concern.

Response: This comment is outside of the scope of the proposed regulatory action. However, from the Director's decision on the imidacloprid detections: "The subcommittee findings noted irregularities with the 5.97 ppb detection and expressed concern about basing potential regulatory action solely on this sample. The subcommittee noted that the 5.97 ppb detection: (1) was much higher in magnitude than all other imidacloprid detections in the same well, and the drop in magnitude of subsequent imidacloprid concentrations from the same well was considered unusual; (2) was far greater than imidacloprid detections in any other well, and was almost 10-fold higher than the next highest GWPP detection of 0.665 ppb; and (3) was sampled from a well where the well water exhibited an unusual degree of murkiness. For these reasons, the subcommittee opposed basing a pollution finding on the 5.97 ppb detection. **Even if the subcommittee had found the 5.97 ppb detection to be reliable, it still would have made a 'no pollution' finding because the 5.97 ppb detection was below the most conservative health-protective level that the subcommittee found to be supportable**. (*See* subcommittee Finding 3.). [bolded for emphasis]

"The numerous potential PHC/HHRLs provided by the subcommittee ranged from 10 to 283 ppb, based on various points of departure and study endpoints. The 10 ppb PHC—the most conservative health-protective level—was proposed by OEHHA in its report to the subcommittee. OEHHA based the 10 ppb level on a 0.8 mg/kg/day point of departure using an immunotoxicity endpoint derived from a study conducted in mice. It included several health-based default assumptions, including: (1) humans are 10-fold more sensitive than mice; (2) there is a 30-fold variation in sensitivity within the human population; and (3) 20% of the total imidacloprid consumption in humans would originate from drinking water (the remaining 80% would derive from other sources, including food and air).

"Pursuant to Food and Agricultural Code section 13152(a)(1), DPR shall continue to conduct groundwater monitoring for imidacloprid in DPR's Well Monitoring Network, which is located

in areas vulnerable to pesticide leaching and runoff and has been shown to be sensitive to detections of imidacloprid. DPR shall continuously review new science and data that could impact the validity of the subcommittee's finding that imidacloprid does not pollute or threaten to pollute groundwater. The Director concurs with the subcommittee recommendation for GWPP to consider incorporating, to the extent feasible, pounds of active ingredient of imidacloprid applied to soil used per section, combined with an assessment of depth to groundwater and vulnerable soil types, to determine priority monitoring wells."

Comment no. 79: California needs guardrails on the section 13150 review process to ensure that the collected data are analyzed appropriately – and not discarded arbitrarily. These guardrails could include requirements for statistical assessment to determine when a sample may be deemed an outlier and consideration of factors such as earlier and later testing, the interconnectedness of groundwater systems, and nearby communities and crops.

Response: Please see response to comment # 64.

Comment no. 80: DPR should also ensure that the section 13150 review accounts for cumulative impacts in the assessment of the actual or potential adverse health effects. Complex blends of pesticides are the rule, not the exception, when it comes to field measurements; individual pesticides do not act in isolation. Rather, the impacts from exposure to multiple pesticides will likely exceed the impacts from exposure to a single toxic chemical. For persistent pesticides, this "cocktail effect" will compound over time as those pesticides build up in the environment and leach into groundwater, mixing with other pesticides.

Response: Please see response to comment # 64.

Comment no. 81: Time-cumulative toxicity should also be considered – i.e., the analytical methods should account for contaminants where harm from repeat and long-term exposures may add up over time. For example, time-cumulative neurotoxic impacts of neonicotinoids have been observed on many non-target terrestrial and aquatic organisms, with implications for similar in harm in people.

Response: Please see response to comment # 64.

Comment no. 82: Pesticide products may also contain other harmful chemicals, such as PFAS in neonic blends, compounding harms even within a single formulation. These additive and synergistic risks are particularly high in disadvantaged communities already facing disproportionate health burdens.

Response: Comment noted; no response needed.

Comment no. 83: Section 13150 reviews that do not consider additive, time cumulative, and synergistic pesticide impacts fail to adequately prevent pollution in alignment with the purpose and mandate of the PCPA to protect California's groundwater aquifers and public health. The final regulation should require consideration of how interactions between detected pesticides and other chemicals exacerbate potential adverse health effects, in the short and long-term.

Response: Please see response to comment # 64.

Comment no. 84: The final regulation should clarify that pesticides that have undergone section 13150 review remain subject to rigorous oversight and monitoring to protect Californians' health. The proposed updates to the Groundwater Protection List would separate pesticides that have gone through section 13150 review (proposed section 6800(a) and (b)) from those that have not (proposed section 6800(c)), and further separate section 13150 reviewed pesticides into lists of those subject to use modifications (proposed section 6800(a)) and those that have been found to not pollute or threaten to pollute groundwater (proposed section 6800(b)).

Response: Section 6800 already states that any pesticide listed in that section has the potential to pollute groundwater and FAC section 13152(a) already requires DPR to conduct ongoing monitoring of these pesticides. Since there is an existing requirement to monitor these pesticides, it is not necessary to further clarify that pesticides that have undergone section 13150 review remain subject to rigorous oversight. Findings made in FAC section 13150(d) do not preclude future determinations of pollution occurrence, potential, or mitigation. DPR will continue to conduct ongoing groundwater monitoring for FAC section 13150 pesticides. DPR's groundwater sampling focuses monitoring in vulnerable areas and DPR continuously reviews new science and data that could impact the validity of the subcommittee's findings.

Comment no. 85: These updates would add clarity and granularity regarding the section 13150 status of the pesticides on the Groundwater Protection List, but they also risk misleading the public regarding the ongoing potential threats posed by the pesticides that would be included in sections 6800(a) and (b). The PCPA recognizes that pesticides once determined to not pollute may be determined to be dangerous in the future. Even though the section 13150 reviews of these pesticides have found that they may continue to be used in ways that do not threaten California's groundwater, future detections could change those findings; in other words, the absence of these pesticides from the section 6800(c) list of pesticides with the "potential to pollute groundwater" does not imply that potential does not remain. Indeed, even after a section 13150 finding that a pesticide does not pollute or threaten to pollute, the PCPA requires pesticides to undergo continued monitoring and review to account for new developments.

Response: Please see response to comment # 84.

Comment no. 86: To ensure that the proposed categorization structure of the Groundwater Protection List does not imply that pesticides that have undergone section 13150 review do not retain the potential to pollute groundwater, the final regulation should reference the ongoing

monitoring provisions in FAC section 13152(a). Specifically, section 6800(a) should state (proposed additions in underline): … and subject to sections 13150(d)(2) and 13152(a) of the Food and Agricultural Code … and section 6800(b) should state: … and subject to sections 13150(d)(1) and 13152(a) of the Food and Agricultural Code… This language will reinforce the continued monitoring and review requirements and protect against calcification of section 13150 findings that are subject to ongoing scrutiny.

Response: Please see response to comment # 84.

Comment no. 87: We support updates to the proposed formula for identifying pesticides that should be included on the Groundwater Protection List, with the additional steps described in the comments from Clean Water Action et al. However, we also encourage DPR to ensure transparency in the formula's application. While more accurate, the proposed complex equation will make it more difficult for outside parties to parse the factors that contributed to a pesticide's inclusion or exclusion from the list (as compared with the current method of determining whether one mobility metric and one persistence metric exceeded a set value). To encourage ongoing public participation and transparency, DPR should make the data and explanations of formula factors available to the public in an easily accessible format.

Response: Please see response to comment # 20.

Comment no. 88: We appreciate DPR's attention to the ongoing threats that pesticides pose to California's water and efforts to transition to sustainable pest management. We urge DPR to consider and incorporate the foregoing comments into its final regulations to maximize and benefit of Californians and the state's precious groundwater resources.

Response: Comment noted; no response needed.

5. Lauris Rose, Cal-Orchid, Inc.

Comment no. 89: I support prudent use of pesticides and most especially, protecting our ground water basins but blanketing all 'nurseries' great and small, field growing or pot plant, seasonal soil drenching or high power fine mist spraying as needed results in an added demand on smaller growers. This is resulting in many of us choosing to end our business endeavors rather than spend time filling out forms etc that do not really apply to our business practices.

Response: The rule does not propose additional requirements on nurseries and therefore it is outside the scope of the rule. To clarify, many of the pesticides listed already have pesticide use reporting requirements because they are either applied by licensed applicators or are applied to a reportable use site. Any additional pesticide use reporting, specifically related to outdoor institutional or outdoor industrial use, is necessary because these pesticides have the potential to

pollute groundwater. These pesticides are continuously monitored for changes in detection frequency and magnitude. Pesticide use data can also inform the source of those detections.

6. Dennese Grimm, Gowan Company, LLC

Comment no. 90: For all active ingredients an assessment of their potential to leach to groundwater should be made in association with their approved use according to the label in force in the State of California. This is particularly relevant for the rice herbicide Benzobicyclon. Products containing Benzobicyclon (Butte Herbicide, 10163-334-AA, Cliffhanger SC Herbicide, 10163-374-AA) are only to be used on rice fields under permanent flood (3-4 inches recommended depth), and once applied, the flooded conditions are recommended to be held for a minimum of 5 days. To be scientifically relevant and supportable, environmental degradation end-points (e.g. half-life) must describe the environmental conditions prevalent during the time interval of maximal exposure to the environmental compartment under consideration.

Response: Please see response to comment # 22.

Comment no. 91: In the case of a rice herbicide, with a use pattern similar to Benzobicyclon, the median soil aerobic metabolism half-life variable is not relevant in describing the characteristics of the chemical with respect to its potential to leach to groundwater The products Butte Herbicide and Cliffhanger SC Herbicide are applied to the flooded rice paddy and the product disperses in water to control any crop damage.

The relevant characteristics are the half lives derived from:

- hydrolysis,
- aquatic field dissipation studies,
- aerobic and anaerobic aqueous metabolism studies.

Response: Please see response to comment # 22. It should be noted that two rice herbicides, bentazon and thiobencarb, were included in the model development dataset and accurately predicted during the LOO and LPO analyses. Once the proposed regulations are implemented, thiobencarb will be removed from GWPL because the MLV procedure does not identify it as having the potential to pollute groundwater.

Comment no. 92: In the case of Benzobicyclon, which is applied directly to the paddy water in a flooded paddy field, the rate of degradation (half-life) is orders of magnitude faster than in aerobic soil. This is recognized in all relevant EPA and DPR evaluations of this active ingredient. Therefore, the critical variable used in the MLV does not describe how the active ingredient degrades when used as authorized. The MLV method is therefore not a scientifically valid methodology to use in the prediction of GWPL for products with a specialized use pattern, such as application to flooded rice paddies.

Response: Please see response to comment # 91.

Comment no. 93: The conclusions of the DPR's memorandum (May 7, 2009, John Saunders: SUBJECT: Modification of the probabilistic modeling approach to predict well water concentrations used for assessing the risk of ground water contamination by pesticides) have not been sufficiently addressed for rice culture. Indeed, one of the parameters cited in the conclusions as relevant to rice culture, "anaerobic conditions," has been specifically excluded from the MLV procedure. This confirms that the MLV process is not scientifically relevant for rice culture products and the active substance Benzobicyclon should not be considered for inclusion under this proposal. The DPR proposal recognizes that concern in the section pasted below from the conclusion:
"Conclusions … There are some situations that might require a different approach. For example, the modelling approach does not include anaerobic conditions, so special cropping scenarios such as rice culture will not be adequately modeled. Evaluations for products that are not yet adequately modeled should continue using the SNV procedure to compare physical-chemical properties and they should rely upon field-derived measures of offsite-movement."

Response: The memo cited is referring to pesticide registration evaluations and not GWPL determination. The memo does specify that the SNV procedure should still be followed in the case of rice pesticides; the MLVs will replace the SNVs with a similar emphasis on mobility and persistence.

Comment no. 94: An acceptable risk assessment was performed by EPA. In the Drinking Water Assessment for the Proposed Use of Benzobicyclon on Rice in California, dated February 2, 2017, PC Code 215101, DP Barcode 427711. EDWCs were generated using EFED's standard model, the Pesticides in Flooded Applications Model (PFAM v 2.0) for surface water. PFAM is a model developed specifically for regulatory applications, to estimate exposure for pesticides used in flooded agriculture environments such as rice paddies.

Response: Comment noted; no response needed.

Comment no. 95: California Department of Pesticide Regulation (CDPR) determined for benzobicyclon in an evaluation report dated September 18, 2023, ID No 302321, EPA Reg No 10163-374 that *"modeling was conducted to generate Estimated Drinking Water Concentrations (EDWCs) in the downstream drinking water intake to assess potential human health risks of Cliffhanger SC Herbicide use on California rice. The EDWCs were lower than the associated Human Health Reference Levels (HHRLs) of the benzobicyclon and metabolite B, which suggests that product application will not pose potential risks to human health via exposure to the chemicals in drinking water."* In CDPR's "Sampling for Pesticide Residues in CA Well Water 2024 Update", benzobicyclon was not screened from monitoring wells.

Response: Comment noted. Benzobicyclon, and other active ingredients and degradation products, will be prioritized for analytical method development and groundwater monitoring after inclusion on the GWPL.

Comment no. 96: EPA evaluated tetraconazole in a drinking water assessment report dated December 2, 2020, Draft Ecological Risk Assessment for Registration Review. PC Code 120603, DP Barcode 440329. When examining the terrestrial field dissipation data, from 3 sites in the US, Germany and Italy, tetraconazole did not show movement below a depth of 6-inches (MRID 44865405). In foreign soil, did not show movement below a depth of 3.9 inches of soil depth. Tetraconazole has minimal potential to leach to groundwater." Further to this, in California, the label language specifically directs the user to avoid application near water via groundwater and surface water advisories on the Affiance, 10163- 332-AA, label. In CDPR's "Sampling for Pesticide Residues in CA Well Water 2024 Update", tetraconazole was sampled 74 times in 5 counties with 0 detects.

Response: Terrestrial field dissipation study (TFD) half-lives were included in the model development dataset. However, this data source was not significant when discriminating between "leachers" and "non-leachers" and thus is not part of the MLV equation. TFD studies are reviewed during registration evaluations, along with high level, predictive modeling. The MLVs serve to inform and prioritize further evaluation of environmental fate data.

Comment no. 97: Overall, Gowan thinks that inclusion of benzobicyclon and tetraconazole on GWPL is not warranted based on all the available data and science reviewed by EPA and DPR. We would appreciate consideration of our comments here and more information from DPR on why they are being proposed for inclusion.

Response: Please see responses to comments # 20, 22, and 24.

7. David Simpson

Comment no. 98: I'm not a scientist or a specialist in groundwater. I'm a regular citizen who cares about what happens to my family, my neighbors, and the people who live here long after I'm gone. And I have to ask—how much longer is the State of California going to look the other way while our groundwater is poisoned?

Response: DPR acknowledges these comments. However, they are outside the scope of the proposed regulation. The proposed regulations are about determining the composition of the GWPL.

Comment no. 99: You already know what's in it. Chemicals like Chlorpyrifos, which has been linked to developmental damage in children. Nitrates, which cause Blue Baby Syndrome.

Perchlorates, which disrupt the thyroid and are found near military bases and in fertilizers. And PFAS, which are connected to cancer and don't break down—ever. These aren't secrets. This isn't new information. So why does it feel like nothing is being done?

I'm not writing this as an expert. I'm writing this as someone who sees what's happening and can't ignore it anymore. These chemicals don't just go away. They sink into our aquifers, sit in our wells, and end up in the water we drink, cook with, and bathe our children in. Some of these chemicals have no safe level of human exposure—none. And yet we continue using them in pesticides, as if the long-term health of our communities doesn't matter.

Response: Please see responses to comments # 1 and 98.

Comment no. 100: Do you know what it's like to not trust your own tap water? Or to wonder if a loved one's illness started in the soil or the sprinkler? I do. Many of us do. And the silence from the state feels like betrayal.

Every time the state fails to act, it sends a message: that profit comes before public health. That agriculture and industry get a pass, while families absorb the cost—with their bodies, their children's health, and their future.

It shouldn't take lawsuits, protests, or outbreaks for change to happen. You already have the science. You already know the risk. Now it's time to do something about it.

Ban these chemicals. Protect our groundwater. Stop pretending this isn't happening—because people are paying the price, and the State of California is letting it happen.

Response: Please see response to comment # 98.

8. Dr. Oliver Pelz, Teleos Ag Solutions

Comment no. 101: Extensive Monitoring by the CDPR, the State Water Resources Control Board (SWRCB), and the United States Geological Service (USGS) shows no evidence of leaching.

CDPR's own groundwater monitoring data over several decades, starting in the 1980's encompassing thousands of wells and samples—has shown no confirmed detections of 1,3-Dichloropropene (1,3-D) in groundwater, through the 2021 sampling year.

The 38th annual well sampling report included monitoring results from January 2022 to December 2023 and showed only two potential detections of 1,3-D out of 13,615 samples analyzed, and one detection of *cis*-1,3-D out of 11,538 samples analyzed.

The detection of *cis*-1,3-D occurred in the same sample/well as the detection of 1,3-D at a location in Los Angeles County, although resampling of that well showed no detection. The detection of *cis*-1,3-D and 1,3-D from the same sample, if confirmed to be accurate, should count as a single detection of 1,3-D. A detection of 1.3 ppb (1,3-D) occurred in Yuba County. DPR is still evaluating that detection. Detections in the counties of Los Angeles and Yuba are both unverified detections.

Response: The MLV procedure identified 1,3-D as having the potential to pollute groundwater and is thus placed on the proposed GWPL (Bergin, 2024). DPR is currently reviewing the reported detections of 1,3-D and *cis*-1,3-D in groundwater. The proposed regulations prioritize monitoring but does not have additional restrictions on use.

Comment no. 102: To support a thorough review of these reported 1,3-D detections, we respectfully request additional information from the monitoring program. Specifically, we seek details regarding the well's location, well depth, groundwater depth, and aquifer characteristics. This information would assist in evaluating the potential for any local 1,3-D sources. We would also appreciate the opportunity to review the associated laboratory analytical methods and sample documentation to better understand the basis for the reported detection.

Response: DPR provided this information as part of a Public Records Request in June 2025.

Comment no. 103: Groundwater monitoring results that are available on DPR's website (2018-2023) are summarized in Table 1.

Table 1. CDPR groundwater monitoring since 2018 Year	No. of Samples	No. of Wells	No. of 1,3-D detections	Source
2018	3645	1780	0	CDPR, 2019
2019	4376	2288	0	CDPR, 2020
2020	4329	1204	0	CDPR, 2021
2021	6219	3206	0	CDPR, 2022
2022 and 2023	13615	5872	2	CDPR, 2025

Table 1 shows that 1,3-D was detected in two (2) samples out of 32,184 samples collected, or a detection rate of **0.006%**. These results strongly suggest that 1,3-D does not leach under California agricultural use conditions.

Response: Please see response to comment # 101.

Comment no. 104: The lack of 1,3-D detections in the groundwater monitoring program is consistent with 'worst-case' groundwater modeling conducted by CDPR. The potential of 1,3-D to leach to groundwater, using conservative model inputs, and extreme irrigation applied after application, showed that the predicted concentrations of 1,3-D in well water were less than 1x10-9 ppb (CDPR, 2008). This concentration is orders of magnitude below the Limit of Detection

(LOD) for the 1,3-D analytical method, and thus it is not surprising that 1,3-D has not been detected in DPR's monitoring programs.

Response: Please see response to comment # 101

Comment no. 105: This is also supported by CDPR's historical analysis of the environmental fate of 1,3-D. For example, in 2015, the CDPR Risk Characterization Document (RCD) (CDPR, 2015) reported that 1,3-D did not meet the criteria for its state **Groundwater Protection List** and had low potential to reach groundwater. Key factors cited by DPR included 1,3-D properties which lead to rapid environmental dissipation and degradation along with low persistence and mobility.

Response: Please see response to comment # 15.

Comment no. 106: Furthermore, CDPR describes 1,3-D in its Multivariate Leaching Value (MLV) modeling report as a "**Known Non-leacher**" (CDPR, 2024). Introducing a chemical to the GWPL in the absence of detections would misrepresent the actual risk profile of 1,3-D. Empirical data from actual field conditions should remain the gold standard for regulatory decision-making.

Response: Classification of a pesticide's leaching status, "leacher" or "non-leacher", during MLV model development is a function of groundwater monitoring results, sampling study design, analytical methodology, and pesticide use reporting. The MLV procedure uses an estimate-based screening model and is not a final determination of a pesticide's groundwater impact. Please see the MLV report for more specifics on creating the "leacher" vs "non-leacher" lists (Troiano et al., 2024).

According to the MLV procedure, 1,3-D has an MLV of 14.56. When compared to the MLT of 14.4706, 1,3-D is classified with the potential to pollute groundwater and is thus placed on the proposed GWPL (Bergin, 2024). The MLT is the lower bound of a one-sided 95% prediction interval calculated from the MLVs of the "leacher" group of chemicals in the MLV model development dataset. 1,3-D shared some molecular and empirical property values that were transitioning between the "leacher" and "non-leacher" groups. The one-sided 95% MLV prediction interval for the "leacher" group of chemicals marginally encompassed 1,3-D. Setting the prediction interval at a 95% confidence level is a standard threshold level in statistics. It provides an acceptable balance between rejecting a null hypothesis and controlling for false positives.

Previous GWPL determination did not include 1,3-D. This was because 1,3-D did not exceed the SNV thresholds for persistence. Unlike the SNV model, the MLV for each chemical is scalar and relative to the MLVs for other chemicals. The greater the MLV, the greater the estimated potential for groundwater pollution. 1,3-D's MLV indicates that it has a lower potential to pollute groundwater than atrazine or simazine (widely distributed groundwater contaminants) which have MLVs of 15.64 and 15.13, respectively. Adding a pesticide to the GWPL is for future

groundwater monitoring prioritization and not a final decision on whether a pesticide has or will pollute groundwater. In general, if a pesticide on the GWPL list or its degradation products are detected in groundwater, DPR will conduct further analysis to determine the source of contamination and whether the detections are determined to be from legal agricultural use, and if additional monitoring or mitigation are necessary.

Comment no. 107: This is consistent with evaluations conducted by CDPR's Environmental Monitoring Branch, which has extensively reviewed 1,3-dichloropropene (Telone) for its potential to leach into groundwater. CDPR's 2015 Risk Characterization Document (RCD) on 1,3-D noted that the chemical's properties make groundwater pollution unlikely. In soil it dissipates rapidly and hydrolyzes quickly in water, with only minimal mobility by diffusion. As CDPR summarized, *"**1,3-D is unlikely to be a groundwater contaminant**."* (CDPR, 2015).

Taken together, CDPR's assessments conclude that when used as labeled, Telone "***does not pose a risk of polluting groundwater***" (CDPR, 2015). This conclusion is supported by decades of monitoring and tens of thousands of samples analyzed, showing no detectable levels of 1,3-D.

Response: Please see response to comment # 106.

Comment no. 108: The California Department of Pesticide Regulation's (CDPR's) Pesticide Registration and Evaluation Committee (PREC) has previously recommended against listing 1,3-D as a potential groundwater pollutant.

The PREC has discussed this issue in recent years. Based on the comprehensive monitoring record and available scientific evidence, the PREC meeting minutes from May 21, 2021 includes the following comment by CDPR staff in response to a stakeholder question.

The following question was submitted to PREC via email:

Will DPR be doing any groundwater sampling for 1,3-D this year given increased use of application methods that use more water? It would be a good idea since you sample shallower rural wells.

CDPR Program Manager for the Groundwater Protection Program provided the following response via email:

*We do not plan to conduct groundwater sampling for 1,3-D. For a pesticide to migrate to groundwater, it needs to be both long-lived and mobile with water. Based on its physical-chemical properties, **1,3-D has not been identified as a potential groundwater contaminant** (it has a short half-life). This has also been confirmed by worst-case modeling for 1,3-D under high irrigation rates and previous groundwater monitoring studies that have not resulted in detections.*

DPR's position that 1,3-D is not likely to leach to groundwater is clearly supported by the 38th Annual Well Sampling Report (DPR, 2025) which showed that out of 13,615 samples collected there were only two (2), yet to be verified, detections of 1,3-D.

Response: Please see responses to comments # 15, 22, 101, and 106.

Comment no. 109: While predictive models are useful tools for screening chemicals for potential leaching, they must be interpreted with caution. Models inherently incorporate conservative assumptions, and when multiple conservative parameters are compounded (e.g., soil organic carbon partition coefficients, half-lives, application rates), the resulting predictions may not reflect realistic field conditions. In the case of 1,3-D, where thousands of monitoring samples analyzed over decades have demonstrated an absence of detections, the model output contradicts robust empirical evidence. In fact, CDPR acknowledges that 1,3-D was one of two chemicals in the modeled dataset that was incorrectly identified as a 'leacher'.

Response: Please see responses to comments # 101 and 106.

Comment no. 110: Best practices in environmental modeling emphasize model calibration and validation using real-world data. In this case, the lack of groundwater detections over decades should serve as a clear and objective validation point that refutes any leaching potential predicted by the MLV model.

Response: Please see responses to comments # 32, 101, 106, and 122.

Comment no. 111: We encourage the State to prioritize monitoring resources toward compounds with confirmed groundwater risks. Requiring ongoing sampling and regulatory tracking of 1,3-D—a compound with no demonstrated leaching—would be an inefficient use of monitoring capacity and divert limited resources from other priorities.

Response: Please see response to comment # 106.

Comment no. 112: The 1,3-D registrant community has a long-standing record of stewardship, including extensive label-driven mitigation measures, voluntary best practices, and participation in CDPR's air and water quality programs. These measures have been effective in managing environmental exposure and underscore the responsible use of this important crop protection tool.

Response: Comment noted; no response needed.

Comment no. 113: For these reasons, we strongly urge CDPR to maintain the current status of 1,3-D and not include it on the Groundwater Protection List. Regulatory action should be based on validated monitoring data and sound science—not conservative model outputs alone.

Response: Please see response to comment # 106.

9. Mac Glackin, Clean Water Action
Tien Tran, Community Water Center
Emily Marquez, Ph.D., Pesticide Action & Agroecology Network
Jenni Shearston, Ph.D., University of Colorado, Boulder
Jenny Rempel, University of California, Berkeley
Dr. Ignacio A. Santana, Occupational & Environmental Medicine
Andrew Christie, California Land Watch
Erin Woolley, Union of Concerned Scientists
Nayamin Martinez, Central California Environmental Justice Network
Geneva M. Omann, We Advocate Thorough Environmental Review
Clare Pace, Ph.D., MPH, University of California, Berkeley
Lara Cushing, Ph.D., MPH, University of California, Los Angeles
Lauren Baehner, University of California, Berkeley
Rachel Morello-Frosch, University of California, Berkeley
Kathleen Kilpatrick, Campaign for Organic and Regenerative Agriculture
Helen Dodd, Farm2People
Angel Garcia, Californias for Pesticide Reform
Anne Katten, MPH, California Rural Legal Assistance Foundation
Vanessa Forsythe, RN, MSN, California Nurses for Environmental Health and Justice
Catherine Dodd, Ph.D., RN, Families Advocating for Chemical and Toxics Safety
Thomas R. Fox, Center for Environmental Health
Rika Gopinath, Beyond Pesticides
Xing Gao, University of California, Merced
Arianna Libenson, Water Equity Science Shop
Catherine Van Dyke, Community Alliance with Family Farmers
Allison Johnson, Natural Resources Defense Council
Ariel Eastburn McCormick, UC San Francisco
Janet Johnson, Richmond Shoreline Alliance
Seigi Karasaki, Fred Hutchinson Cancer Center

Comment no. 114: In this letter, we share recommendations to ensure that the GWPL is protective of drinking water impacts, especially for groundwater dependent communities. The Department must ensure that the updated GWPL complies with the Human Right to Water and the Pesticide Contamination Act, among other laws and regulations.

Response: Comment noted; no response needed.

Comment no. 115: The Department should conduct additional validation of the new Method to improve confidence in how accurately the Method will identify new-to-California pesticides likely to move to groundwater. The Department's new Method for determining which pesticides are likely to move to groundwater is a substantial improvement over the prior methodology. The Department conducted several types of model validation, including leave-one-out testing and sending the Method to external reviewers for comments, all of which improve confidence in the Method's likely performance. While we appreciate this update to the methodology, we are concerned about how the Method will perform with novel pesticide data. Due to limitations in the size of the dataset used to build the new Method, a portion of the data was not set aside for model testing; all testing and validation of the Method used the same data that the Model was built on. This makes it unclear how well the new Method will perform when it is used on data that was not used to build the Method.

Response: Please see response to comment # 32.

Comment no. 116: The Department should conduct an additional model validation step to address this limitation, using an external "test" dataset made up of pesticides that are more or less likely to leach, that were excluded from the model building dataset. This would evaluate the Method's performance on new "unseen" data and would inform the model's utility in accurately predicting leachability for pesticides not currently used in California, or pesticides that may be registered in the future. This validation step would further improve confidence in the new Method for protecting groundwater from pesticide contamination. We provide a list of pesticides to consider for this additional validation step in the attached Appendix 1.

Response: Please see responses to comments # 1, 8, 24, 32, and 122. Pesticides and pesticide degradation products were selected for the MLV procedure if they met at least one of the following criteria (Bergin, 2024):

- Currently registered pesticide on the GWPL
- Currently registered pesticide with environmental fate data in PestChem
- Human Health Assessment Branch's pesticide prioritization list
- Currently registered pesticide with groundwater advisories on their product label
- Pesticide evaluated by GWPP
- Pesticide degradation product with reported groundwater detections in California or other states
- Degradation product of a pesticide on the old GWPL that passed the MLV procedure
- Developmental dataset of the MLV procedure (Troiano et al., 2024)

Based on the criteria above, DPR reviewed many of the pesticides or degradation products listed in Appendix 1 to determine which pesticides would be added to the GWPL. If an active ingredient was currently registered at the time of GWPL determination (Bergin, 2024) and has an MLV greater than the MLT, then they are on the proposed GWPL.

Comment no. 117: The Department should regularly update the base data used to build the model and the resulting Multivariate Leaching Threshold Value by updating the categorization of leacher and non-leacher chemicals from additional well sampling data. We commend the Department for the substantial work that has gone into building the model and determining an appropriate Multivariate Leaching Threshold Value. This effort reflects a substantial improvement made possible by the enactment of Senate Bill 1117 (SB 1117) in 2015. We appreciate the great effort required to develop this new modeling approach, which is the first update since 1991 of the method used to identify active potential groundwater pollutants in California.

Since the Department and other state agencies routinely conduct groundwater monitoring for pesticide active ingredients and degradates, new information is regularly emerging that could inform the model and the GWPL. The Department should use all available data to update the model on a regular and frequent basis, such as every two years. With the enactment of SB 1117, regular updates that incorporate new data into the recently updated modeling approach are now possible. We encourage the Department to make use of newly emerging data to ensure the GWPL is based on the most recently available data. This recommendation supports the Department's statutory requirement to incorporate "new science and data" to ensure that a newly registered pesticide "has not polluted and does not threaten to pollute the groundwater of the state."

Response: Please see response to comment # 15.

Comment no. 118: The Department should prioritize active ingredients and degradates of pesticides that are major sources of per- and polyfluoroalkyl substances (PFAS) in the GWPL. Recent research has shown that pesticides (active ingredients and degradates) are potential sources of PFAS contamination, which particularly impacts Latinx and non-Latinx People of Color communities who rely on groundwater as a drinking water source. Specific pesticide active ingredients have been identified as sources of PFAS. The Department should prioritize pesticides that are sources of PFAS in the GWPL update, given the adverse human health and environmental health impacts of PFAS and the widespread prevalence of PFAS.

Response: Please see response to comment # 8.

Comment no. 119: In the attached Appendix 2, we compared pesticide active ingredients in the GWPL and the PFAS-pesticide list from Donley et al. 2024. We found that both lists include 21 active ingredients (Table 1, column A). However, the PFAS-pesticide list has 48 active ingredients not included in the GWPL (Table 1, column B). The Department should review these active ingredients, if registered in California, to see if they have groundwater leaching potential and consider including them in the GWPL update. In particular, we are concerned that the U.S. Environmental Protection Agency (U.S. EPA) is in the process of assessing at least four new PFAS pesticides (cyclobutrifluram, diflufenican, isocycloseram, and trifludimoxazin) for federal registrations. Similar to our previous recommendations, the Department should incorporate "new science and data" in the GWPL by considering the potential groundwater leaching potential and impacts of newly registered pesticides.

Response: Please see responses to comments # 8, 15, 22, and 24. Pesticides and pesticide degradation products were selected for the MLV procedure if they met at least one of the following criteria (Bergin, 2024):

- Currently registered pesticide on the GWPL
- Currently registered pesticide with environmental fate data in PestChem
- Human Health Assessment Branch's pesticide prioritization list
- Currently registered pesticide with groundwater advisories on their product label
- Pesticide evaluated by the GWPP
- Pesticide degradation product with reported groundwater detections in California or other states
- Degradation product of a pesticide on the old GWPL that passed the MLV procedure
- Developmental dataset of the MLV procedure (Troiano et al., 2024)

After reviewing 480 different pesticides and degradation products with the MLV procedure, 119 currently registered pesticides are proposed for inclusion on the new GWPL (Bergin, 2024). DPR reviewed the 48 active ingredients identified in this comment. Of those 48, only 32 are currently registered for use in California, and DPR has determined that none of those pesticides have a MLV greater than the MLT. Following the procedures identified in this regulation, these active ingredients do not meet the threshold for inclusion on the new GWPL.

When these regulations go into effect, any pesticides that are not currently registered and are pending DPR review will be evaluated using the MLV procedure as part of the standard evaluation process for new active ingredients.

Comment no. 120: Additionally, the Department should coordinate this PFAS-pesticide work with the PFAS rulemaking process. Last month, the State Water Resources Control Board initiated the process of revising notification and/or response levels for perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and perfluorohexane sulfonic acid (PFHxS) and establishing a notification level and response level for perfluorohexanoic acid (PFHxA). The Department's monitoring data and updated GWPL are useful resources for informing interagency rulemaking.

Response: Please see response to comment # 8.

Comment no. 121: The Department should examine cumulative exposures and synergistic impacts of pesticides in groundwater. Cumulative exposures – a framework that considers a person or population's total exposure to substances (e.g., pesticides) or stressors (e.g., poverty) from all sources over time – is essential for accurately characterizing health risks. This framework more accurately captures people's true experience, for example by characterizing exposure to pesticides through drinking water, food, and occupation instead of characterizing exposure to only one pesticide through one source. Public health has begun to incorporate elements of cumulative exposures and synergistic impacts into regulation; for example, for

twenty years, the Office of Environmental Health Hazard Assessment (OEHHA) has considered the effects of exposure to multiple contaminants in developing drinking water standards (AB 2342, 2004), and during the Biden administration, the U.S. EPA regulated PFAS mixtures using a hazard index. Evidence of the potential for pesticide product mixtures in groundwater to harm health is concerning, and unfortunately many groundwater dependent communities are exposed to other harmful contaminants. In addition, research has highlighted that there are many sources of PFAS in pesticides, from active and inactive ingredients and adjuvants to PFAS that can leach from fluorinated pesticide containers, which together lead to complex mixtures of PFAS. The Department should consider cumulative exposures in their risk assessments, given the potential for interactive effects from multiple exposures.

Response: Please see response to comment # 1.

Comment no. 122: Minnesota classifies Acetochlor, Alachlor, Atrazine, Metolachlor, and Metribuzin as 'common detection pesticides' meaning "detection of a pollutant that is not due to misuse or unusual or unique circumstances but is likely to be the result of normal use of a product or a practice" (Minn. Stat. § 103H.005, Subd. 5). This is similar to DPR's specification that groundwater contamination with pesticides must have been the result of agricultural use. However, of these 'common detection pesticides', 2 are not in the DPR model development dataset (Acetochlor, Metribuzin), 2 are classified as leaching pesticides by DPR (Atrazine, Metolachlor ESA), and 1 is classified as a non-leacher by DPR (Alachlor).

Response: "Leacher" and "non-leacher" classification was developed from California-only monitoring data (Troiano et al., 2024). Analyses were limited to well monitoring data from studies conducted within California by DPR and other agencies because of greater reliability of the data generated from these studies. Specifically, there was: 1) greater access to analytical quality control data, 2) knowledge of the condition of the wells sampled, and 3) the ability to demonstrate a connection between analytical results obtained from a well sample and pesticide applications made near the wellhead.

Initially, data from well sampling conducted throughout the U.S. were to be utilized for determining pesticide chemical potential to move to groundwater due to agricultural use. However, verification of detections reported in studies conducted outside of California was problematic because:

- Inspection of laboratory QA/QC data indicated potential issues with determining well water samples as sources of detections.
- Most of the wells were not resampled to verify detections.
- Previous agricultural pesticide use around the well was not verified.
- The type of well, the well's condition, or the structural integrity of the well was not reported.

Lack of data on the type and condition of a well is problematic. For example, detections in extremely shallow monitoring wells may not translate to detections in domestic well water, which is typically deeper. In addition, detections could be due to point source contamination

resulting from damaged or poor well construction rather than from nonpoint-source agricultural applications.

Comment no. 123: Some pesticides identified by DPR as non-leaching substances have been detected in groundwater in other places, such as Cyanazine (MDOA, 2022). While DPR identified Alachlor as a non-leacher, metabolites of Alachlor have been detected in groundwater (Bexfield et al., 2021; MDOA, 2022; Hruby et al., 2015). This may be because Alachlor degrades quickly to Alachlor ESA (8 day half-life; https://doi.org/10.1021/es991264s). In DPR's 2024 report introducing the new method, Alachlor is specifically mentioned as being assigned to the non-leacher category because it only had 2 detections in California groundwater and they "were considered questionable and not the result of agricultural use" (p.20). DPR should reconsider how Alachlor is categorized, based on detections in groundwater documented in reports and literature from other agencies / researchers.

Response: Please see response to comment # 106 and 122. Classification of a pesticide's leaching status, "leacher" or "non-leacher", during MLV model development is a function of groundwater monitoring results, sampling study design, analytical methodology, and pesticide use reporting. The MLV procedure uses an estimate-based screening model and is not a final determination of a pesticide's groundwater impact. Please see the MLV report for more specifics on creating the "leacher" vs "non-leacher" lists (Troiano et al., 2024). In the MLV report, DPR identified alachlor as a "non-leacher" and identified alachlor ESA as a "leacher". Alachlor was removed from the GWPL because there are no products registered for use in California. According to the documents relied upon, current data suggests that alachlor should be included on the GWPL if it is ever reregistered in California (Bergin, 2024).

10. Dillon Gabbert, CropLife America

Comment no. 124: We respectfully note that the pesticide registration process under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), in addition to California's own robust registration and reevaluation programs, includes a thorough assessment of environmental fate, mobility, and leaching potential. These factors are carefully considered in risk assessments and resulting label mitigations and restrictions at both U.S. EPA and DPR. As such, we encourage DPR to ensure the GWPL framework is harmonized with the existing pesticide registration process to avoid duplicative assessments and unnecessary regulatory burdens. One example of how the proposed process is not harmonized with the existing pesticide registration process is the proposed addition of pesticides to the GWPL based on the MLV of degradates. Because the MLV calculation includes data that are not typically required in the US on degradates, DPR is implicitly imposing additional data requirements. Because the proposed software to conduct the MLV calculation, Spartan, is neither readily available nor commonly utilized in the pesticide regulatory framework, and the processes under which degradates would be subject to MLV assessment by DPR are not transparent, proactive assessment by registrants is precluded and such data requests are likely to occur during DPR's evaluation of products, which will further delay the registration process.

Response: Comment noted. Please see responses to comments # 20, 22, 24, and 25.

Comment no. 125: We request additional clarity regarding how registrants will be notified when their products are being considered for inclusion on the GWPL under the revised MLV model. Specifically: What formal process will DPR use to notify registrants of proposed addition of their pesticide to the GWPL?

Response: The formal process to notify registrants of GWPL inclusion in section 6800 is during the formal rulemaking process, such as this. Prior to adding any pesticide to the GWPL in section 6800 through a regulatory action, DPR will mail and publish a Notice of Proposed Regulatory Action in accordance with the requirements of the APA. Please see response to comment # 37.

Comment no. 126: Will there be an opportunity for technical consultation prior to public listing?

Response: Please see response to comment # 37.

Comment no. 127: MLV inputs (Koc, half-life, dipole moment, EHOMO, MaxElPot) may not always be readily available and may require modeling or surrogate data, will DPR provide clear and transparent guidance to how these values will be determined?

Response: Please see responses to comments # 24 and 25.

Comment no. 128: How will DPR handle cases involving degradates or breakdown products associated with multiple parent AIs?

Response: Please see response to comment # 36.

Comment no. 129: Early, transparent engagement with registrants is critical to ensuring accurate assessments and providing context about formulation, use patterns, and existing mitigations.

Response: Comment noted; no response needed.

Comment no. 130: The proposed rulemaking references data submission and the inclusion of chemical-specific properties used in the MLV calculation. We urge DPR to clarify how Confidential Business Information (CBI) will be safeguarded throughout the process. Registrants may need to submit proprietary data or computational models (e.g., physicochemical properties, environmental modeling outputs), and it is vital that these materials be handled in accordance with existing CBI protections under California law and federal provisions.

Response: Comment noted. CBI will be handled in accordance with DPR's policies on data confidentiality and applicable legal requirements.

Comment no. 131: CLA encourages DPR to consider the inherent limitations in attributing groundwater pesticide detections to specific point sources, especially in agricultural regions where shared aquifers, regional water movement, and multiple landowners or users complicate source identification.

Response: Please see response to comment # 122. The MLV report, a document relied upon in support of the proposed regulations and referenced in the ISOR, details DPR's analysis of reported groundwater pesticide detections.

Comment no. 132: Additionally, it is unclear how the proposed process, which is focused solely on potential groundwater detections, is fully responsive to the requirements of the Pesticide Contamination Prevention Act (PCPA), which is relevant to potential pollution of groundwater. Pollution is defined in the PCPA as relevant to potential adverse health effects. DPR's proposed process does not address potential pollution and solely addresses potential detections, which are overly precautionary.

Response: These proposed regulations are focused only on GWPL determination and not the other functions of the PCPA. Additionally, please see response to comment # 1.

Comment no. 133: Many groundwater basins in California serve large and hydrologically complex areas, and are often accessed by multiple growers, districts, or operations. In some cases, grower-managed water systems span several miles, incorporate blended water sources, or rely on community wells that serve both agricultural and non-agricultural uses. In such cases, a detection in a given well cannot reasonably be tied to a specific product, use pattern, or registrant without comprehensive hydrological and historical use data—which may not be available.

Response: Comment noted; no response needed.

Comment no. 134: Accordingly, we recommend DPR:

- Clearly acknowledge the limitations of assigning product responsibility based solely on a groundwater detection;
- Require that registrants be provided with all available contextual information, including well location, depth, and use history, before any regulatory action can be taken;
- Require the use of additional scientific criteria and geographic tracing tools before the processes under FAC §13149 and §13150 can be triggered.

Response: This comment is outside the scope of the proposed regulations as it deals with DPR's detection response process and not GWPL determination.

Comment no. 135: Without these safeguards, registrants may face cancellation proceedings for detections that do not originate from their products or intended uses, placing a significant and unnecessary burden on compliant manufacturers.

Response: Comment noted; no response needed.

Comment no. 136: We appreciate DPR's efforts to modernize its approach to groundwater protection and reaffirm our shared commitment to the safe and effective use of pesticides in California. We believe that with additional clarifications and procedural refinements, the proposed regulation can achieve its objectives while maintaining a science-based and transparent regulatory framework. We welcome continued engagement on this topic and are available to discuss these recommendations in greater detail.

Response: Comment noted; no response needed.

11. Zachary Fraser, American Pistachio Growers
Todd Sanders, California Apple Commission
Tim Ashlock, PE, Buena Vista Coalition
Kari Fisher, California Farm Bureau Federation
Terry Gage, California Agricultural Aircraft Association
Daniel Hartwig, California Fresh Fruit Association
Rick Tomlinson, California Strawberry Commission
Nicole Bell, Kern River Watershed Coalition Authority
Mike Montna, California Tomato Growers Association
Debra Dunn, Kings River Watershed Coalition Authority
Robert Verloop, California Walnut Commission
Bruce Houdesheldt, Sacramento Valley Water Quality Coalition
David Halopoff, PE, Cawelo Water District Coalition
Michael Wackman, San Joaquin County & Delta Resource Conservation District
Terry Kippley, Council of Producers & Distributors of Agrotechnology
David De Groot, PE, Tule Basin Water Quality Coalition
Caitie Diemel, East San Joaquin Water Quality Coalition
Renee Pinel, Western Plant Health Association
Chris Linneman, Grassland Drainage Area Coalition
Orvil McKinnis, Westside San Joaquin River Watershed Coalition
Christopher Valadez, Grower-Shipper Association of Central California
Morgan Campbell, Westside Water Authority
Donald Ikemiya, Kaweah Basin Water Quality Association

Comment no. 137: We recognize that the Groundwater Protection List (GWPL) is an important tool for protecting statewide water resources. However, any new methodology employed to identify a pesticide's potential for leaching to groundwater may impact pesticide registrations

and influence various programs at DPR and other agencies. Therefore, systems used to update the groundwater protection list must rely on sound, risk-based science through a process that at a minimum meets the United States Environmental Protection Agency's (U.S. EPA) standards in determining potential to leach to groundwater. We have significant concerns about DPR's proposed use of the Multivariate Leaching Value (MLV) methodology as a regulatory threshold for determining pesticide inclusion on the GWPL. The methodological flaws we highlight in this letter risk producing misleading conclusions that could adversely impact both regulatory programs and product registration decisions, ultimately resulting in the misallocation of valuable resources.

Response: Please see response to comment # 22.

Comment no. 138: DPR cites the Food and Agricultural Code in its Initial Statement of Reasons (ISOR) for creating a new methodology for determining potential for a pesticide to leach to groundwater. That section (Food & Agricultural Code Section 13144) specifically states: "The department shall establish specific numerical values for water solubility, soil adsorption coefficient (Koc), hydrolysis, aerobic and anaerobic soil metabolism, and field dissipation. The values established by the department shall be at least equal to those established by the Environmental Protection Agency. The department shall revise the numerical values when the department finds that the revision is necessary to protect the groundwater of the state. The numerical values established or revised by the department shall always be at least as stringent as the values being used by the Environmental Protection Agency at the time the values are established or revised by the department."

Response: Comment noted; no response needed.

Comment no. 139: Instead of assessing each physicochemical and environmental fate parameter independently, the proposed method combines all the parameters into a single value based on a derived multivariate equation, DPR's proposed Multivariate Leaching Value (MLV). If a pesticide MLV exceeds the multivariate leaching threshold (MLT), then the pesticide is identified as having the potential to migrate to groundwater and is subsequently placed on the GWPL.

Response: Comment noted; no response needed.

Comment no. 140: The MLT proposed (14.4706) was selected based on an optimization that had a preference for false positive (Type 1 errors) inclusion of a pesticide as a "leacher" versus the false negative (Type 2 error) where a pesticide that has the potential to move to groundwater was instead misclassified.

Response: The MLT was created by setting the alpha level at 0.05. This level corresponds to a 5% chance, or less, of committing a false positive classification (Type 1 error).

Comment no. 141: DPR's approach of separating pesticides into binary categories "leachers" and "non-leachers" based only on the chemical characteristics of the pesticide molecule itself is not consistent with the more complicated scientific understanding of fate and transport of pesticides in the environment. DPR seeks to simplify pesticide fate and transport into two categories with a clean threshold between them, when in fact, pesticide fate and transport is a continuous spectrum of varying degrees of leaching potential to groundwater. More so, the potential for pesticides to leach to groundwater is also heavily influenced by other factors, such as soil composition, depth to groundwater, weather conditions, and application intensity (rate and duration).

Response: Please see response to comment # 22.

Comment no. 142: The frequency and method of pesticide application, and the environmental conditions during and after application, can impact the transport and fate of a pesticide as well as its likelihood to reach groundwater. The degree to which the MLV method incorporates any of these other factors would be inherent to the dataset used for the observations of "leachers" and "non-leachers" in the groupings used to derive the MLV equation, but it is undocumented and unlikely that that dataset captures a comprehensive range of these other factors.

Response: Please see response to comment # 22.

Comment no. 143: Because of these important limitations to the use of numerical and/or threshold methods for identifying the potential for pesticides to leach to groundwater, U.S.EPA has moved away from this approach. Instead, U.S. EPA considers a wide range of environmental fate data and modeling results when assessing groundwater impacts. U.S. EPA has developed procedures for bench-top experiments, in-situ monitoring on test plots, and numerical transport models. U.S. EPA appropriately represents leaching potential as a spectrum of conditions that require consideration.

Response: Please see response to comment # 22.

Comment no. 144: DPR did not appear to perform a sensitivity analysis regarding the MLT input parameters to determine the precision of this MLV methodology.

Response: Please see response to comment # 32.

Comment no. 145: DPR does not provide the MLV input parameters and overall MLV scores for the new 51 pesticides proposed for the GWPL. Thus, there is no transparency, analysis, or discussion about MLV calculations of the new pesticide additions, how they compare to the MLT value of 14.4706, and the level of sensitivity to the known uncertainty of the five MLV input parameters on their classification.

Response: Please see responses to comments # 20, 24, and 32.

Comment no. 146: The MLV method may be more appropriately applied as an initial screening tool to trigger a more robust and thorough evaluation by DPR of the potential for pesticides to leach to groundwater and inclusion on the GWPL – similar to or borrowing from the bench-top experiments, in-situ monitoring on test plots, and numerical transport models employed by U.S. EPA. Use of the MLV alone for inclusion of pesticides on the GWPL appears scientifically questionable and at risk of significant misclassification.

Response: Please see response to comment # 32.

Comment no. 147: The MLV method is a statistical attempt to understand the complex phenomenon of chemical transport in the environment and oversimplifies the diverse agricultural landscape of California. DPR has proposed to replace the current SNV methodology with a process with a prevalence toward the misclassification of pesticides as 'leachers.' Instead of meeting the statute requirements to develop a methodology at least as stringent as the values being used by the U.S. EPA, what is under consideration is considerably less robust and lacks a nuanced understanding of the fate and transport of pesticides.

Response: The SNV approach was conceived from observations in a U.S. EPA report by Cohen et al. (1984). That report lists water solubility, Koc, Henry's law constant (Kh), speciation, hydrolysis half-life, soil photolysis half-life, and soil metabolism half-life as important chemical characteristics for groundwater pollution potential. Values, and sometimes a range of values, were provided for each property to identify a pesticide as a potential groundwater pollutant. These values were estimates and were not derived through an analytical procedure. Early pesticide evaluations by U.S. EPA used these Cohen values as "Leaching Criteria" in their risk assessments. However, current U.S. EPA pesticide risk assessments no longer use such values in deciding whether a pesticide pollutes groundwater or not.

As a result of the amendments in SB 1117 and as directed by FAC section 13145(e), the GWPL shall now be updated via a new peer reviewed method, using SNVs as stringent as the values being used by U.S. EPA. However, as indicated above, U.S. EPA does not currently use SNVs or threshold values in their pesticide risk assessments. Additionally, there are no established SNVs in federal regulation for water solubility, soil adsorption coefficient, hydrolysis, aerobic and anaerobic soil metabolism, and field dissipation. Therefore, since there are no federally established values, DPR developed the MLV procedure as a practical, comprehensible model that would perform significantly better at identifying potential groundwater pollutants when compared to the current SNV approach. As noted previously, similar to the SNVs, the MLV model is a screening tool that is used for monitoring prioritization and does not impose additional restrictions on use of the pesticide.

Comment no. 148: Senate Bill 1117, adopted in 2014, further amended the Food and Agricultural Code, specifically adding language (Food & Agriculture Code Section 13145 (e))

that directed the department to develop a peer-reviewed method to determine the potential of a pesticide to pollute groundwater using specific numerical values.

DPR is relying on this updated statutory language to propose a new groundwater leaching potential methodology. We support the continuous evolution of methodologies and assessments based upon risk-based scientific standards. However, as detailed above, we have concerns with the proposed use of this MLV methodology as a regulatory mechanism.

Response: Comment noted; no response needed.

Comment no. 149: In its ISOR on this matter, DPR states "current U.S. EPA pesticide risk assessments no longer use such values [SNVs] in deciding whether a pesticide pollutes groundwater or not. Instead, U.S. EPA considers a wide range of environmental fate data and modeling results when assessing groundwater impacts."

Indeed, U.S. EPA no longer uses SNVs in its methodology to determine leaching potential and instead has evolved its assessment based on current science and understanding of fate and transport of pesticides. DPR has failed to address why its proposed process does not consider this methodology, instead focusing on the legislative allowance of "flexibility" to revise the method used to identify potential groundwater pollutants, touting it as a practical model. Given the concerns identified above, we ask DPR to provide transparency as to the basis for rejecting the U.S. EPA approach.

Response: Please see responses to comments # 22, 32, and 147.

Comment no. 150: Beyond our concerns that DPR's recommended MLV methodology lacks the rigor of U.S. EPA's approach, the objective of the original legislation (SB 1117) was not to limit the department to specific numerical values (SNVs), but to provide DPR the opportunity to use the best-available science. As stated in the bill summary (Cal. Adv. Legis. Service, Synopsis of Sen. Bill 1117 (2013-2014 Reg. Sess.) Sept. 26, 2014, res. ch. 626, p. 1), the intent was that "this bill would require the department, for a pesticide whose continued use is allowed, to continuously review new science and data that could impact the validity of a finding that the pesticide has not polluted and does not threaten to pollute the groundwater of the state." A variety of resources are relied upon by U.S. EPA as the agency determines leaching potential. In our review of materials available and cited in the ISOR, DPR did not sufficiently evaluate these methods.

Response: Previously, the GWPL had two subsections. As part of this regulatory update, DPR proposes three. The new 6800(b) list would list all active ingredients and degradation products detected pursuant to FAC section 13149(a). Although DPR proposes to add a reference to FAC section 13150(d)(1) to notice that pesticides in 6800(b) are not subject to use modification regulations like those in 6800(a), the director does have the authority, if there is new science or data that could impact the validity of a finding that allowed for continued use of a pesticide, to

mitigate the threat presented by the pollution or subject the pesticide again to the Section 13150 review process (Food & Agricultural Code Section 13152(a)(2)).

DPR's continuous evaluation of pesticides that are subject to FAC section 13152 is different from the GWPL determination process. Currently, the GWPL has two subsections: 6800(a) and 6800(b). The rule proposes to split 6800(b) into a third subsection: 6800(c), which distinguishes pesticides that have not been detected in groundwater due to legal agricultural use and subsequently have not gone through the PCPA formal hearing process. The 6800(c) list is used for monitoring prioritization and does not impose additional restrictions on use. Pesticides added to the GWPL are not necessarily pesticides that have had a "finding that the pesticide has not polluted and does not threaten to pollute the groundwater of the state". More analysis, such as environmental fate modeling, groundwater monitoring, legal agricultural use determinations, and the FAC section 13150 hearing process, will determine the severity of leaching potential. Additionally, please see response to comment # 32.

Comment no. 151: The (Off. Of Sen. Floor Analyses, 3d reading analysis of Sen. Bill No. 1117 (2013-2014 Reg. Sess.) as amended August 14, 2014, p. 2.) provides further insight into the intention of this bill, including: "DPR is concerned that if a legislative change is not made, some pesticides will remain on the list that are unlikely to pollute groundwater, decreasing DPR's ability to focus resources on pesticides of greater concern."

The aim of this law, as stated in (Assem. Com. On Environmental, Safety and Toxic Materials, on SB 1117 (2013-2014 Reg. Sess.) as amended June 4, 2014, p. 3-4.) was "to develop a peer-reviewed method that reflects the best available science to determine which pesticides have the potential to move to groundwater, thus allowing DPR to better focus time and resources on monitoring those pesticides which actually pose the greatest risk.

Response: Comment noted; response not needed.

Comment no. 152: Rather than employing a methodology with the highest potential for accurately estimating groundwater migration potential, DPR has proposed a system that is statistics-based, does not consider U.S. EPA's more robust approach of considering a wide range of environmental fate data and modeling results to assess groundwater impacts, and is prone to false-positives. This MLV methodology designates 51 new pesticides for its groundwater protection list without sufficient fate and transport analysis and fails to consider existing processes that conduct similar evaluations with greater accuracy.

Response: Please see responses to comments # 20, 22, 24 and 32.

Comment no. 153: We recommend that any statistics-based assessment like the proposed MLV not serve as a regulatory mechanism. Rather than directly adding pesticides to the GWPL based on this assessment, such methodologies should function solely as screening instruments. Pesticides should not be placed on the GWPL based on the results of this methodology alone.

Instead, these evaluations should prompt dialogue with registrants to facilitate additional discussion and analysis.

Response: Please see response to comment # 22.

Comment no. 154: Before adopting any new methodology, DPR must thoroughly evaluate and transparently communicate with stakeholders about how this approach will be implemented. This includes clarifying the various applications of both the methodology itself and the groundwater protection list it will influence.

Response: This proposed regulation package and subsequent comment period are avenues to communicate with DPR on the MLV procedure. Also, please see response to comment # 21.

Comment no. 155: As a pesticide is considered for registration in California, it travels through a variety of evaluation "stations." Included in those is the chemistry station, in which DPR assesses the material against thresholds outlined in regulation to determine whether the active ingredient has the potential to leach into groundwater. If it is found to have leaching potential, the application is then sent to the groundwater station where scientists further evaluate.

Response: Comment noted; no response needed.

Comment no. 156: Will DPR incorporate this MLV methodology into the registration process in the chemistry and groundwater stations as leaching potential is assessed, replacing the previously used SNV method?

Response: Please see response to comment # 22.

Comment no. 157: As part of the U.S. EPA pesticide registration process, a focus is made on the information most relevant to the assessment to "ensure there is sufficient information to reliably support registration decisions that are protective of human health and the environment, while avoiding the generation and evaluation of data that do not materially influence the scientific certainty of a regulatory decision." Will this MLV methodology be an indicator mechanism for further studies analysis that, similar to U.S. EPA, builds in flexibility allows for a more nuanced risk-based analysis?

Response: Please see response to comment # 22.

Comment no. 158: How will this MLV methodology influence the current registration process, the length of time of review in each of the DPR stations, and the likelihood of pesticide products being registered in California?

Response: Please see response to comment # 22. Registration applications are reviewed and evaluated individually, and decisions are made on a case-by-case basis. The department shall not approve an activity which would cause a significant adverse environmental impact if there is a feasible alternative or feasible mitigation measure available which would substantially lessen any significant adverse impact. DPR routes certain registration applications for groundwater evaluation which consists of high level, predictive modeling. With the MLVs being a more accurate approach to identify potential leachers than the SNVs, DPR anticipates more efficient and targeted routing of pesticides that need additional groundwater review during the registration process.

Comment no. 159: How will this MLV methodology affect products already in the registration queue at each of the DPR stations as well as final decisions?

Response: Please see responses to comments # 22 and 158.

Comment no. 160: Can DPR confirm that pesticides added to registration queues before adoption of this updated regulation will not be subject to the MLV methodology?

Response: Upon the regulations becoming effective, DPR would appropriately utilize the MLV methodology relative to pesticides subject to PCPA data requirements.

Comment no. 161: How will this MLV methodology complement or contradict the U.S. EPA analysis already used to federally register the same pesticide?

Response: U.S. EPA does not currently use SNVs or threshold values in their pesticide risk assessments. Additionally, there are no established SNVs in federal regulation for water solubility, soil adsorption coefficient, hydrolysis, aerobic and anaerobic soil metabolism, and field dissipation. Therefore, since there are no federally established values, DPR developed the peer reviewed method as a practical, comprehensible model that would perform significantly better at identifying potential groundwater pollutants when compared to the current SNV approach.

Comment no. 162: Has an implementation analysis been conducted to address how this MLV methodology will impact or influence other DPR programs?

Response: Please see response to comment # 158.

Comment no. 163: We express significant concern with DPR using the MLV as a decision-making tool in its pesticide registration process. The MLV should be considered as a potential screening tool that is used as an indicator and initiates further discussion with registrants.

Response: Please see response to comment # 37.

Comment no. 164: Currently, DPR mandates additional restrictions on a pesticide's use if it is on the GWPL 6800 (a) list. DPR proposes modifying the 6800 sections, creating a new list named 6800 (c), and transferring existing section 6800 (b) to that list.

Response: Comment noted; no response needed.

Comment no. 165: Previously, the GWPL had two subsections. As part of this regulatory update, DPR proposes three. The new 6800 (b) list would list all active ingredients and degradants detected pursuant to FAC section 13149 (a). Although DPR proposes to add a reference to FAC section 13150 (d)(1) to notice that pesticides in 6800 (b) are not subject to use modification regulations like those in 6800 (a), the director does have the authority, if there is new science or data that could impact the validity of a finding that allowed for continued use of a pesticide, to mitigate the threat presented by the pollution or subject the pesticide again to the Section 13150 review process (Food & Agricultural Code Section 13152 (a)(2)).

Response: Comment noted; no response needed.

Comment no. 166: In its ISOR, DPR describes the importance of cross-referencing subsection 6800 (b) and 6800 (c) in statute (FAC Section 6624 (a)(5)) to "track who is purchasing or using these pesticides as these pesticides have the potential to pollute groundwater and are continuously monitored for changes in detection frequency and magnitude."

Response: Comment noted; no response needed.

Comment no. 167: Are there any other State or Federal agencies that refer to the 6800 list or the inherent tracking required of materials on this list in determining risk to groundwater in creating or implementing regulations?

Response: This comment is outside the scope of the proposed regulations.

Comment no. 168: Will pesticide materials on these lists be incorporated into California Vulnerability Model (CALVUL) in the future, thereby influencing future groundwater protection area determinations?

Response: This comment is outside of the scope of the proposed regulations. Any changes to the CALVUL model and Groundwater Protection Areas would require regulatory changes.

Comment no. 169: In addition to the reporting requirements noted above, is DPR intending to require additional mitigations around use of the pesticides added to the 6800 (b) list outside of the established PCPA hearing process?

Response: This comment refers to potential regulatory actions outside of the scope of the proposed regulations. The full scope of regulatory changes for this package were included in the proposal.

Comment no. 170: Will all pesticides added to the 6800 (b) and (c) lists be required to include qualifying language on their labels?

Response: This comment refers to potential regulatory actions outside of the scope of the proposed regulations. It is not DPR's intent to require such language based on GWPL inclusion. Please see response to comment # 158.

Comment no. 171: What documented public process would the director follow if they chose to require further mitigation measures for pesticides on the proposed 6800 (b) list without initiating another hearing?

Response: This comment refers to potential regulatory actions outside of the scope of the proposed regulations. Any mitigation DPR imposes on active ingredients and/or their degradation products listed in section 6800(b) will be in compliance with all applicable due process requirements, including the APA.

Comment no. 172: In summary, we have serious concerns about the proposed binary approach, which is inherently prone to misclassification of a pesticide's leaching potential.

Response: Please see response to comment # 32.

Comment no. 173: If applied to the registration process, such flaws could result in erroneous decisions regarding which pesticides should be approved for registration in California or designated for inclusion on the groundwater protection list. These misguided determinations may have far-reaching consequences, potentially compromising DPR's broader regulatory framework and influencing policy decisions at other agencies. Additionally, this MLV methodology threatens to undermine the effectiveness of existing environmental protection programs by prioritizing attention on pesticides that were placed on the 6800-list based on a flawed system.

Response: Please see responses to comments # 32 and 158.

Comment no. 174: As stated previously, the MLV, if used, should serve only as a screening tool that prompts further conversations with registrants.

Response: Comment noted; please see response to comment # 37.

Comment no. 175: DPR should regulate pesticides only to the extent necessary to protect public health and the environment, while considering the regulatory burdens to be proportional to the risks involved. Given that this MLV methodology is likely to generate false positives, it is critical that DPR consider the cost to the department and stakeholders of adding unnecessary pesticides to this list.

Response: Please see responses to comments # 32 and 158.

Comment no. 176: Further, DPR is required to follow processes that reflect the goals of sustainable pest management, requiring the department to provide clarity on its scientific review and decision-making process for both registrants and the public and improve its process for evaluating pesticides that are already registered (Food & Agriculture Code Section 11520 (4)(B-C)).

Response: Please see response to comment #20.

Comment no. 177: Should DPR incorporate this MLV methodology into its pesticide registration process as more than a screening tool for further conversations with registrants, the department could create adverse impacts on both the registration process for new products and the evaluation procedures for currently registered materials.

Response: Please see responses to comments # 32 and 158.

Comment no. 178: By adopting an inadequate methodology, DPR will burden its staff and resources by requiring statewide monitoring of 51 additional pesticides rather than concentrating on those with genuine groundwater leaching potential based on scientifically sound assessments. Further, registrants, applicators and other agencies referencing this list will be tethered to a flawed approach.

Response: Please see responses to comments # 22, 32, and 158.

Comment no. 179: DPR's previous approach for determining legal agricultural use focused solely on the pesticide's active ingredient. As is required, this proposed regulatory update changes that process. Groundwater detections of degradation products confirmed to originate from legal agricultural use may now also initiate an investigation and determination (Food & Agriculture Code Section 13149). Therefore, transparency and regular communication throughout DPR’s process of monitoring a material, building an analysis and determining Legal

Agricultural Use (LAU) is critical to ensuring thorough analysis and review may be conducted by registrants in consultation with commodity organizations.

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 180: When pesticides are found to have leached to groundwater, the established process determines whether detections resulted from legal, label-compliant agricultural use. If such use is confirmed, the law provides a clear framework for implementing additional label mitigation measures to protect groundwater while maintaining product registration. However, this process can also result in product deregistration in California. Our comments below address concerns about the current lack of transparency in these proceedings.

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 181: The director has 90 days to determine whether a pesticide detection resulted from LAU in accordance with state and federal laws and regulations and shall state in writing the reasons for the determination.

The director is then required to immediately notify the registrant of the determination and the registrant's opportunity to request a hearing, and the registrant has 30 days to respond. If no hearing is requested, the director shall cancel the registration of the pesticide.

If a hearing is requested, it must be conducted by a sub-committee of the Pesticide Registration and Evaluation Committee (PREC) within 180 days. An evaluation is made of whether the product pollutes or threatens to pollute groundwater, whether agricultural use can be modified to avoid this, as well as the economic impact of modification of use or cancellation of the product. The director then reviews the determination and can disagree with this determination (Food & Agriculture Code Section 13150).

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 182: Currently, registrants are not notified that their product is under review until a recommendation reaches the director. This means registrants have at most four months to learn about the multi-year process DPR has been conducting to determine that their product was detected in groundwater due to LAU.

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 183: Hearings must be held within 180 days, but may be scheduled much sooner, creating an unreasonably short preparation period. Registrants need adequate time to defend their product's continued use, examine DPR's analysis and sampling files, research mitigation options, conduct scientific analysis, scrutinize DPR's findings, and develop solutions—tasks that cannot be completed effectively under such compressed timelines.

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 184: Earlier and more frequent communication with registrants and commodity representatives must be incorporated into this process, particularly given the expanded scope that now includes active ingredient degradants. Stakeholders need timely updates at each major stage, providing registrants sufficient advance notice to properly assess monitoring data and explore mitigation possibilities.

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 185: In 2022, a hearing was conducted regarding Imidacloprid as a result of groundwater sampling studies between 2003 and 2021. The DPR groundwater protection program analyzed more than 700 groundwater samples from over 400 wells and detected Imidacloprid above the reporting limit in 16 wells in Fresno, Santa Barbara and Tulare counties with concentrations ranging from 0.022 to 5.97 ppb. The single detection point of 5.97 ppb was anomalous in relation to all other detections, within the same well and the other wells with detections. This detection was almost 10-fold higher than the second highest imidacloprid detection and was detected in a well that served a vacant home and where the sampled water appeared murky (murkiness was not a characteristic of any other well samples and was not reflective of an active domestic well).

While the detections were sufficient to demonstrate an LAU, it was clear during the hearing that this one detection was a focal point in the discussion of the need for mitigation. All detections, including the anomalous one, were well below health screening levels. Rather than using this anomalous sample as the focal point for a hearing on whether Imidacloprid leached to groundwater, it would have been more useful to disclose the sample contemporaneously with its detection and engage stakeholders at that time to determine the cause, which appeared to not be from a legal agricultural use. Because this determination was not made in a transparent fashion, resources were not utilized in a manner that provided solutions.

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 186: Similarly, in 2018, a hearing was held on Chlorthal-Dimethyl and its metabolites: monomethyl tetrachloroterephthalate (MTP) and tetrachloroterephthalic acid (TPA)

at which the registrant challenged the LAU determination because the hydrologist analysis indicated that the high detects at concentrations near or exceeding the alleged Health Advisory level were *not the result of leaching into groundwater* and normal uptake through the wells, and similar to the anomalous sample in the Imidacloprid hearings were likely from a non-agricultural source.

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 187: Since the current LAU process documentation is not publicly available, we request that DPR provide it in response to this comment period. Please include the criteria used to establish LAU, such as sampling results; and verification measures documenting the presence of illegal, non-agricultural, and/or non-pesticidal sources of the pesticide's ingredients within the general vicinity of the detections.

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 188: Given that there have been two recent hearings where the LAU determination was itself an important part of the analysis and the hearing, at a minimum, we request that the process be amended so that registrants and commodity organizations representing crops registered for these materials be notified within 30 days when any of the following DPR actions occur:
•Initiation of additional groundwater monitoring based on preliminary results.
•Decisions whether to further expand studies beyond first round of monitoring.
•The process to determine LAU is initiated based on the data collected.
•Recommendations are made to the Executive Team.

Response: Comment noted; no response needed as DPR's detection response process is outside the scope of the proposed regulations.

Comment no. 189: While we appreciate the diligent efforts to meet the statutory requirements of SB 1117, this comment period represents stakeholders' first opportunity to comment on this proposal. Given its potentially significant impact on the registration process and the groundwater monitoring program, final decisions should be made thoughtfully rather than rushed simply because the MLV methodology is now complete.

Response: Please see response to comment # 21.

Comment no. 190: Our review of DPR's proposed MLV methodology has revealed significant shortcomings, as detailed in this letter. Additionally, it is our understanding that registrants were not given advance notice or the opportunity to review each active ingredient and/or degradant to

provide input for this assessment. Given that stakeholders received only two months to evaluate what DPR spent a decade developing, we request further discussion and review, sufficient for such a complex and impactful tool.

Response: Please see response to comment # 21.

Comment no. 191: We urge DPR to pause the current process and thoroughly re-evaluate the MLV methodology based on these technical concerns. Until a scientifically sound methodology is developed, we request that no new pesticides be added to the GWPL. Additionally, we request that DPR clearly communicate how this proposed MLV methodology will inform and affect the current registration process and ensure alignment with U.S. EPA procedures. Further, we ask that DPR enhance transparency in the monitoring and LAU determination process that precedes any recommendations made to the director.

Response: Monitoring and LAU processes are outside the scope of these proposed regulations. For technical and implementation concerns, please see responses to comments # 20, 22, 32, and 158.

Comment no. 192: The primary revision proposed by DPR involves replacing the Standard Normal Variant (SNV) numerical approach to determining what pesticides have the potential to leach to groundwater with a new multivariate numerical method. Pesticides that have the potential to leach to groundwater are listed on the Groundwater Protection List (GWPL) and are subject to monitoring by DPR to determine whether they have actually migrated to groundwater. In addition, DPR uses the new multivariate numerical method to assess and augment the list of pesticides and degradation products of pesticides on the GWPL.

The old numerical approach established specific numerical values (SNVs) for determining what pesticides have the potential to leach to groundwater based on the following physicochemical and environmental fate characteristics of each pesticide: mobility (water solubility, soil adsorption coefficient (Koc), field dissipation) and persistence (hydrolysis, aerobic soil metabolism, and anaerobic soil metabolism). Exceedance of at least one SNV from each category of mobility and persistence identifies the pesticide as having the potential to leach to groundwater (“leacher”).

Response: Comment noted; no response needed.

Comment no. 193: The new numerical approach proposed uses a multivariate numerical method to establish a single Multivariate Leaching Value (MLV) for identifying pesticides having the potential to leach to groundwater (“leacher”). As with the SNVs, the physicochemical and environmental fate characteristics of each pesticide used for the MLV calculation are based on mobility and persistence of the chemical itself: mobility (median soil adsorption coefficient (Koc), dipole moment, maximum electrostatic potential) and persistence (median soil aerobic metabolism half-life, energy of the highest occupied molecular orbital). Instead of assessing each

physicochemical and environmental fate parameter independently, as did the SNVs, the new method combines all the parameters into a single value based on a derived multivariate equation. This oversimplification propagates the uncertainty of each parameter into the overall value and ignores the variability in actual field conditions and omits consideration of important soil factors that can also be critical to predicting how a chemical might behave (leach or not leach) in different soil environments across California. Thus, without any site soils specific considerations, a pesticide MLV that exceeds the multivariate leaching threshold (MLT) is identified as having the potential to migrate to groundwater and is subsequently placed on the GWPL.

Response: Please see response to comment # 32.

Comment no. 194: The MTL was determined from field observations of a subset of pesticides where specific agricultural applications were known and whether groundwater impacts were observed. Pesticides where groundwater impacts were observed were grouped into a category of "leachers" and pesticides where groundwater impacts were not observed were grouped into a category of "non-leachers". Based on these two groupings from this subset of pesticides, the empirical equation for the MLV was developed based on mobility and persistence parameters that most effectively separated the two groups numerically. The MLT proposed (14.4706) was selected based on an optimization that had a preference for false positive (Type 1 errors) inclusion of a pesticide as a "leacher" versus the false negative (Type 2 error) where a pesticide that has the potential to move to groundwater was instead misclassified.

Response: Comment noted; no response needed.

Comment no. 195: In general, the MLV method relies on parameters of chemical properties that are measurable or calculatable. These chemical parameters include common physically measured characteristics, as well as computational chemistry modeling of established chemical parameters based on software (Spartan '20) for "quantum properties". While a range of parameters to the MLV equation are possible, the MLV method deals with the range of potential parameter inputs by using the median value in the data assembled for measured parameters, such as the soil aerobic half-life and Koc of the chemical. The MLV method appears to use the single value output from the Spartan '20 software for modeled chemical parameters and does not consider variability in the quantum properties based on modeling assumptions or different methods in computational chemistry for calculating the same quantum parameter.

Response: Please see responses to comments # 32 and 38.

Comment no. 196: Ultimately, the proposed changes require a pesticide to be listed on the GWPL if it is currently registered for agricultural use in California, and the pesticide, or its degradates, has an MLV greater than or equal to the MLT. Thus, there are expected to be significant additional costs associated with the use of pesticides on the GWPL that should be incurred only based on scientifically reliable methods for GWPL classification.

Response: It is unknown what specific costs this comment refers to. The "Economic and Fiscal Impact Statement" estimates a statewide, five-year cost to businesses and private individuals who apply pesticides included on the GWPL, due to additional reporting requirements, at $159,800 to $279,650. These numbers are conservatively high as they are based on total records and not reports; one Monthly Pesticide Use Report may consist of multiple records. DPR determined that no savings or increased costs to any state agency will result from the proposed regulatory action.

Comment no. 197: It is important to note upfront that the DPR approach of separating pesticides into binary categories "leachers" and "non-leachers" based only on the chemical characteristics of the pesticide molecule itself is not consistent with the more complicated scientific understanding of fate and transport of pesticides in the environment. DPR seeks to simplify pesticide fate and transport into two categories with a clean threshold between them, when in fact, pesticide fate and transport is a continuous spectrum of varying degrees of leaching potential to groundwater. More so, the potential for pesticides to leach to groundwater is also heavily influenced by other factors, such as soil composition, depth to groundwater, weather conditions, and application intensity (rate and duration).

Response: Please see response to comment # 22.

Comment no. 198: The frequency and method of pesticide application, and the environmental conditions during and after application, can impact the transport and fate of a pesticide as well as its likelihood to reach groundwater. The degree to which the MLV method incorporates any of these other factors would be inherent to the dataset used for the observations of "leachers" and "non-leachers" in the groupings used to derive the MLV equation, but it is undocumented and unlikely that that dataset captures a comprehensive range of these other factors.

Response: Please see responses to comments # 20 (especially the MLV report cited in the ISOR as a document relied upon) and 22.

Comment no. 199: Because of these important limitations to the use of numerical and/or threshold methods for identifying the potential for pesticides to leach to groundwater, USEPA has moved away from this approach with an alternative peer-reviewed approach. Instead, USEPA identifies pesticides with leaching potential based on mobility and persistence screening parameters but then uses that evaluation to determine which pesticides warrant more though evaluation. USEPA's more thorough evaluation includes multiple lines of evidence based on a wide range of environmental fate data and modeling results when assessing groundwater impacts. USEPA has developed procedures for bench-top experiments, in-situ monitoring on test plots, and numerical transport models. USEPA appropriately represents leaching potential as a spectrum of conditions that require consideration. Compared to the USEPA approach, the MLV method is significantly lacking robustness. DPR does not adequately explain why they are not following USEPA's technical lead in its methodology for assessing leaching potential.

Response: Please see responses to comments # 22 and 32.

Comment no. 200: USEPA assessment of leaching through bench-top soil columns, "Fate, Transport and Transformation Test Guidelines" (OPPTS 835.1240, Leaching Studies) requires 3 to 4 soils with varying pH, organic carbon content, and that are representative of where the pesticide to be tested (see page 6). The USEPA does not sort pesticides into leachers and non-leachers but instead has created a five-tier Mobility Classes that are based on Relative Mobility Factors (RMF = leaching distance of test substance / leaching distance of reference substance) determined by the bench-top leaching study. USEPA assesses leachability from experimental measurements that are presentative of the soil conditions where pesticide application takes place, and not solely from the pesticide's physio-chemical properties alone.

Response: Comment noted; no response needed.

Comment no. 201: Additionally, the USEPA has developed OPPTS 8354.7100: Guidance for Prospective Ground-Water Monitoring Studies, to assess the fate and transport of pesticides in-situ. Prospective Ground-Water (PGW) monitoring studies, according to USEPA, "help answer questions such as (1) Will the pesticide leach in portions of the pesticide use area that are similar to the study area? (2) How do pesticide residues change over time? (3) What measures might be effective in mitigating the pesticide leaching?" (see page 7)

The PGW guidance states:
"The potential for pesticide movement to ground water depends on a variety of factors, including hydrologic properties of the overlying soil and vadose zone that affect downward movement of water and chemicals, travel time through the unsaturated zone to ground water, aquifer properties (conductivity, porosity, depth, type, location of recharge area), leaching potential of the pesticide (persistence and mobility), and type of well drawing water for drinking purposes (Focazio et al, 2002). These factors can vary significantly throughout the use area of a pesticide. While pesticide persistence and mobility parameters derived from laboratory studies are useful as a starting point for assessment, these parameters are not always sufficient to adequately characterize leaching of chemicals under actual field conditions. Data collected in PGW monitoring studies represent the integration of effects of multiple environmental and agronomic practices at a site where a specific crop is grown." (see page 11)

"The vadose and saturated zones under the field are monitored over time (usually at least two years) for residues of the pesticide, significant degradates, and a conservative tracer. The tracer identifies the depth to which recharge has moved following the application of the pesticide. Weather data is also collected during the study. The pesticide and tracer are only applied one time, to enable the movement of the pesticide and the tracer to be tracked without interference. These studies track the movement of the pesticide, degradate, and applied water (using a tracer compound) through the soil into the water table and produce a time-series of concentrations over a period of several years. Adequate ancillary data are collected (e.g., climate, timing and mass of pesticide applied, irrigation, soil characteristics) to enable the results to be interpreted. Study results should be evaluated, and concentrations adjusted accordingly to take into consideration

the numbers and frequencies of application allowed on the label. The goal of the study is to determine whether a pesticide will move to ground water in some locations where it can be applied, and to determine the time-course concentrations in ground water of the pesticide, major degradates, and degradates of toxicological concern" (see page 12)

Response: Comment noted; no response needed.

Comment no. 202: In addition, to be used in conjunction with bench-top and in-situ studies (above), USEPA has developed the SCI-GROW (Screening Concentration In Groundwater) model to estimate groundwater concentrations if the pesticide is used at the maximum allowable rate in areas with ground water exceptionally vulnerable to contamination. The SCI-GROW estimate is based on environmental fate properties of the pesticide, the application rate, and data from small-scale prospective ground-water monitoring studies. Additionally, USEPA has identified ongoing efforts to systematically improve SCI-GROW estimates, through efforts to compare ground-water monitoring data, PGW studies, and PRZM-GW (Pesticide Root Zone Model for Groundwater) a screening tool refined for risk assessment purposes that provides a conservative estimate of pesticide concentrations in groundwater and allows for region specific scenario development.

Response: Comment noted; no response needed.

Comment no. 203: Because of these limitations, the MLV may be more appropriately applied as an initial screening tool to trigger a more robust and thorough evaluation by DRP of the potential for pesticides to leach to groundwater – similar to or borrowing from the bench-top experiments, in-situ monitoring on test plots, and numerical transport models employed by USEPA. DPR did not sufficiently evaluate USEPA's peer-reviewed framework for assessing the human health and ecosystem risk associated with pesticides. Unlike DPR's proposed statistical analysis, USEPA does not use a screening-level assessment for final determination of pesticide risk to groundwater. Instead USEPA relies on multiple lines of evidence that can include the use of bench-top studies, in-situ studies and modeling, the conclusions of which are driven by a single statistical analysis. Overall, DPR's approach appears to be contradictory and inconsistent with how USEPA has evolved to adopt a multi-pronged approach to assess groundwater impacts from pesticides. DPR's proposed approach as a standalone methodology does not represent the best available science when compared with USEPA technical approach for assessment of leaching potential for pesticides.

Response: Please see responses to comments # 1, 22, 32, and 98.

Comment no. 204: The parameters used by DPR in the MLV calculation are reasonable parameters to base screening level calculation of the potential mobility and persistence of the chemical itself, but ignore other critical factors described above that impact the actual mobility and persistence.

Again, the DPR approach of separating pesticides into binary categories "leachers" and "non-leachers" based only on the chemical characteristics of the pesticide molecule itself is not consistent with the scientific understanding of fate and transport of pesticides in the environment. DPR seeks to oversimplify pesticide fate and transport into two categories with a clean threshold between them, when in fact, pesticide fate and transport is a continuous spectrum of varying degrees of leaching potential to groundwater.

For example:

- The partitioning of pesticides soils can vary by multiple orders of magnitude depending on properties of the soil and the pesticide and the physiochemical interactions between the chemical molecules of the pesticide and the soil and dissolved materials encountered.
- The subsurface is heterogeneous and preferential pathways to groundwater can expediate chemical transport to groundwater. In locations with a high porosity sub-surface, low organic carbon or perhaps including fractures in the subsurface, physio-chemical properties may be much less relevant than hydro-geologic properties that determine transport and fate through the subsurface.
- Groundwater in California occurs at a range of depths, from just a few feet to over a hundred feet. The likelihood of chemicals leaching into groundwater depends on the depth to groundwater, how far the chemical needs to travel to reach groundwater.
- Rain and runoff conditions, including the frequency and duration of rain events, affect infiltration of rainfall into groundwater and can vary considerably from north to south and the seasonal timing of different pesticide applications.
- Streambed morphology can greatly impact the infiltration rate of chemicals that runoff into streams and river tributaries into groundwater. Different watersheds and areas within a watershed have different infiltration rates across California.

Because the MLV model training dataset does not represent a full spectrum of reasonably expected environmental and application conditions, the results are not applicable statewide from a hydrogeological perspective. DPR's proposed approach as a standalone methodology does not represent the best available science when having to assess the potential for leaching of pesticides for a range of environmental and soil conditions.

Response: Please see responses to comments # 22 and 32.

Comment no. 205: The MLV method is an oversimplified statistical attempt to understand the complex phenomenon of chemical transport in the environment and oversimplifies the diverse agricultural landscape of California.

Even if the binary approach was appropriate, the reported accuracy of the model is based only on the subset of pesticide data used to derive the MLV equation. It is yet undetermined whether the MLV is similarly effective at binning the additional pesticides evaluated. While DPR performed numerous statistical tests to optimize the accuracy of the equation for the binary binning, they did not appear to perform a sensitivity analysis regarding the MLT input parameters to assess the precision (despite representing a MLT with 6 significant figures!).

Response: Please see response to comment # 32.

Comment no. 206: DPR misleadingly claims that the MLV method has a 5% misclassification rate (error rate), and that this is a big improvement compared to the SNV approach that has a 36% error rate. However, what DPR is claiming as a misclassification rate of the training dataset cannot be reliably forecasted into the future for a new set of pesticides. While DPR focuses on the accuracy of the classification for the model training dataset, they have seemingly ignored the precision of the MLV and MLT. The lack of an analysis of input parameter precision on the model output does not represent a thorough and complete evaluation the reliability of their proposed methodology.

Response: Please see response to comment # 32.

Comment no. 207: We did a simple test of the MLV sensitivity using the subset of pesticide data used to derive the MLV equation based on only an overall 10% imprecision in the parameters used for the MLV calculation. As you can see from the figure below, a 10% imprecision in the MLV calculation results in a 58% (14 of the 24) potential misclassification of “non-leachers” as “leachers”. Similarly, a 10% imprecision could result in an 11% (2 of the 18) misclassification of the “leachers” as a “non-leacher”. Thus, even a little as 10% parameter uncertainty can result in a significant number of misclassifications of pesticides on the GWPL based on DPR’s proposed methodology. DPR provides no discussion of MLV input parameter sensitivity and the impacts on classification. DPR does not illustrate how the uncertainty is propagated from parameter inputs to equation results.

Response: It is not clear how the commenter conducted this analysis. The "subset of pesticide data used" is not specified. For example, it is not known whether the "subset of pesticide data" consisted of multiple pesticide parameters changed for imprecision in unison or if single parameters were changed. The commenter's analysis and reporting of the high overall percentage rates of misclassification appears also to be based on the extreme unlikely scenario where all 42 chemicals are universally assigned a 10% "imprecision" all in the same direction. For example, all 42 chemical's Koc values in a direction of increased of 10%. This is speculated because the 'error' range for each chemical in the commenter's supplied graphic was constant within each “leacher” and “non-leacher” set of chemicals. Calculation of a permutation under this potential scenario results in an extremely small probability of such a random occurrence. Alternatively, a direction change of 10% "imprecision" in one parameter and a direction change of 10% "imprecision" in the opposite direction of another parameter could just as easily minimize or cancel out the overall effects of the "imprecision" on the MLV calculation. Therefore, it is not possible to respond in completeness to this commenter without precise knowledge of the analysis.

However, it is unrealistic that the molecular properties in the MLV model will vary 10%. Dipole, MaxElPot, and EHOMO are calculated from 3-D conformational data and chemical-specific regeneration of their values is invariant under the same quantum modeling construct. Values for Koc and soil aerobic half-life are known to have considerable variability. For each chemical used

in the MLV report, medians were used to represent the values of these variables. Medians have been used to represent values for these same pesticide variables in statistical-based studies evaluating the variability of such data [Spurlock, F. 2008. Distribution and variance/covariance structure of pesticide environmental fate data. Environmental Toxicology and Chemistry, Vol. 27, No. 8, pp. 1683-1690]. Logic would dictate that if the median values for Koc and soil aerobic half-life for each chemical were not representative or excessively unrealistic then predicted-verses known-leaching status of the model development set of chemicals would have been poor or unacceptable. As it is, the misclassification rate of the predicted leaching status for all chemicals was less than 5%. This would indicate that the inherent variability in median values for Koc and soil aerobic half-life, which almost certainly would have existed in the model development set of chemicals, was sufficient low to be desensitized by the multivariate analysis resulting in a small overall misclassification rate by the model.

Additionally, please see response to comment # 32.

Comment no. 208: However, MLV model input parameters are known, in fact, to have significant variability. For example, KOC is sensitive to pH, temperature, and different types of organic matter, and in different soils across California may vary by orders of magnitude for the same chemical. Additionally, aerobic half-life depends on soil type, temperature, moisture, the presence (biomass) of microorganisms, nutrients required for microorganism growth, and application history. As discussed above, DPR chose to simply choose the median value of measured parameters but never assessed the sensitivity of model results for choosing the median versus minimum or maximum reported values. Similarly, the MLV method appears to use the single value output from the Spartan ’20 software for computation chemistry modeled parameters but even these calculations have variation. For example, calculating the dipole moment of a chemical compound depends on several factors, including the computational method, basis set, and molecular geometry used that can easily result in 0.5 Debye uncertainty on a dipole moment value of 1 to 8 Debye.

Response: Means, medians, and modes are commonly used in scientific-based research to represent dataset values, especially when considerable variation in the values may exist. DPR focused on using representative values for both Koc and aerobic soil metabolism half-life in the MLV calculation. Where data are not normally distributed or when outliers are common, such as in environmental fate data, the median is a reasonable representative value. For Koc and soil aerobic half-life, medians, as opposed to means and modes, were used in the MLV report to reduce the bias of outliers, erroneous data, and zero values. An analysis of the variance/covariance structure of pesticide environmental fate data for many chemical variables indicated considerable variability in some of these parameters, particularly for Koc and soil aerobic half-life. Median values were considered most appropriate for each pesticide's single or representative parameter value [Spurlock, F. 2008. Distribution and variance/covariance structure of pesticide environmental fate data. Environmental Toxicology and Chemistry, Vol. 27, No. 8, pp. 1683-1690].)

Concerning SPARTAN variability, please see response to comment # 38.

Comment no. 209: As shown above, without a more robust evaluation of the MLV performance for realistic ranges of equation parameter uncertainty, the accuracy of the MLV methodology appears to be quite fragile to model input imprecision. DPR's proposed approach as a standalone methodology does not represent the best available science when including mobility and persistence parameters with significant variability.

Response: Please see response to comment # 207.

Comment no. 210: As discussed above, there are substantive technical issues with regard to the use of the MLV method as a binary basis for inclusion on the GWPL and the accuracy of the additional of 51 new pesticides to the GWPL based on the sensitivity of MLV classification to input uncertainty.

Response: Please see response to comment # 32.

Comment no. 211: Even still, DPR does not provide the MLV input parameters and overall MLV scores for the new 51 pesticides proposed for the GWPL. Thus, there is no transparency, analysis, or discussion about MLV calculations of the new pesticide additions, how do they compare to the MLT value of 14.4706, and the level of sensitivity to the known uncertainty of the five MLV input parameters on their classification.

Response: Please see responses to comments # 20, 24, and 32.

Comment no. 212: As stated earlier, because of these limitations, the MLV method may be more appropriately applied as an initial screening tool to trigger a more robust and thorough evaluation by DRP of the potential for pesticides to leach to groundwater and inclusion on the GWPL – similar to or borrowing from the bench-top experiments, in-situ monitoring on test plots, and numerical transport models employed by USEPA. Use of the MLV alone for inclusion of pesticides on the GWPL appears scientifically questionable and at risk of significant misclassification.

Response: Please see response to comment # 22.