October 22, 2023

Jan Matuszko
Director, Environmental Fate and Effects Division
Office of Pesticide Programs
Environmental Protection Agency
1200 Pennsylvania Ave NW
Washington, DC 20460

Submitted to Docket **EPA-HQ-OPP-2023-0365**

RE: Request for Comment: Draft Herbicide Strategy Framework to Reduce Exposure of Federally Listed Endangered and Threatened Species and Designated Critical Habitats from the Use of Conventional Agricultural Herbicides. Herbicide Strategy Framework Document

Dear Ms. Matuszko:

Established in 1933, CropLife America (CLA) represents the developers, manufacturers, formulators, and distributors of pesticides for agriculture and pest management in the United States. CLA's member companies produce, sell, and distribute nearly all the pesticide and biotechnology products used by American farmers. CLA represents the interests of its registrant member companies by, among other things, monitoring legislation, federal agency regulations and actions, and litigation that impact the crop protection and pest control industries and participating in such actions when appropriate.

CLA appreciates the opportunity to comment on the U.S. Environmental Protection Agency's (EPA or the Agency) Office of Pesticide Program's Draft Herbicide Strategy Framework and the accompanying draft technical support documents.

Our comments are divided into two categories, I. General Improvements to the Endangered Species Act (ESA) process and II. Specific Comments on the Draft Strategy and Draft Technical Support documents, including 40 recommendations for consideration in the final Herbicide Strategy (Appendix I and II). We fully support the comments submitted by our member companies. Should you have any questions or comments, please feel free to contact me at mbasu@croplifeamerica.org or (202) 296-1585.

Sincerely,

Manojit Basu, PhD
Vice President, Science Policy
CropLife America

CC: Ed Messina Director, OPP
Gina Schultz, Deputy Assistant Director, USFWS
Lisa Marie Carruba, Acting Division Chief, NMFS Office of Protected Resources
Kimberly Nesci, Director, USDA OPMP

I. General Improvements to the Endangered Species Act process

Response to Comments

At the outset, we urge the Agency to issue a formal response to comments submitted to the docket for the Draft Herbicide Strategy (HS). As EPA's pesticide program continues to improve its review process under ESA, incorporation of input from stakeholders and regulated entities as to how they will practically implement these proposals will be critical for long-term success. Feedback and specific direction to stakeholders and coregulators that have submitted questions and raised concerns with the Agency's plans, such as during the Agency's revised ESA Work Plan proposal comment period,[1] and the recent Vulnerable Species Pilot Project (VSPP),[2] are essential to improve the quality of future questions and feedback.

We request that EPA provide a response to comments and reaffirm its commitment to work with stakeholders and coregulators to understand how it practically plans to implement its ESA proposals.

Broad Mitigation Measures Should Not Supplant Appropriate Risk Assessment

We appreciate the significant updates the Agency has made in the ESA process over the past few years. The predictive Jeopardy/Adverse Modification (J/AM) analysis is a step toward the right direction. While the Agency has relied upon the use of early mitigation measures in the ESA process, they should not supplant product-specific risk assessments that could confirm the need for a particular measure or reveal that less stringent mitigations are necessary. Overly conservative assumptions will drive unworkable mitigations with no environmental benefit for listed species. As such, broad mitigation measures should not automatically be incorporated into the ESA process. For a proper risk assessment, it is important to take toxicity and exposure (usage) into account, otherwise proposed mitigations may be unnecessary to protect species and detrimental for agriculture. Relatedly, it is imperative that EPA right-size mitigations early on in this process and remain open to adjusting the default mitigations as the Agency proceeds through the stages of the registration process.

Adopting an overly precautionary approach, early on, can hinder the eventual development of more appropriate and product-specific mitigations. Such an overly conservative and precautionary approach has most recently been rejected by the US Court of Appeals for the District of Columbia Circuit. *Maine Lobstermen's Association et al. v. National Marine Fisheries Association et al*., Case No. 22-5238 (D.C. Cir. June 16, 2023). We encourage the Agency, the United States Fish and Wildlife Service (FWS), and the National Marine Fisheries Service (hereafter, the Services) to greatly refine their exposure assessments to be more reflective of actual pesticide use and thus allow a better determination of potential population level effects.

Industry Conducted Biological Evaluations

Given the resource intense nature of the ESA risk assessment, the Agency should set a timeline to develop a process to allow registrants to develop a Biological Evaluation (BE) that includes a predictive J/AM assessment. EPA has made improvements in the ESA process and reviewing a BE instead of developing a BE will allow EPA to meet its legal and regulatory obligations under ESA in a timely fashion. Registrants have expertise in conducting risk assessments, at a minimum for the US if not globally. For example, Europe has guidance documents for conducting risk assessments that registrants follow to

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[1] ESA Work Plan - https://www.epa.gov/system/files/documents/2022-11/esa-workplan-update.pdf
[2] Vulnerable Species Pilot Project - https://www.regulations.gov/document/EPA-HQ-OPP-2023-0327-0002

submit a dossier.[3] If EPA were to create a voluntary pathway for registrants to conduct risk assessments according to updated US EPA guidance, efficiencies would be gained.

We, therefore, request that the Agency publish an ESA predictive J/AM guidance document like the 2020 publication of the draft Revised Methods for national level BEs.[4] The Agency should allow stakeholders to comment on the predictive J/AM analysis and finalize an approach that can be used by registrants to submit BEs with predictive J/AM analysis for EPA's review. This would allow our member companies to provide supporting information in a form congruent with their assessment to expedite the Agency's ESA evaluation and potential mitigation development.

Early Coordination with Registrants

CLA believes registrant-submitted data and information will play an essential role in supporting the effort to develop robust risk assessments and manageable and meaningful mitigations. From the outset of the registration and consultation processes, pesticide registrants have a significant role to play in completing a pragmatic ESA process. This is particularly important when EPA is making predictive J/AM determinations for individual species/critical habitats as discussed further below. CLA and its members are well positioned to provide scientific expertise, novel tools (e.g., models), agricultural knowledge, farmer/applicator interaction information, and other relevant information to assist EPA in establishing the scientific foundation for Agency findings during the BE process and to assist the Services with developing the BiOp (Biological Opinion) and associated potential mitigations. EPA, in its recent workplan update document,[5] highlighted the additional work created by the ESA process which affects the Agency, pesticide registrants, and state agencies. That is precisely why it is so important that EPA include registrants early and at every step of the registration process, and the Services should also be included in those aspects impacting consultation.

CLA strongly encourages greater collaboration with individual registrants as ESA applicants, and growers and other pesticide users as part of developing the strategies in the future. As described in EPA's own Stakeholder Input Enhancement Plan for Pesticide Registration Review and ESA consultation,[6] relevant stakeholders must have meaningful opportunities to participate in a manageable, efficient, defensible, and transparent process to share information to protect vulnerable species, provide regulatory certainty, and support agriculture and pest control.

Stakeholder Engagement

The rapidly changing ESA regulatory environment requires an increased focus on communication, transparency, the use of best available data, and collaboration with registrants/applicants. CLA recognizes the importance, and legal obligation as codified by the 2018 Farm Bill,[7] of collaboration among EPA, the US Department of Agriculture (USDA), and the Services on the ESA. Conservation opportunities prescribed by EPA in ESA pilots and strategies must be science-based and reasonable, taking into consideration actions that growers and other landowners are already taking to limit off-target pesticide

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[3] Birds and Mammals: Guidance Document on Risk Assessment for Birds and Mammals on request from EFSA. EFSA Journal 2009; 7(12): 1438; Aquatics Organisms: EFSA PPR Panel (EFSA Panel on Plant Protection Products and their Residues), 2013. Guidance on tiered risk assessment for plant protection products for aquatic organisms in edge-of-field surface waters. EFSA Journal 2013;11(7):3290, 186 pp. doi:10.2903/j.efsa.2013.3290; Bees: European Food Safety Authority, 2013. EFSA Guidance Document on the risk assessment of plant protection products on bees (*Apis mellifera*, *Bombus spp*. and solitary bees). EFSA Journal 2013;11(7):3295, 268 pp., doi:10.2903/j.efsa.2013.3295; Non-target Arthropods, Terrestrial Plants: Guidance Document on Terrestrial Ecotoxicology", as provided by the Commission Services (SANCO/10329/2002 rev.2 (final), October 17, 2002), and in consideration of the recommendations of the guidance document ESCORT 2 (2001)

[4] Revised Methods – https://www3.epa.gov/pesticides/nas/revised/revised-method-march2020.pdf

[5] Workplan Update – https://www.epa.gov/pesticides/epa-advances-early-pesticides-protections-endangered-species-increases-regulatory

[6] Stakeholder Engagement - https://www3.epa.gov/pesticides/endanger/2012/regreview-esa.pdf

[7] 2018 Farm Bill Sec. 10115. FIFRA interagency Working Group pp. 435-438

movement, and must allow for the continued economic use of private lands. In particular, USDA is underutilized in this regard; and we encourage its broader engagement in this process, especially in defining regionally appropriate conservation mitigations tailored to cropping systems.

The emphasis the VSPP and HS place on recognized conservation programs, such as those administered by the Natural Resources Conservation Service (NRCS), highlights the increasing need for growers to have access to Technical Service Providers (TSP). These TSPs, which can be public or private entities, are technical experts in customizing conservation advice to growers specific to their operation and geography. EPA should explore how specifically the trusted advisors of pesticide end users, such as retailers, agriculture extension agents, and certified crop advisors can help in the development and implementation of these plans and how they can be trained and supported to assist growers in adopting these approaches when making pesticide application decisions.

We appreciate the renewed focus on agency coordination shown at the May 12, 2023, stakeholder meeting co-hosted by Robert Bonnie, USDA and Jake Li, EPA, to discuss the importance of this initiative and the need for coordination across USDA and EPA. We continue to support these efforts and the important role USDA can play in the success of these efforts. Furthermore, the involved agencies need adequate funding to help develop and implement these improvements, as well as to minimize registration decision delays, which can have a significant impact on the development of new products.

Several agricultural stakeholder groups have submitted thoughtful and substantive comments expressing their views on the feasibility of proposed mitigation measures in the HS, the overly conservative nature of underlying assumptions, and their frustration at the lack of meaningful communication on issues such as implementation, exemptions, and enforcement. EPA proposes to start implementing the HS once finalized (expected mid-2024) to apply upfront mitigations early in the ESA-FIFRA process, potentially prior to completing a full risk assessment. It is still unclear how the previous comments on this point have been addressed or whether the Agency has a plan to integrate these considerations into the final strategy. CLA strongly encourages the Agency to carefully review and consider these grower and user stakeholder comments and incorporate the recommendations as the VSPP and HS are finalized and implemented.

II. Specific Comments on the HS Framework and accompanying Technical Documents

Credit for Conservation Practices

EPA must consider in the HS, and in upcoming strategies, that many growers already follow well-established conservation practices, such as state good agricultural practices or NRCS practices, to protect biodiversity on their land and limit off-target pesticide movement. While these may be identical in substance and effect as those mitigation measures identified by EPA for ESA purposes, they may not be readily understood as such by busy growers. We encourage EPA to recognize the importance of maintaining the voluntary nature of such programs, while identifying ESA measures as consistent with widely adopted conservation practices, such as those administered by the NRCS. This coordination and identification will be extremely helpful in avoiding unnecessary confusion among growers and may help speed understanding and adoption. CLA also recommends the Agency work towards simplifying the points system; many of the technical recommendations below will streamline the mitigation menu options.

Implementation Plan Concerns

The success of EPA's improvements to the ESA process will depend on the feasibility of implementation by the growers and other pesticide users. While of course growers and applicators know that they must carefully review all label requirements, significant efforts are needed to inform and educate growers and users about new mitigations, and the relationship between the label and Bulletins Live! Two (BLT). CLA appreciates the November 9, 2023 webinar EPA is hosting to educate the public about BLT and anticipates meaningful dialogue on questions about the often-complex mitigations and language related to ESA protections.[8] CLA encourages the Agency to partner with stakeholders, such as land grant universities, certified crop consultants and the USDA Agriculture Research Service, to provide additional training and resources that will be critical to this initiative's success. CLA would be happy to work with the agency and other stakeholders to build out and amplify these training materials at the appropriate time.

We appreciate EPA's efforts to broaden the scope of opportunities for growers to mitigate potential effects on species from pesticides beyond those originally set forward in the ESA Workplan Update, the VSPP, and registration decisions. The agricultural community wants to be protective of species but needs workable options. In other contexts, education and training have been recognized as mitigation, particularly where education was an important component of meaningful change in conduct that would have more direct mitigating effects. **Therefore, we recommend the Agency formally incorporate education and training as a mitigation option into ESA pilots and strategies.**

Strategies/ pilot preemption and inconsistencies

CLA requests the Agency provide greater clarification on how the varying compliance measures will be applied to an individual product (e.g., FIFRA mitigations, Interim Ecological Mitigations (IEMs), HS, J/AM analysis) and the intent of the "day forward" implementation approach. EPA suggested in the VSPP that IEMs should continue to be applied, and that inconsistencies in those and the VSPP mitigations would be resolved. We want to avoid overly broad protections proposed by the VSPP or the HS overriding more carefully thought-out protective programs which pesticide registrants have supported by research and education and which pesticide users have adopted by making cultural or cropping changes. There are also products with FIFRA mitigations already on the label (from a recent regulatory decision, for example, atrazine). Under the HS, would additional or different mitigations be required for such a product, or, if a user is in a VSPP Pesticide Use Limitation Area (PULA), would the product be prohibited altogether?

When extensive mitigations are not warranted, implementation unduly penalizes products with favorable environmental risk profiles, as well as growers who rely on these tools. This could have the unintended effect of slowing down the pace of development and introduction of more sustainable lower risk products and indeed disincentivize the development of new technology. Registrants support mitigations that provide necessary protections to listed species through pesticide- and species-specific assessments. We believe this is the best approach to obtaining decisions made with the best available science.

Potential Unintended Consequences

A significant rate reduction as a mitigation is a concerning proposal; reduced rates are not only very unlikely to effectively control pests but are also likely to create resistance management challenges in pest populations. Furthermore, as subsequent ESA consultations and registration review actions proceed and labels are "tightened up," it will be increasingly difficult to reduce application rates and maintain control when pest pressure is high. The Agency should provide greater clarification on this proposed mitigation.

Beyond rate reduction as a mitigation option, CLA is concerned about the potential for negative effects to resistance management programs should use of a certain herbicide, or group of herbicides, be precluded in a region. EPA's own resistance management guidance directs users to rotate the use of an herbicide or group of herbicides with those from a different mode of action group number within or among growing seasons.[9] Restricting the number of available herbicide options will undermine a grower's ability to combat herbicide resistance and control target weeds.

Restricting access to herbicides will also negatively affect conservation practices contingent on herbicides, such as reduced tillage, cover crop establishment, and wildlife habitat maintenance. Growers using conservation practices, like reduced tillage and cover crops, see a reduction in soil erosion, runoff,

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[8] EPA Webinar – Understanding Bulletins Live! Two: and Overview of the System Registration (gotowebinar.com)

[9] US EPA Pesticide Registration Notice (PRN) 2017-1 https://www.epa.gov/sites/default/files/2017-09/documents/prn-2017-1-pesticide-resistance-management-labeling.pdf

fuel consumption, pest and weed pressure, and increases in soil carbon sequestration.[10] Herbicides support the use of cover crops by clearing cropland after cover crop growth to make way for commercial crops. According to the USDA, between 2012-2017, cover crop plantings grew by 50% and herbicide use was the primary method of termination.[11] If producers revert to mechanical tillage for weed control and discontinue the use of cover crops, this could potentially increase soil erosion, negatively impact water quality and reduce carbon sequestered in the soil.

Another concern from growers implementing certain mitigations described in the HS is a potential negative impact on the grower's Integrated Pest Management (IPM) plan for controlling pests. For example, vegetative strips, whether as a vegetative filter strip (VFS) or employed in another runoff-reduction measure, such as a grassed waterway, may become habitat for pests the growers are trying to eliminate from their fields; potentially resulting in additional pesticide applications. Vegetative strips also present an additional concern for growers producing for the fresh produce market, as they must adhere to food safety requirements developed by, among others, the U.S. Food and Drug Administration (FDA).[12] These rules include steps to ensure that produce does not become contaminated with, among other things, microbial pathogens from animals, amphibians, and reptiles, which could inhabit vegetative strips. Food safety audits conducted by FDA or retailers will cite farms that use vegetative/grassed ditch banks, because they may provide cover for species that can transmit microbial diseases and pathogens.

If the HS is enacted as currently drafted, there are major concerns from grower communities that significant capital will need to be invested to continue farm operations. Growers not able to invest the required capital to comply with new standards will potentially cease farming operations resulting in a loss of cropland in production. Loss of productive farmland may negatively impact our nation's ability to maintain an accessible and safe food supply, and that land would be unlikely to be put to use in ways more protective of endangered species.

Furthermore, the various ESA strategies and pilots may negatively affect growers' ability to acquire financing and insurance. Pests can cause significant damage to crops, infrastructure, and other financial investments. An applicant's ability to repay a loan, which could be seriously undermined by pest damage as described above, is cited as a condition of financing for various loans administered by USDA's Farm Service Agency (FSA)[13]. In addition, loss payments made by the federal crop insurance program may be precluded for producers who fail to maintain good farming practices, which include pest and disease management.[14]

Geographic Scope

While USDA's Office of Pest Management Policy (OPMP) estimated 3.9% of total cropped acres based on the 2022 Cropland Data Layer (CDL) would be potentially impacted by EPA's Draft VSPP, the geographic extent of the impact is much larger for the HS. The HS indicates that the mitigation menu will be applicable to the general label when population-level impacts are predicted for listed generalist animals and within geographically specific areas (PULAs) when population-level effects to listed plants and animals with obligate relationships are predicted. Out of the 12 chemicals presented in the HS as

[10] Claassen, Roger, Maria Bowman, Jonathan McFadden, David Smith, Steven Wallander. (2018, September). *Tillage Intensity and Conservation Cropping in the United States*, EIB-197, U.S. Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/webdocs/publications/90201/eib-197.pdf

[11] Steven Wallander, David Smith, Maria Bowman, and Roger Claassen (February, 2021). *Cover Crop Trends, Programs, and Practices in the United States*, EIB 222, U.S. Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/webdocs/publications/100551/eib-222.pdf?v=9246

[12] See, 21 CFR Part 112. These are typically referred to as the Produce Safety Rule

[13] U.S. Department of Agriculture. Farm Service Agency. Revised February 15, 2023. *FSA Handbook: Direct Loan Making*. https://www.fsa.usda.gov/Internet/FSA_File/3-flp_r02_a46.pdf

[14] U.S. Department of Agriculture. Risk Management Agency. N.D. *Good Farming Practices Protect Your Investment in Crop Insurance*. https://rma.usda.gov/-/media/RMA/Publications/Risk-Management-Publications/good_farming_practices.ashx?la=en

case studies, 11 would require general label mitigations for either terrestrial and/or aquatic areas and 8 would require additional run-off/erosion mitigations within at least one PULA.

Because the conventional agricultural herbicides that EPA selected for the case studies have various modes of action, use patterns, physical-chemical properties, and toxicities to plants, we assume that the 12 chemicals generally represent most herbicides and provide a good indication of how other herbicides would be assessed under the proposed framework. As such, most herbicides would have mitigations that would apply across the entire labeled use sites. **The fact that all cropped acres, across all agricultural use sites, could potentially be impacted by the HS framework has not been well communicated by EPA.**

Offsets

CLA supports EPA and the Services developing programs to offset potential impacts to listed species. CLA will be reaching out in the near future to EPA, the Services, USDA and other interested stakeholders to explore how offsets may play a role in the ESA review process for pesticide registration decisions.

Expand Mitigation Menu and Exemption Options

CLA recognizes the Agency's effort to develop an approach which can provide predictability for mitigations and efficiency of the review process. The HS proposes certain mitigations on all product labels but does attempt to provide flexibility to growers, by providing a menu of mitigation options based on a points system, and exemption scenarios. CLA is encouraged by the Agency's perceived willingness to add other exemption options and mitigation measures in the future, particularly to incorporate emerging technology or new information on the effectiveness of additional measures used by growers. The Agency specifically requested efficacy data supporting mitigations proposed in the HS and additional mitigation measures not listed in the draft strategy. Such additional mitigation options include precision application, adjuvants, and soil binding agents. CLA along with the Council of Producers & Distributors of Agrotechnology (CPDA) are analyzing extensive wind tunnel data from CPDA member companies that confirms the effectiveness of adjuvants in reducing drift. CLA and CPDA will publish this analysis in a peer reviewed journal soon and we hope the Agency will include adjuvants as an option in the mitigation menu. Additionally, CLA and CPDA continue to collaborate to identify data to demonstrate the effectiveness of soil binding agents. Precision or targeted application technology will also enable an applicator to reduce the rate per acre but not the effective rate. The Agency should evaluate such efficacy data referenced in stakeholder comments to the HS docket and in subsequent submissions and expand mitigation menu options accordingly.

Technical Recommendations

In cooperation with our members, CLA submits the technical recommendations summarized below in Table 1, for improvement and alternative approaches to portions of the HS. Each technical recommendation is supported by scientific data, references and/or examples, as detailed in the attached reports (Appendices I & II).

Table 1. Technical recommendations and alternate approaches to improve EPA's Herbicide Strategy

Recommendations to improve proposed PULAs (Appendix I)	
Unless significant new data has become available, when a PULA has been developed by the Services in a previous consultation, EPA should rely on the Services' PULA. When a PULA has not been developed by the Services, an alternative to using range for listed species for the derivation of PULAs is to use "interim" PULAs. When developing PULAs, use the best available data and methodology.	Pg. 7
EPA should provide a minimum 60-day public comment period on the proposed PULA changes in advance of the annual update.	Pg. 7
EPA should use best available and most up to date data for use sites and species data; Follow the process outlined in Frank et al., 2022 to better represent potential overlap; Provide more clarity to end-users in terms of the location and description of habitat; and provide more clarity about where and in what circumstances mitigation measures are needed and what constitutes a "field".	Pg. 12
Recommendations to improve implementation (Appendix I)	
EPA should work with USDA on determining whether implementation of multiple measures on a single field is practical, necessary, or indeed even possible across wide areas of the agricultural landscape where the HS would apply.	Pg. 10
Recommendations to improve effects characterization (Appendix I)	
EPA should work with the Services to maintain an updated list of on/off species to ensure accuracy and outline the process for how this information will be used in EPA assessments.	Pg. 9
EPA should acknowledge that the Species Sensitivity Distribution (SSD) does not capture population-level effects but can be used in a population model to predict impacts to a listed species population. A hazardous concentration (HCx) from SSD can be applied as a surrogate sensitivity endpoint. EPA should provide greater transparency in the construction of SSDs and use the full toxicity profile, including non-definitive values, to derive endpoints for assessing risk to listed species. If SSD Toolbox is unable to accommodate these values, alternative scientifically accepted tools, like SSD Tools, should be used in a weight of evidence approach.	Pg. 15
EPA should use independent lines of evidence for field-realistic risk concerns to support effect determinations; and the EPA's Incident Data System[15] notes the agency's "limited confidence in the accuracy and validity of the data because the data entries are reports of one individual's perspective of what happened." Therefore, EPA should be transparent in their legitimacy evaluation of any report used for regulatory decisions.	Pg. 16
Recommendations to improve determination of spray drift buffers and mitigations (Appendix II)	
Given the significant reliance upon the AgDRIFT Tier 1 ground model in determining buffer distances in the HS, EPA should incorporate more recently developed ground spray field study drift data into their analysis and characterization of ground spray buffer distances. This will ensure that the buffer estimates accurately reflect current spray technology and that modeled estimates are calibrated to match nozzle drop size distributions (DSD) and wind speeds.	Pg. 6

[15] EPA Incident Data System (IDS) https://www.epa.gov/pesticide-incidents/about-incident-data-system-ids

CLA strongly encourages the EPA to adopt the National Agricultural Aviation Association's recommendations into their standard Tier 1 aerial drift modeling and to update the maximum buffer distances and mitigation effectiveness values in the HS to reflect this.	Pg .7
The EPA should incorporate the AgDRIFT Tier 1 models most representative of specific orchard/vineyard types/conditions when determining required buffer distances for orchard/airblast applications.	Pg. 8
The EPA should re-check its calculation of maximum buffer distances to confirm accuracy. If the EPA believes that its original calculations are correct, EPA should publicly provide additional data and information to support this, as our analysis shows different results.	Pg. 9
The EPA should re-evaluate and explain the criteria used to establish a maximum buffer distance, including consideration of how the resulting distances compare with buffer distance requirements for currently registered herbicides.	Pg. 9
Recommendations for Options to Reduce Buffer Distances and Efficacy Data (Appendix II)	
The windbreak/hedgerow mitigation efficacies should be further developed to provide multiple levels of efficacy based on the vegetation characteristics of the windbreak/hedgerow. Please refer to VSPP Comment 4 in Appendix A for further discussion and support for buffer reductions of greater than 50% for some application methods and hedgerow/windbreak situations.	Pg. 10
We agree that hooded airblast sprayer technology can greatly reduce off-field drift and the EPA should work on acquiring existing datasets and/or endorse new studies to collect data that will support the quantification of hooded airblast sprayer mitigation effectiveness.	Pg. 10
Considering the variety of nozzles and their associated DSDs used in practice for ground applications, the EPA should clarify this mitigation and provide explicit guidance on drift buffer reductions associated with specific nozzle alterations.	Pg. 11
The HS spray drift mitigation guidelines for ground spray changes in DSD should include a clear differentiation of how buffer size reductions correlate with incremental changes in the standard ASAE DSD categories.	Pg. 11
Based on the data provided in Table 6-6, EPA should increase the in-field crop mitigation to a 50 ft buffer reduction when the non-mitigated buffer is >= 300 ft. While this is expected to impact only aerial applications with finer DSD nozzles, it may be important for some growers where coarser droplets are not efficacious for the targeted weeds.	Pg. 12
Wind speed mitigation should be adjusted as follows: a 25 ft buffer reduction for applications made between 5 and 7 mph, and a 50 ft buffer reduction for applications made between 2 and 5 mph. The applicable non-mitigated buffer distance could be uniformly set at 50 ft to 175 ft. Alternatively, it can vary with wind speeds: 50 ft to 150 ft below 5 mph and 75 ft to 175 ft for 5 to 7 mph.	Pg. 12
Given the clear correlation between wind speed and off-field spray drift, the EPA should compile ground boom spray data (as well as airblast data) sufficient to quantify reductions in spray drift buffers with decreasing wind speed.	Pg. 13
Current Drift Reduction Technology (DRT) nozzles should be added to the menu of spray drift mitigations and options for buffer reductions.	Pg. 13

Recommendations for Determination of Runoff and Erosion Mitigations Requirements and Options (Appendix II)	
This level of variability in exposure necessitates an approach to Magnitude of Difference (MOD) and mitigation level determination that is more refined than the national or near-national level and should be determined at a more local geographic scale.	Pg. 17
The determination of exposure potential, subsequent resulting MODs, and resulting mitigation levels should be tailored to match the transport potential of a given field, not be based almost entirely on the highest 90th percentile exposure scenario at a national or PULA scale.	Pg. 19
EPA should modify the methodology for calculating MODs to adjust the EECs used in the calculation to account for the reduction in EECs resulting from required spray drift mitigations. This will allow growers to direct resources effectively to mitigating transport pathways causing higher exposure.	Pg. 22
Recommendations for improving the criteria and evaluations of effectiveness for specific mitigations (Appendix II)	
Given that studies can vary greatly in both size and quality, EPA should adjust its Strength of Evidence scoring system to assign higher value/importance to studies with higher numbers of sites and/or more events and consider the quality of the study in determining the final Strength of Evidence category.	Pg. 23
The EPA should modify the communication of the Mitigation Efficacy Rating CLA recommends a rating efficacy based on the line of evidence and average reduction.	Pg. 24
The EPA should provide clarification on how the effectiveness of mitigation practice combinations that are not independent will be rated within the HS framework and how practice combination effectiveness will be further analyzed and refined in the future.	Pg. 25
MODs and the level of runoff/erosion mitigations required should be determined at the HUC2 or finer scale. This would potentially eliminate the need for a low rainfall mitigation credit. If rainfall were to vary considerably within a HUC2 (such as within the western US HUC2s or very large HUC2s like the Missouri Basin), the HUC2-specifc low rainfall mitigation factors could be developed.	Pg. 26
MODs and mitigation levels should be defined at the HUC2 or finer scale. Mitigation credits for soils with lower runoff potential relative to EPA's standard scenario for a given crop and HUC2 should be determined through modeling, similar to the example provided in these comments (see Table 4). We expect the level of mitigation provided by HSG B and HSG A soils to be classified as 'high' for many crops and geographic regions.	Pg. 27
Mitigation credit for reduced slope should be offered to growers by crop group on a HUC2-level basis, with the mitigation efficacy class based on the difference in runoff/erosion transport between the EPA's standard scenario slope and a grower's field slope. We expect this to be important for erosion-prone compounds (e.g., Koc >= 1000 L/kg).	Pg. 27
The application parameters mitigation options should be extended to include reductions in the number of applications and annual application rates. This additional application mitigation option would be consistent with EPA's recent Enlist decision (EPA, 2022c), which provides mitigation credits for reducing the number of applications in a year.	Pg. 28
The EPA should expand the soil incorporation mitigation to include an option for incorporation below 2 inches, which would provide a higher level (> 50% reduction) of mitigation efficacy.	Pg. 28

The cover crop/continuous ground cover mitigation should be refined to provide greater specificity concerning the mitigation efficacy for timing of the herbicide application relative to cover crop establishment, as well as to consider the persistence of the pesticide. We would expect that the cover crop mitigation would receive a higher efficacy rating ('medium' or 'high') when the pesticide is more persistent and when application timing is during or close to cover crop establishment. This refinement would require additional modeling and/or review of the scientific literature to determine more specifically the combinations of aerobic soil metabolism rates and application timing that qualify for the higher mitigation efficacy ratings.	Pg. 29
The grassed waterway mitigation effectiveness rating distinction should be considered for sediment-bound pesticides with high Koc (> 1000 L/kg) and the literature focused on sediment removal efficiency of this practice provides the additional support for this efficacy refinement.	Pg. 29
The EPA should provide more specificity regarding what cropping situations qualify for the in-field vegetative filter strip mitigation.	Pg. 29
The EPA should clarify the efficacy rating intended for the mulching with natural materials mitigation.	Pg. 30
The EPA should update the efficacy rating of the residue tillage mitigation practice to be consistent with the rubric described in Table 7-2 (EPA, 2023b).	Pg. 30
The EPA should consider previous analyses, described in Appendix II and in VSPP Comments, and decisions arriving at a 100 ft distance from edge-of-field for potential runoff concerns to listed species.	Pg. 31
We have significant concerns regarding the feasibility of the required mitigations for fields with subsurface or tile drains.	Pg. 31
The level of mitigation and mitigation effectiveness should be determined at a more locally-relevant scale. The narrative provides further support for the issues concerning the geographic resolution and relevance of mitigation requirements identified in this comment and offers similar recommendations for improving the approach.	Pg. 32 7
The EPA should continue to explore the use of EPA's Vegetative Filter Strip Modeling System (VFSMOD) for estimation of VFS efficacy using the best available scientific approach and provide additional clarification regarding their VFSMOD modeling methodology. Additional detailed supporting comments and recommendations concerning the use of VFSMOD in quantifying VFS effectiveness are provided in the VSPP Comments 15 through 18 in Appendix A.	Pg. 35

III. Conclusion

CLA supports our members' technical concerns about the use of the best available science, transparency, validated methodology, and data quality standards in making decisions regarding the protection of endangered species. CLA echoes the concerns of our member companies and other key stakeholders highlighting the departure from EPA's established risk- and exposure-based environmental protection under both FIFRA and ESA. We also understand the concerns expressed by the user community and recognize the difficulty or inability to sustain farming operations or other livelihoods which rely on pesticide applications should the draft HS be implemented in its current state. We remind the Agency that the potential impact of these restrictions will go far beyond pesticide users and the local communities in which they operate. Pesticides are a vital tool in securing a safe and equitable food supply, public health programs, maintaining wildlife habitat and protecting critical infrastructures.

The comments we have presented focus on policy and scientific procedures, technical recommendations, and how the HS should be rethought, improved, or heavily amended before any implementation or expansion is finalized. CLA appreciates the need for interim mitigation measures while consultation moves forward, but it is not likely that all runoff, spray drift, and avoidance practices described at this draft stage will be required universally for all pesticides when an individual product's risk and exposure are fully addressed. As drafted, the HS proposes temporary measures that will involve significant efforts and lost uses, on the grower, applicator, landowner, retailer, state enforcement agencies, and the registrant.

CLA remains committed to support improvements to the ESA review for pesticide registration decisions. In that spirit, we have offered the enclosed comments and recommendations above on overall improvements to the ESA process and specific comments on the draft HS and supporting technical documents. CLA recommends that the Agency resolve the outstanding questions, requests for clarity and refinement, inconsistencies between parallel programs and collect adequate stakeholder input on the resolutions.

TITLE

Comments on EPA's Draft Herbicide Strategy Framework
to Reduce Exposure of Federally Listed Endangered and Threatened Species and Designated Critical Habitats from the Use of Conventional Agricultural Herbicides

TEST GUIDELINE

Not Applicable

DATE COMPLETED

October 20, 2023

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Introduction

The Environmental Protection Agency's (EPA) Draft Herbicide Strategy (HS) furthers the goals outlined in the April 2022 Endangered Species Act (ESA) Workplan to reduce exposure for more than 900 listed plants (and listed species that depend on plants) and designated Critical Habitat from spray drift and runoff/erosion from agricultural uses of conventional herbicides in the continental 48 states. EPA proposes to start implementing once finalized (expected early 2024) to apply mitigations early in the ESA-Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) process.

The HS includes certain mitigations on all product labels but attempts to provide flexibility to growers, by providing a menu of mitigation options, which include conservation practices to reduce spray drift and runoff/erosion, based on a points system. The HS also provides options for adding other mitigation measures in the future, particularly to incorporate emerging technology or new information on the effectiveness of additional measures used by growers. Finally, the strategy provides information on identifying the geographic extent of mitigation measures which could include pesticide use limitation areas (PULAs) or restrictions on the nationwide label.

The HS is the first section of what EPA portrays in their goals as a larger overall plan potentially for a programmatic consultation, which means the strategy would eventually apply to the FIFRA registration program and all pesticide actions. Because this plan will shape other strategies for different classes of products (insecticides, fungicides, etc.), as well as a potential programmatic pesticide plans, it carries great weight in the overall process. Therefore, we submit the detailed technical comments, and recommendations for improvement, below.

PULAs in the HS Framework Need Refinement (Section 3.c.4)

In the HS, EPA proposes requiring additional mitigation measures in geographically defined areas when EPA has determined that population-level impacts to listed plants and listed animals with an obligate relationship to these plants are likely. Four geographically defined PULAs, based on taxonomy and habitat are proposed. To determine the geographic extent of each grouped PULA, EPA conducted an overlap exercise comparing species ranges and designated critical habitat to a 300-meter expansion area from cultivated land. Based on the taxonomic and habitat groupings of the four PULAs, species ranges and designated critical habitats with ≥ 5% overlap at 300 meters were used to create the geographic extents of each PULA (illustrated in Figure 7-2 in the HS).

The approach used to derive the PULAs in the HS Framework is not consistent with the approach used by US Fish and Wildlife (FWS) in the malathion biological opinion (BiOp) and ignores PULAs created by FWS, which have been implemented by EPA in Bulletins Live! Two. [1,2] Specifically, when species-specific measures were required in the US FWS biological opinion for malathion, FWS commonly relied on critical habitat where designated and described that the areas in which mitigation (including avoidance areas) were derived by identifying:

> "Specific areas of the species range, critical habitat, key habitat types/areas, or other important features to reduce the risk of exposure and adverse effects. For each species requiring specific or refined avoidance areas, we qualitatively assessed which areas were either the most vulnerable to malathion use or most important to preserve for the conservation and recovery of the listed species and their critical habitats. Examples of refined areas that require specific avoidance areas include springs, sinkholes, or other low flow and low volume aquatic habitats, which can

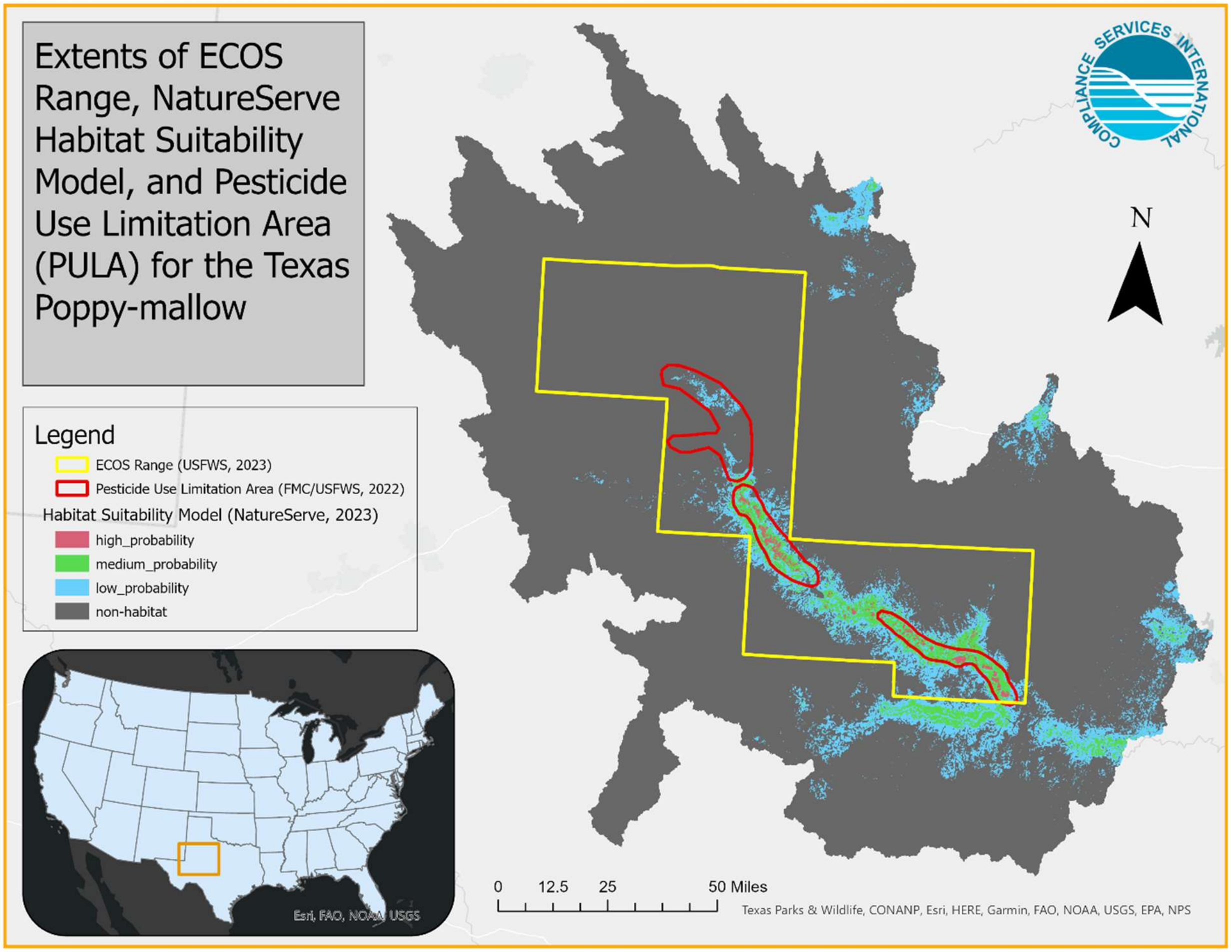
[1] https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins

[2] https://www.fws.gov/sites/default/files/documents/Malathion-Biological-Opinion-2022-02-28.pdf

aggregate malathion residues from a broad drainage area and other habitat features that are important for breeding, nesting, or reintroductions (pg. 179)."[3]

The ranges of many species included in the HS grouped PULAs cover significantly more area than is occupied by the species, serve as potential habitat, or contain features important to the species, as illustrated in **Error! Reference source not found.**.

Figure 1. *Extent of Range, Habitat Suitability, and Pesticide Use Limitation Area from the US FWS Malathion Biological Opinion for the Texas Poppy-mallow*



With regard to using PULAs based on species ranges as opposed to critical habitat or specific geological features, EPA indicates on pg. 93 of the HS Framework that "this approach is being proposed to limit impacts on growers in areas where they [mitigations] are needed most." However, the grouped PULAs significantly overstate the area in which mitigation measures are needed and does not use the most up to date or best available data. The approach places an unnecessary burden on pesticide applicators and enforcement agencies in areas where the species or designated critical habitat is not located, causes confusion when no habitats or species are observable by the users, and ultimately may not provide the intended protection level for the species in question.

Additionally, there are 12 species included in a grouped PULA in the HS Framework that have a PULA previously developed by US FWS in formal consultation. These species include Aboriginal Prickly-apple,

[3] Ibid.

Fragrant prickly-apple, Highlands scrub hypericum, Lakela's mint, Monterey spineflower, Scrub lupine, Texas ayenia, Texas poppy-mallow (see **Error! Reference source not found.** above), Wide-leaf warea, and Lange's metalmark from the malathion BiOp and Whorled sunflower and Spring Creek bladderpod for the Enlist One and Enlist Duo BiOp[4]. When a PULA has been developed by US FWS in a previous consultation, EPA should rely on the US FWS PULA, as the FWS is the species and habitat expert.

When a PULA has not been developed by US FWS, an alternative to using range for listed species for the derivation of PULAs is to use "interim" species protection areas until such time that US FWS finalizes a PULA. Compliance Services International (CSI), with the support of numerous CLA members, grower groups, and other stakeholders, has developed a process to create "interim" species protection areas.

Conceptually, a standard set of geographically specific areas in which pesticide mitigation measures are required for each listed species would be developed based on where the species resides, key areas to be protected within the range, designated critical habitat, where habitat is or is not found within the range, and other species-specific information that may be important to the definition of protection. "Interim" species protection areas are to be developed according to a Standard Operating Procedure (SOP) that is consistent with the approach outlined by US FWS in the malathion BiOp and uses publicly available data from US FWS and other federal and state agencies (such as US Geological Survey and state wildlife departments). CSI intends to provide the SOP to EPA and US FWS for review.

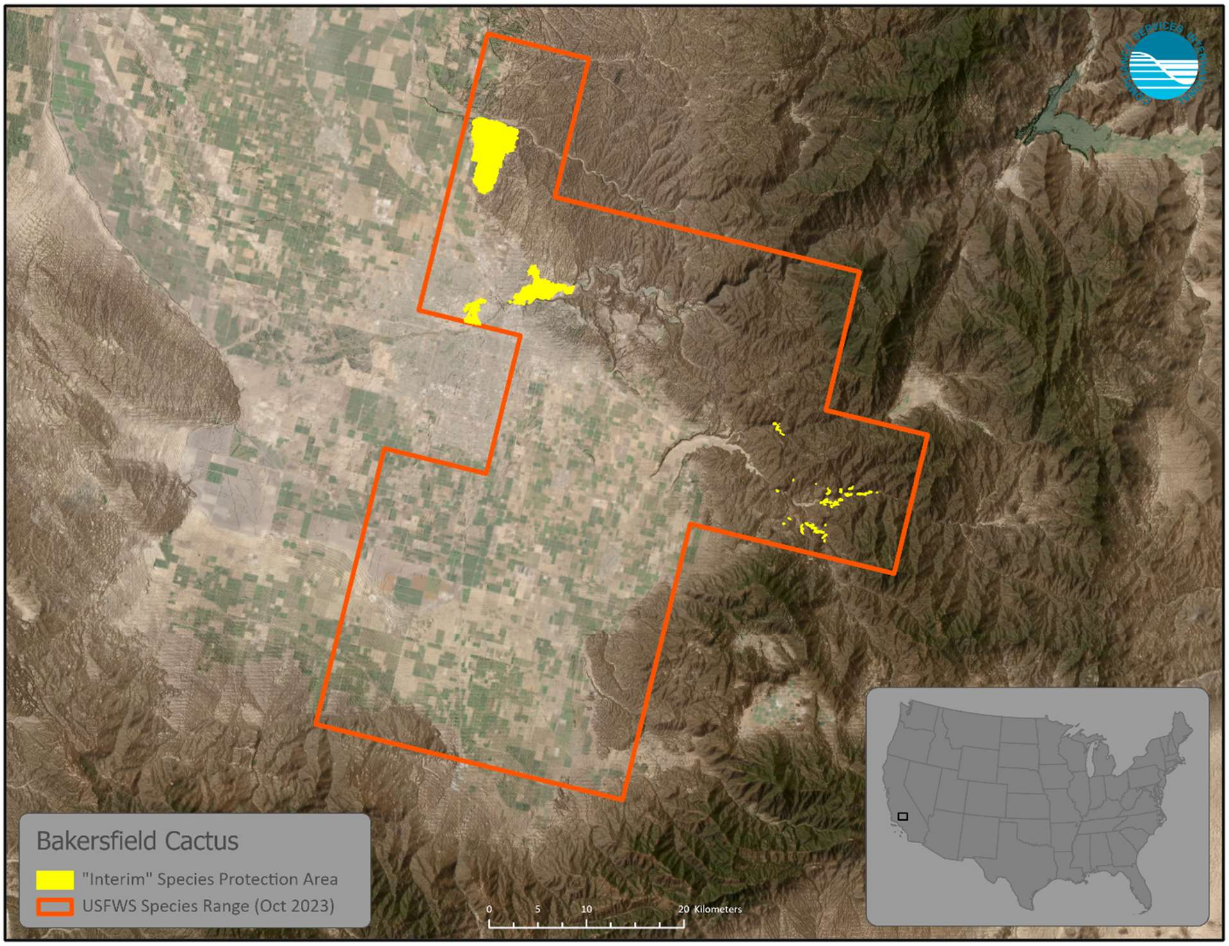
An example of an "interim" species protection area, compared to the species range, is provided in Figure 2. For Bakersfield cactus, the "interim" species protection area in Figure 2 represents the sandy soil habitat of the Sierra-Tehachapi saltbush scrub plant community and blue oak woodland and riparian woodlands within the elevation range (396-1800 ft.) where this species grows.[5,6]

[4] Draft Biological Opinion on the Registration of Enlist One and Enlist Duo Pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act, https://www.epa.gov/endangered-species/biological-opinions-available-public-comment-and-links-final-opinions

[5] https://www.fws.gov/species/bakersfield-cactus-opuntia-treleasei

[6] Habitat description for Bakersfield cactus was cross walked to habitat classes from: *California Wildlife Habitat Relationships (WHR). California wildlife habitat relationships (WHR) | Data Basin. (2014, November 4). https://databasin.org/datasets/b44e9a19ee954c00b5830836e6b8264c/; CALVEG, [ESRI geodatabase]. (2009). McClellan, CA: USDA-Forest Service, Central Valley, Central Coast, South Coast CALVEG Zone 5. [2023].*

Figure 2. *"Interim" Species Protection Area Example for the Bakersfield Cactus*



Data used in the development of “interim” species protection areas will be fully documented and submitted in a manner that is consistent with the guidance provided by EPA in *Guidance to Registrants on Activities to Improve the Efficiency of Endangered Species Act Considerations for New Active Ingredient Registrations and Registration Review* (EPA-HQ-OPP-2023-0281-0026): “sufficient detail to allow EPA to perform an independent analysis of data quality and utility in that it can be easily incorporated into the current processes used by the agency.”

“Interim” species protection areas are not intended to replace the role of US FWS as species experts; rather, geographically specific areas developed through the “interim” species protection area process could be used by EPA across pesticide actions, modified, and then finalized as PULAs as needed for specific situations by US FWS in the consultation process. This will bring efficiency to the overall pesticide and ESA compliance process, help to reduce complexity for pesticide applicators by providing a consistent area in which Use Limitations for various pesticides may be needed, and focus protection actions in the areas most in need of protection for the species.

EPA states in the HS Framework that they are “not proposing to implement spatially limited mitigations for specific species because of the large number of listed plants and their extents throughout the conterminous US and because of the large amount of time and effort needed to generate and maintain individual PULAs.” The “interim” species protection area proposal helps to alleviate these hurdles and changes what EPA indicates is a “longer-term effort” (pg. 96 HS Framework) to a more immediate effort, to address an imminent need. Additional details on the “interim” species protection area concept, including description of a proposed pilot to test the concept, can be found in CSI's comment on the HS. The proposed pilot to test the concept is supported by the larger agricultural community and is the motivation for CSI submitting separate comments on it to the HS docket.

Recommendation: Unless significant new data has become available, when a PULA has been developed by US FWS in a previous consultation, EPA should rely on the US FWS PULA. When a PULA has not been developed by US FWS, an alternative to using range for listed species for the derivation of PULAs is to use "interim" PULAs. When developing PULAs, use the best available data and methodology.

Potential Concerns Related to Updating PULAs (Section 3.c.5)
On page 11 of the HS Framework, EPA states:

> "EPA's current thinking is that it would update any PULAs developed for the final Strategy on a periodic and known basis (*e.g.*, once per year in a given month), ensuring its geographic restrictions reflect the best available information not only today but into the future."

Although CLA supports the regular updates of PULAs to continue to reflect the use of best available data, proposed annual updates present concerns for registrants and applicators. Currently, EPA recommends that applicators check the BLT website up to six (6) months in advance for restrictions within a given geographic area. Given expansion of PULAs to areas where no restrictions existed at the time the applicator checked the BLT website is problematic.

Furthermore, it is imperative that EPA publish and receive comments on the proposed PULA changes (i.e. increase/decrease areas, new designated critical habitat, added species, delisted species). This provides an opportunity for the regulated community to communicate concerns and/or new or alternative data to the EPA and to determine if certain mitigation measures are still applicable in the new areas.

Recommendation: EPA should have a 60-day public comment period on the proposed PULA changes in advance of the annual update.

Potential Impact of HS on Agriculture (Section 4)
CLA appreciates that EPA included case study chemicals and example crop production scenarios in the HS framework, but there is concern about the number of points needed for the case study chemicals, other products that are not included in the case study examples, and products in development. Much of the complexity of the HS surrounds the different mitigations required depending on where the product is being applied, environmental conditions and the production system. For example, in the Mississippi Delta, where cotton is furrowed irrigated, it will be difficult for farmers to get enough runoff/erosion points for any of the case study chemicals, except for pendimethalin, for the general label and the PULA points. Apart from irrigation water management, most in-field management mitigation measures are not compatible with the furrow irrigated production systems of the Mississippi Delta.

Impact to Cultivated Land
In terms of proposed PULAs, EPA notes that the approach of grouping species into PULAs "is being proposed to limit impacts to growers and focus mitigations in areas where they are needed most. Although there are hundreds of millions of acres of cultivated lands that overlap with the PULAs, there are hundreds of millions of cultivated acres that are outside of the PULAs (pg. 93)" and provides statistics of the number of cultivated land and specific crops or crop groups overlapping each of the four grouped PULAs (pg. 94). While it is true that cultivated land occurs outside of the four grouped PULAs, Table C1 and pg. 92-94 of the HS illustrate that the amount of cultivated land within the four grouped PULAs in the HS Framework exceeds 100 million acres. *Therefore, it is likely that most herbicides would require general label mitigations under the proposed framework and therefore, all cultivated land (inside or outside) of PULAs would be impacted.*

Based on an analysis estimating impact conducted by the FIFRA Endangered Species Task Force (FESTF), except for wheat and other grains, >30% of all UDLs are within at least one of the four PULA. More specifically, there are >1.4 million acres of citrus (88% of the US total), >4.7 million acres of other orchards (68% of the US total), >0.88 million acres of grapes (61% of US total), and >3 million acres of rice (51% of the US total) within at least one of the four PULAs as illustrated in Table 1 below. More information about this analysis can be found in the Federal Endangered Species Task Force's (FESTF) comments on the HS.

Table 1. *Number of Acres in at least One of the Four PULAs and % of Total US Acreage*

Use Data Layer (based on 2018-2022 Cropland Data Layer)	Acres in PULAs	% US Total
Corn	88,484,977	43.60%
Other Crops	23,651,281	31.57%
Alfalfa Grasses	12,388,563	32.44%
Cotton	8,527,210	31.51%
Rice	3,160,577	51.10%
Soybeans	84,149,362	43.19%
Wheat	20,766,784	18.29%
Vegetables and Ground Fruit	6,678,385	30.04%
Other Orchards	4,765,867	68.39%
Grapes	880,001	60.52%
Citrus	1,434,262	88.16%
Other Grains	10,219,583	18.56%
Other Row Crops	5,488,159	34.92%

While the case studies provide examples of linking labeled use sites to overlap information by Use Data Layer and references the "Herbicide Strategy Species Overlap and Characteristics" (EPA-HQ-OPP-2023-0365-0005_content.xlsx) file, it is not clear how the species and UDL-specific information provided in this file is intended to be used in the determination of mitigations. Overlap by UDL information is provided in this Excel file for individual species but the PULAs are groups of species that are based on overlap with a 300 m offsite transport zone from cultivated land; providing overlap information for each species by UDL but then using cultivated land for PULAs is confusing.

The Excel file also provides an on/off call if the species is on cultivated lands. This list is an excellent start of what could be a dynamic document that continuously provides insights in the most up-to-date status of what EPA considers the on/off designation for these species. This list can be even more refined to pesticide class (herbicide, insecticide, etc.). Because scientific knowledge and understanding of species continuously evolves, we furthermore recommend that EPA provide a feedback mechanism that enables registrants and other parties to provide corrections to the lists as needed, with a feedback loop to the US FWS for verification. Upon verification with US FWS, the corrections should be published and the PULA's updated as appropriate. Having these lists publicly available increases the transparency of the risk assessment and provides fewer surprises when ESA decisions are released.

Additionally, in their comments on the VSPP, USDA stated that "While ESA is not a cost-benefit statute, FIFRA requires taking into account the economic, social, and environmental costs and benefits of pesticide use. Also, ESA allows for consideration of relative impacts of equally effective mitigation measures when developing RPAs and RPMs. We believe that EPA should fully evaluate and consider the impact of actions on all stakeholders, regardless of whether risk can be offset by benefit, especially actions as significant as are proposed by the Vulnerable Species Pilot Project."[7] CLA contends that this statement is also true for the HS. Given the expansive nature of the potential general label mitigations and scale of the proposed PULAs, the HS, and subsequent Insecticide and Fungicide Strategies, will potentially have an even larger impact on stakeholders.

Recommendation: EPA should work with USFWS to maintain an updated list of on/off species to ensure accuracy and outline the process for how this information will be used in EPA assessments.

Conservation measures must be crop and site specific

The agricultural community clearly demonstrated in their comments to the VSPP that agricultural production is site-specific, and the HS is no different in terms of decision-making for farmers. While CLA appreciates that EPA added additional mitigation measures to the menu in the HS and identified possible exemptions, there are still substantial concerns about how to implement a one-size-fits-all approach to an industry where decisions are made at the field level. Additionally, production decisions are complicated by land ownership and rental challenges, such as absentee landowners and long-term rotations (such as with seed crops, potatoes, and sugarbeets).

Throughout the comments on the VSPP there is important and relevant information provided by agricultural stakeholders related to the HS. The following two quotes from comments on the VSPP demonstrate the crop- and site-specific challenges that are directly applicable to the HS. These are select examples and CLA anticipates the agricultural community will provide substantial and informative comments on the HS.

The **California Citrus Quality Council** reviewed the draft options for runoff and erosion control and provided detailed explanations of the impact of and/or difficulties surrounding adoption of the mitigations by their grower members. Specifically, they noted:

- "….the difficulty that growers in dry climates will have in maintaining vegetative ditches, grass water ways or other mitigations that require year-round maintenance of vegetation. The challenge of growing and maintaining vegetative buffers means that these options would be very difficult for growers to use as mitigation options. We also explained that citrus groves are permanent structures that cannot be retrofitted into terraces or contour curve production systems."[8]

The **Tennessee Farm Bureau Federation** stated in their comment to the VSPP that "Limiting the use of pesticides will threaten the very conservation practices the EPA is encouraging in the VSPP, along with their environmental benefits."[9] This is an important point that needs to be recognized – conservation on

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[7] United States Department of Agriculture, Office of Pest Management Policy. 2023. USDA Office of Pest Management Policy Comments on the Vulnerable Species Pilot Project, Docket ID EPA-HQ-OPP-2023-0327, August 6, 2023. Available at: https://www.regulations.gov/comment/EPA-HQ-OPP-2023-0327-0140.

[8] California Citrus Quality Council. 2023. California Citrus Quality Council's Comments on the Vulnerable Species Pilot Project, Docket ID EPA-HQ-OPP-2023-0327-0118. Available at: https://www.regulations.gov/comment/EPA-HQ-OPP-2023-0327-0118.

[9] Tennessee Farm Bureau Federation. 2023. Tennessee Farm Bureau Federation Comments on the Vulnerable Species Pilot Project, Docket ID EPA-HQ-OPP-2023-0327-0001. Available at: https://www.regulations.gov/comment/EPA-HQ-OPP-2023-0327-0164.

working agricultural lands is possible because of herbicides. In the case of the HS, herbicides are one of the primary methods for terminating cover crops, which is one of the measures listed in the mitigation menu.[10] Therefore, there needs to be more development and clarity on exemptions.

Not only are agricultural production decisions crop and site-specific, but conservation recommendation and adoption decisions are crop and site-specific. In EPA's document "Application of EPA's Draft Herbicide Strategy Framework through Scenarios that Represent Crop Production Systems," EPA identified representative crops and land cover-type conditions across a variety of geographies, with the stated intent of presenting "a subset of scenarios to help herbicide users and other interested stakeholders better understand how the identified mitigations may be used to reduce the potential exposure from conventional herbicides with agricultural uses."[11] For this, EPA relied upon data from the Conservation Effects Assessment Project (CEAP) report which summarized adoption rates based on surveys of conservation practices.

While useful in understanding what conservation practices are being applied, it appears EPA combined practices based on the practice being identified as "adopted", even at a relatively low rate, EPA deemed the point from such practices would be "available" and were included in the practice scenario. For example, in Scenario 1, based on CEAP, buffers or filters on the edge of the field have been adopted on 18% of cropland, and the associated 2 points were considered available. The idea that a single field in Iowa would have residue tillage management, cover crops, contour farming, terracing, grassed waterways, and filter strips should be considered the exception—not the typical.

Among the case study herbicides, up to 9 points would be needed to allow use, meaning that up to 4 or 5 measures might be needed depending on the production system. EPA has stated that they are working closely with USDA on the practicality of the mitigation measures but using adoption rates in isolation from each other does not give a complete picture. Certified conservation planners are trained to identify and design conservation systems that work well on a landscape. USDA NRCS states that "a conservation plan identifies the customer's conservation objectives and assesses and analyzes the natural resources issues on that customer's land related to soil, water, animals, plants, air, energy, and human interaction."[12] A conservation plan is based on the producer's goals and the resource needs. If there is no resource need, then it would not be included in a conservation plan. Requiring producers to implement conservation practices on fields where runoff and erosion are not natural resource issues potentially creates unnecessary management and production costs.

Recommendation: EPA should work with USDA on determining whether implementation of multiple measures on a single field is practical, necessary, or indeed even possible across wide areas of the agricultural landscape where the HS would apply.

Challenges with Evaluating Potential Risk and Identifying Mitigations

The HS framework highlights many challenges associated not only with evaluating potential risks of pesticides to threatened and endangered species, but also determining where and when mitigation measures are needed. For example, when determining the need for and amount of mitigation measures required for a specific herbicide and use site, EPA used outdated range information in overlap analysis. EPA should use the best available and most up to date data including updated ranges maps from US

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[10] United States Department of Agriculture, Natural Resources Conservation Services. 2019. NRCS Cover Crop Termination Guidelines Version 4: June 2019. Available at: https://www.nrcs.usda.gov/sites/default/files/2022-09/Termination_Guidelines_Designed_6.28_10.24am_%28002%29.pdf.

[11] [EPA] United States Environmental Protection Agency. 2023. Application of EPA's Draft Herbicide Strategy Framework Through Scenarios that Represent Crop Production Systems, Docket ID EPA-HQ-OPP-2023-0365-0006. Available at: https://www.regulations.gov/document/EPA-HQ-OPP-2023-0365-0006.

[12] https://www.nrcs.usda.gov/getting-assistance/conservation-technical-assistance/conservation-planning

FWS. Additionally, range maps should not be used as the extent of where pesticide limitations are needed without ensuring that the range does not significantly overstate the area in need of protection (see Section 3.c.4 above for more comments on PULAs). Ensuring that PULAs do not overstate the area in need of protection would reduce confusion, remove unnecessary restrictions, and increase the certainty of species protection because it would be targeted to where it is needed the most.

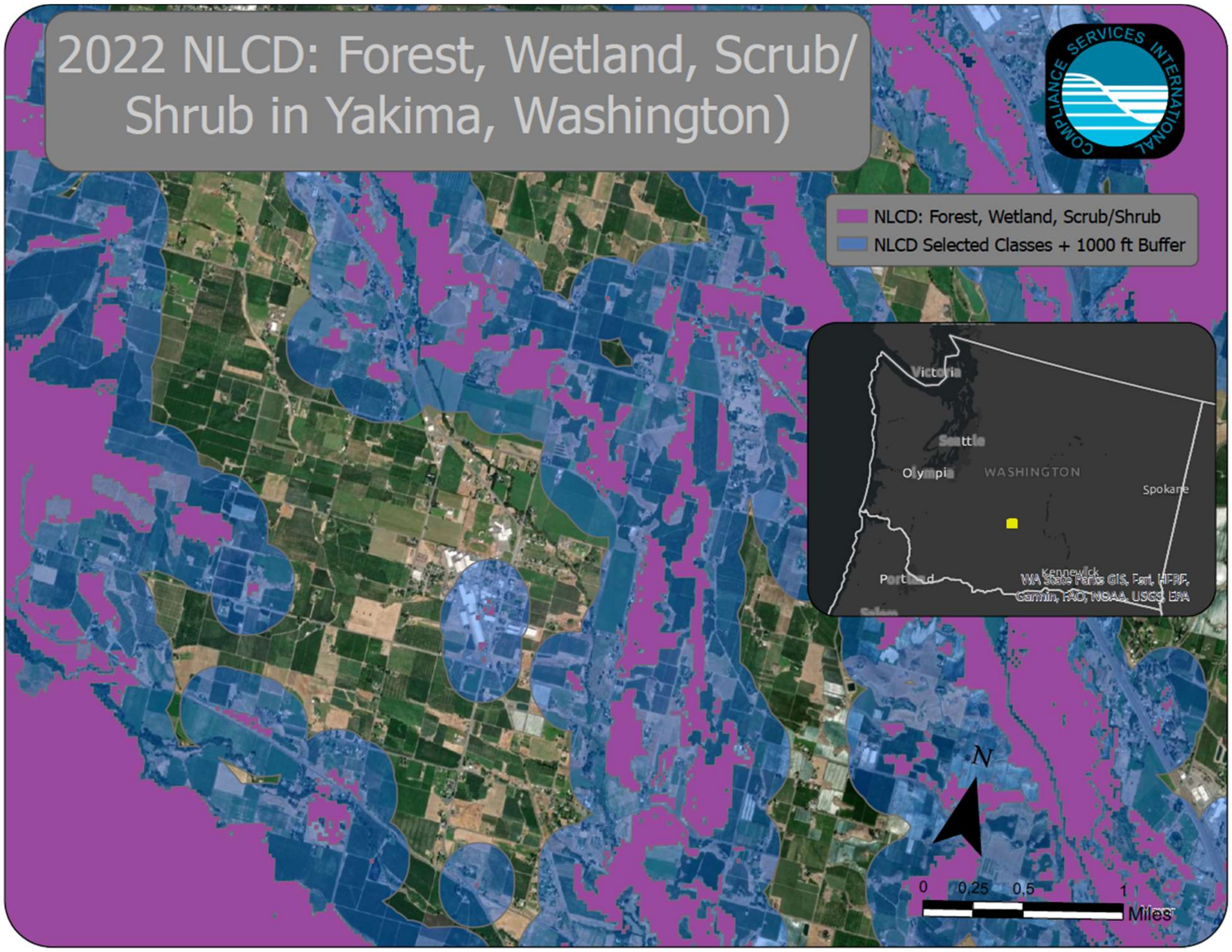
EPA should also use updated data from USDA Cropland Data Layer (2022 data are now available) and interpretation of overlap information should include consideration of data accuracy information from the Cropland Data Layer metadata.[13] There are known misclassifications in the Cropland Data Layer that can significantly over- or under-estimate the spatial extent and amount of a given crop and these uncertainties should be factored into EPA's process for not only aggregating the crops into crop groups and Use Data Layers, following what is outlined in Frank et al., 2022[14], but also interpreting the amount of overlap.

These challenges will be amplified when growers and applicators need to comply with label instructions and interpret what is required for compliance. An example is the exemption from needing to follow the mitigation menu related to distance from habitat. More information and clarity are needed to determine the applicability of this exemption. EPA's use of the term "listed species" in the exemption description in Table 6-10 and on pages 54-55 is confusing because, unlike the habitat descriptions in the VSPP, EPA's habitat descriptions in the HS are *not* species specific, but rather describe very general terrestrial and aquatic habitat that can not necessarily support listed species. Given the diversity of terrestrial and aquatic habitat, identifying habitat, and meeting the exemption related to distance from habitat, such as that below in 3, would be challenging. In 3, a 1,000 ft expansion area has been added to land classified as forest, wetland, and scrub/shrub; if these areas are assumed to be habitat, the majority of fields would not be exempt, some fields would have very small areas exempt, and some fields would result in a cookie-cutter application area causing much confusion and complexity in terms of implementation.

[13] https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php

[14] Frank, A., Ghebremichael, L., Duzy, L., Jones, C., Brain, R. and Burd, T. (2022), A data accuracy evaluation strategy to improve the representation of potential pesticide use areas for endangered species assessments. Integr Environ Assess Manag, 18: 1655-1666. https://doi.org/10.1002/ieam.4591.

Figure 3. *Agricultural Area in Yakima, Washington with Forestry, Wetlands, Scrub/Shrub Land Cover with a 1,000 ft Expansion*



Further, there is uncertainty related to EPA's definition of a "field" in the HS and where one "field" ends and another begins in terms of accumulated and required points for mitigation measures. The HS strategy states that "EPA defines a field for this purpose as the areas where the crop is grown (including fallow land)" (pg. 52) but a grower can grow crops in areas of varying sizes and locations. When adding up points for mitigations measures, are all the lands in which a crop is grown under the management of a given grower considered one "field" under this strategy?

Recommendations: EPA should 1) Use best available and most up to date data for use sites and species data; 2) Follow the process outlined in Frank et al., 2022 to better represent potential overlap; 3) Provide more clarity to end-users in terms of the location and description of habitat; and 4) Provide more clarity about where and in what circumstances mitigation measures are needed and what constitutes a "field".

SSD Discussion

The EPA proposes to use species sensitivity distributions (SSDs) to elucidate potential population-level effects. The EPA calculates Magnitude of Difference (MODs) using toxicity endpoints that they believe are protective of a population of a single species or a community of species. Thus, the proposed HS uses the ratio of EECs to the 'population toxicity endpoints' (e.g., 5th percentile of the SSD – HC5). An HC5 is not a population-level endpoint and should not be called one in the proposed HS. The HC5 (or any HCx) represents a 'surrogate sensitivity endpoint' for the listed species being evaluated and this should be clarified.

A surrogate sensitivity endpoint is required, primarily because toxicity testing for listed species cannot be conducted and an SSD represents a distribution of sensitivities among species within a taxon (e.g., terrestrial plants) based on the ecotoxicity data available for that taxon. From a modeling perspective, the toxicological sensitivity of a plant population should be represented using an appropriate surrogate ER50 (exposure rate affecting 50% of the test plants) with an associated slope; and a distribution of estimated environmental concentration (EECs) across a species range to characterize the exposure-response relationship. This is an ideal place to begin addressing the NRC NAS panel comments on the use of probabilistic methods in endangered species risk assessments (NRC, 2012) by combining exposure and effect distributions into a risk curve (or joint-probability curve) rather than relying on deterministic data to characterize risk.

There are many more pieces of information that are required to assess a population or community of species. The information from a risk curve can then be incorporated into a population model that integrates this information plus additional data on carrying capacity, population growth rate, immigration and emigration rates between sub-populations, demographic data (e.g., survival and reproduction rates with age or life stage) and various other factors (e.g., attractiveness of habitats within the range in a spatially-explicit model) depending on level of refinement. Ideally, the modeling would be probabilistic to incorporate variability and uncertainty regarding exposure, sensitivity, and the population model parameters in the analysis. If indirect effects are a potential issue, then a sub-model would be required to determine the influence of indirect effects on survival and reproduction of different life stages in the model. EPA through the Office of Research Development (ORD) has been developing population modeling capabilities. We recommend that the Environmental Fate and Effects Division (EFED) work with ORD to develop a reasonable approach to population modeling that can be adapted across species (e.g., trait-based models).

Notwithstanding the above, the SSD development methodology is not described in the proposed HS and it is unclear if there will be any criteria for selecting data for the SSD. These criteria should include a minimum number of species, study quality, data relevance and how to use unqualified values (> and <), multiple values for the same species (same study and different study), differing exposure periods, non-laboratory-based toxicity data, non-standard exposure regimes, outliers, and others. EPA often recalculates effects values or selects a lower NOEC than provided by the original study. This is a suitable practice if the data warrant recalculation; however, these recalculations must be made publicly available to demonstrate scientific support for the new values, and so registrants can update their records and correct any errors in the data calculation process.

EPA proposes to calculate the MoD using an SSD or the lowest reliable effects endpoint if an SSD cannot be derived. The SSDs are derived using IC25s for terrestrial plants and IC50s for aquatic plants. For direct effects to plants and indirect effects to other species that have an obligate relationship with plants, the HC5 from the SSD is used, whereas the HC25 is used for indirect effects to other species with a general dependency on plants (i.e., impacts to plant community). If no SSD is available, the lowest IC25 for terrestrial plants and lowest IC50 for aquatic plants is used for both direct and indirect (obligate and general) effects assessments. When no SSD is available, use of the lowest IC25 or IC50 greatly overestimates the potential for population-level effects.

On page 89 of the HS Framework, EPA states, "The slope of the SSD or the dose/response curve is a relevant consideration because when the slope is steep a small change in the EEC would result in a big increase in the potential number of species impacted. When the slope is shallow, there would be small changes in the number of species impacted with larger changes in EEC." The EPA goes on to define a steep slope as "a small difference between the 5th and 25th percentile of the SSD (p.33 of HS Framework)." These statements are not entirely correct. SSDs are the product of available data. If data are only available for sensitive species, the SSD will skew to the left, whereas if the data are primarily for resistant species, the SSD will skew to the right. Oftentimes, toxicity studies are conducted on species that are assumed to be more sensitive instead of spending resources on tolerant species. As a result, the SSDs are biased towards more sensitive species and the HC5 is protective of >95% of species in natural communities.[15] Through an evaluation of the protectiveness of HCx values to endangered species, Raimondo et al. (2008) found that the HC1s and HC5s were lower than 99.5% and 97% of mean acute LC50s, respectively.[16] Thus, the HC5 is overprotective for most listed species. Furthermore, it is unclear how EPA defines a "small" difference between percentiles (p. 89 quote)? These criteria need to be described so industry can understand the evaluation of their products.

It is assumed that the SSDs proposed for use in the proposed HS will be based on single species laboratory data. However, these types of studies do not account for community-level effects, interspecies interactions (e.g., predation), functional redundancy, keystone species, habitat characteristics, and other environmental factors that influence bioavailability and toxicity in natural systems.[17] Therefore, higher tier studies (field and cosm) should be used to validate the chosen SSD and associated effects value to ensure the correct level of protection. CLA previously submitted a white paper to the EPA that validates SSDs and the selection of HCx values using higher tier toxicity data.[18] The white paper emphasizes the use of best available data, including evaluation of data quality. When multiple values were available for a single species, the lowest value was used within a study and the geometric mean was calculated across studies.

To derive an SSD that is representative of the range of sensitives of a taxon, it should be comprised of data from a variety of species with a variety of sensitivities. This includes data for which adverse effects were not observed at the highest test rates (> values). The inclusion of non-definitive endpoints is necessary for accurately representing the toxicity profile and the differential sensitivity of species. Dr. John Green's *Statistical Analysis of Ecotoxicity Studies*[19] Chapter 12 outlines numerous examples of how these values can be included in SSD's and the influence of these endpoints on the results however, SSDToolbox does not allow for the most transparent inclusion of these values. Dr. John Green has identified the following options for working with censored data in SSDToolbox and alternative approaches:

> SSD Toolbox is based on Matlab and fits numerous distributions with options for the method of model fitting. It also provides model averaging to capture some of the model uncertainty inherent in SSD work. A limitation of this software is that the only way to take censoring into account is to treat all data above some user specified quantile as censored.
>
> The only way to consider censored data is by restricting the quantile cutoff P, i.e., the lowest 100P% of the observations. This quantile cutoff is selected by the user, with P=1 meaning to include all observations (i.e., no censoring or censoring ignored). This assumes that all censored values are at the high end of the reported range of values. For survival data, this may be reasonable, but not for sublethal responses. As pointed out elsewhere in this report, guideline studies designed for sublethal effects are performed at test concentrations below the survival LC50 which will vary, sometimes considerably, among species. This could also affect the survival values based on expected LC50 values derived from historical data.

[15] Fox DR. 2015. Selection bias correction for species sensitivity distribution modelling and hazardous concentration estimation. Environ Toxicol Chem 34:2555-2563.
[16] Raimondo S, Vivian DN, Delos C, Barron MG. 2008. Protectiveness of species sensitivity distribution hazard concentrations for acute toxicity used in endangered species risk assessment. Environ Toxicol Chem 27:2599-2607.
[17] Posthuma L, Suter II GW, Traas TP, Eds. 2002. Species Sensitivity Distributions in Ecotoxicology. Boca Raton (FL): Lewis Publishers.
[18] Priest D and Moore RJ. 2021. Use of Species Sensitivity Distributions in Environmental Decision Making. Report prepared by Intrinsik Ltd. for CropLife America.

In the simulated censored data, some data sets had few or no observations below the lowest censored value. To make comparisons with other software more equitable, only samples were used in SSD Toolbox where a quantile cutoff value of 0.5 excluded all censored data. An alternative workaround is to replace the censored values by values larger than all non-censored values and then select the quantile cut off so as to exclude only the censored data. However, this approach ignores the known lower bound on the censored values and thus distorts the data.

The data import routine allows the input file to contain information as to what observations are censored. However, only the first three columns marked as Genus, Species, and EC50 (or NOEC, etc.) will appear in the data entered screen and the extra columns will not appear in any output. The user must examine the data outside of SSD Toolbox to determine what trim percent to use to assure the censored data are in the trimmed data directly used in the fit of the distribution(s). If some censored value is near the low end of the dataset, there is no useful trimming percent that will exclude the censored data.

Another limitation for censored data is that it requires the linearization method be used and consequently there is no way provided to obtain a model average HC5 estimate, as model averaging in SSD Toolbox is based on AICc or BIC weights, neither of which can be obtained from linearization. In simulations, it happened that no model indicated significant lack of fit while HC5 estimates varied by a factor of 8 or more. The user can plot the different distributions and apply informal model selection criteria or go outside the software to obtain more formal measures. This is quite unfortunate and could have been avoided by using maximum likelihood methods to fit censored data. Related to this is the noteworthy differences observed between GOF and AIC or BIC weights when fitting non-censored data using maximum likelihood or Metropolis-Hastings fitting methods. One wonders what is being missed by goodness-of-fit measures only with linearization fitting.

SSDTools is the most versatile of the software packages under review. It takes parameter uncertainty (including HC5) into account using bootstrap sampling. By default, this uncertainty is mainly in terms of the confidence bounds on HC5, but the underlying software, fitdistrplus, also allows bootstrapping to be used in the HC5 point estimate. The ability to calculate model averages provides a powerful way to take model uncertainty into account.

Dr. Green has provided a comprehensive analysis attached to the FESTF comments on the treatment of censored data in SSDs, statistical approaches to handling model uncertainty and a comparison of available tools.

Recommendations: (1) EPA should acknowledge that an SSD does not capture population-level effects but can be used in a population model to predict impacts to a listed species population. An HCx from an SSD can be applied as a surrogate sensitivity endpoint. (2) Provide greater transparency in the construction of SSDs and use the full toxicity profile, including non-definitive values, to derive endpoints for assessing risk to listed species. (3) If SSDToolbox is unable to accommodate these values, alternative scientifically accepted tools, like SSDTools, should be used in a weight of evidence approach.

Weight of Evidence

A weight of evidence section is important in any risk assessment because it provides additional qualitative and quantitative data to support the effects determination and decrease uncertainty in the risk conclusions. EPA proposes to use other lines of evidence in the HS to qualify their predictions of effect. Lines of evidence must be independent, and the lines proposed by EPA are not. If lines of evidence are not independent, they merely compound the initial conclusions and do not provide additional evidence to support or change the conclusions.

For example, EPA proposes to examine the steepness of the SSD slope to determine the MoE. However, the SSD is already used to derive the MoD and the HC5 is highly conservative, protective of >95% of natural communities. Therefore, using the slope of the SSD to further qualify the MoE only increases the conservativeness of the MoE. Because the HC5 and slope parameters are based on the same SSD and the HC5 is already calculated by taking the slope of the data into account, this line of evidence is not independent of the MoD.

EPA also proposes to use the similarity in growth and survival endpoints as a line of evidence. Reduced growth is a precursor for reduced survival, and both are expected to occur hand in hand, particularly for more sensitive species. This skews the data to the most sensitive species, which may not be representative of the listed species to be protected. These endpoints are also measured from the same tested individuals and thus, are not independent of one another.

Examples of independent lines of evidence are incident data, higher tier toxicity testing, anecdotal evidence, water quality monitoring, and tracking programs.

- Incident data were discussed in the HS and will be used by EPA only if there are known incidents. Again, this increases the perceived potential for effects. To be a true line of evidence, the incident data should be able to also have a positive or null effect on the risk conclusions. For example, if an active ingredient has been registered for many years and no incidents have been reported, even with older chemistries and older application technology, this would support a more favorable risk profile.
- Likewise, higher tier toxicity studies (e.g., mesocosm, field) are conducted under more realistic conditions similar to those which organisms are likely to encounter in nature. Thus, higher tier studies may provide a more realistic risk picture than standardized laboratory studies. Results from higher tier studies could have a positive, negative, or no effect on the risk conclusions.
- Anecdotal evidence and tracking programs may show that a species population is increasing in size despite local pesticide use. Similarly, target water quality monitoring programs can be used to validate estimate exposure concentrations in agricultural areas.

Recommendations: (1) EPA should use independent lines of evidence for field-realistic risk concerns to support effect determinations. (2) EPA's Incident Data System[19] notes the agency's "limited confidence in the accuracy and validity of the data because the data entries are reports of one individual's perspective of what happened." Therefore, EPA should be transparent in their legitimacy evaluation of any report used for regulatory decisions.

[19] EPA Incident Data System (IDS) https://www.epa.gov/pesticide-incidents/about-incident-data-system-ids

CropLife America Comments on the Herbicide Strategy Implementation of Spray Drift and Runoff/Erosion Mitigation

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1 Introduction

The U.S. Environmental Protection Agency (EPA or the Agency) Work Plan (EPA, 2022a) and work plan update (EPA, 2022b) provides insight into the EPA's intended path towards meeting its Endangered Species Act (ESA) obligations for Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) actions. Within the work plan (EPA, 2022a), the EPA identified several pilot projects to ensure that the EPA adopts meaningful protections for listed species without waiting until the Agency has completed effects determinations (the precursor to consulting with the Services) or completed consultation with the Services. One of these pilots is the Vulnerable Species Pilot Project (VSPP). The objective of the VSPP is to identify early mitigations for listed species that the EPA has determined are particularly vulnerable to potential pesticide effects. The EPA released the draft VSPP for public comment[1] and has received numerous comments. CLA submitted comments that focused on procedures and policy and how the draft VSPP should be rethought, improved, or heavily amended before any implementation or expansion is finalized.

Continuing with steps outlined in the Work Plan, the EPA released the draft Herbicide Strategy (HS)[2] for public comment. The HS focuses on developing and implementing early protections for more than 900 federally threatened and endangered species (listed) and designated critical habitat from the potential exposure from the use of conventional herbicides with agricultural uses in the lower 48 states. Within the HS docket, the EPA released several supporting documents including the "Draft Technical Support for Runoff, Erosion, and Spray Drift Mitigation to Protect Non-Target Plants and Wildlife" (EPA, 2023b), also part of the VSPP docket documents which is the primary focus of these comments. Understanding how the proposed mitigations fit within the overall herbicide registration and ESA strategy is critical; therefore, the "Draft Herbicide Strategy Framework to Reduce Exposure of Federally Listed Endangered and Threatened Species and Designated Critical Habitats from the Use of Conventional Agricultural Herbicides" document (EPA, 2023c) and the accompanying "Herbicide Strategy Case Study Summary and Process" document (EPA, 2023d) were carefully reviewed and will also be referenced as needed to put into context the mitigation level requirements and mitigation effectiveness determinations.

The first section of comments provided will focus on the determination of spray drift mitigations and their effectiveness. The second section of comments will focus on the determination of runoff/erosion mitigation level requirements specific to the draft HS Framework, the effectiveness evaluation of the

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[1] See Docket Number EPA-HQ-OPP-2023-0327

[2] See Docket Number EPA-HQ-OPP-2023-0365

mitigations proposed, and the proposed geographic extent of mitigation implementation. Because the Draft Technical Support document (EPA, 2023b) was included in the VSPP docket and CLA member companies and other groups previously provided several comments to the EPA on this document, we will directly reference these specific comments when they overlap in relevance specific to the HS. These previously submitted comments are provided in Appendix A in their original form so that the EPA may cross-reference their consideration and responses with the review conducted of VSPP public comments.

2 Determination of Spray Drift Buffers and Mitigations

Section 6 of the Draft Technical Support document (EPA, 2023b) provides a description of how spray drift mitigation requirements will be determined. This includes descriptions of the modeling tools and assumptions used to support the requirements, the methodology for determining maximum buffer distances, and the mitigations available to reduce buffer distances and estimates of their effectiveness. The following sections provide comments in each of these three areas.

2.1 Standard AgDRIFT Modeling Limitations and Assumptions (Section 6.1)

This section of comments focusses on the assumptions and limitations associated with AgDRIFT ground spray, aerial spray, and orchard airblast modleing which provides the foundation for determining mitigation requirements and effectiveness. Refer to in Appendix A (VSPP Comment 1) for further supporting comments on AgDRIFT modeling limitations and assumptions.

2.1.1 Ground Boom Spray Drift Modeling Used to Define Mitigation Requirements has Significant Limitations

The EPA's AgDRIFT Tier 1 ground boom spray model is based upon Spray Drift Task Force (SDTF) studies conducted in 1992 and 1993. The Tier 1 ground model has several limitations, including: (1) The SDTF studies were conducted with spray technology (e.g., nozzles) that are now 30 years old and are not representative of current drift-reducing technology (DRT) nozzles, resulting in over-prediction of drift, (2) The Tier 1 ground model lumps nozzles into broad Droplet Size Distribution (DSD) categories (e.g., Very Fine to Fine and Fine to Medium/Coarse), making it difficult to select drift curves appropriate to specific nozzle requirements, and (3) the Tier 1 ground model does not differentiate between wind speeds, making it impossible to consider the effects of reduced wind speed on off-target spray drift.

Recommendation: Given the significant reliance upon the AgDRIFT Tier 1 ground model in determining buffer distances in the HS, EPA should incorporate more recently developed ground spray field study drift data into their analysis and characterization of ground spray buffer distances. This will ensure that the buffer estimates accurately reflect current spray technology and that modeled estimates are calibrated to match nozzle DSDs and wind speeds.

2.1.2 Aerial Spray Drift Modeling Assumptions are not Reflective of Current Practices

EPA has implemented the AgDRIFT Tier 1 aerial spray model in the determination of buffer distances for aerial applications. The EPA notes that they received comments from stakeholders, including the National Agricultural Aviation Association (NAAA), requesting that AgDRIFT input parameters are updated to reflect advances in aerial application technology (NAAA, 2020). The agency indicated that they may update its input parameters and aerial spray drift modeling prior to implementing spray drift buffers calculated using AgDRIFT described in the technical support document (EPA, 2023b).

Conducting aerial spray drift modeling according to the standard practices that have been described by the NAAA, including nozzle arrangement and swath displacement, is essential to accurately evaluate off-target drift estimates and calculation of necessary buffer distances.

Recommendation: CLA strongly encourages the EPA to adopt the NAAA's recommendations into their standard Tier 1 aerial drift modeling and to update the maximum buffer distances and mitigation effectiveness values in the HS to reflect this.

2.1.3 Airblast Spray Modeling Assumptions are Not Representative of Most Orchard Types and Conditions

The EPA used AgDRIFT's Tier 1 orchard/airblast model with the default assumption of a "Sparse (Young, Dormant)" orchard to determine buffer distances for airblast applications to orchards and vineyards. The drift deposition in the AgDRIFT Tier 1 orchard/airblast model based on the "Sparse" (no canopy) assumption is significantly higher than the other orchard type models available in AgDRIFT. For example, at 100 ft, drift deposition (fraction of applied) varies as follows:

- Sparse (Young/Dormant): 0.0103
- Normal (Stone and Pome Fruit, Vineyard): 0.0006 (94.2% lower)
- Dense (Citrus, Tall Trees): 0.0065 (36.9% lower)
- Vineyard: 0.0008 (92.2% lower)

Recommendation: The EPA should incorporate the AgDRIFT Tier 1 models most representative of specific orchard/vineyard types/conditions when determining required buffer distances for orchard/airblast applications.

2.2 Determination of Maximum Buffer Distances and Off-Sets (Section 6.2)

Maximum buffer distances for aerial, ground boom, and airblast applications were determined based on AgDRIFT Tier 1 modeling. For aerial and ground boom, the maximum buffer distances varied based on nozzle DSD (aerial) or nozzle DSD and boom height (ground boom). Comments concerning the methodology used to determine these maximum buffer distances and the calculations following that methodology are provided here. Please refer to Appendix A (VSPP Comment 2) for an alternative suggested approach for identifying a maximum buffer distance based on a change in deposition per unit distance.

2.2.1 Maximum Buffer Distances Reported in Table 6-1 do not Match EPA's Described Methodology

The EPA implemented a methodology for determining maximum buffer distances which identifies the distance from edge-of-field beyond which a 100 ft increase in buffer size results in less than a 1% drop in drift deposition. The example calculation provided by EPA in Section 6.2.2 (EPA, 2023b) is as follows: "For example, if the predicted depositions at 100 ft and 200 ft are 1.5% and 0.6%, respectively, the difference is 0.9% and the recommended maximum is 100 ft." Using the AgDRIFT Tier 1 models and assumptions described by the EPA in Section 6.1 (EPA, 2023b), we followed EPA's maximum buffer distance calculation methodology and arrived at different maximum buffer values for many of the application scenarios. These buffer distances values, along with supporting drift deposition fractions and the EPA's maximum buffer distances are provided in the

Table 1 below. The drift fractions shown were calculated using the AgDRIFT "Terrestrial Assessment" Toolbox and the "Point Deposition" values. For all application scenarios except the Airblast/Sparse scenario, we calculated maximum buffer distances from 25 ft to 100 ft smaller than reported by the EPA. Each 25 ft of additional buffer requirement impacts a grower's crop yield and profitability, thus ensuring that maximum buffer distances are calculated accurately is imperative.

Table 1. Comparison of maximum buffer distances calculated by application method between the EPA and CLA drift curve analysis.

Type of Application	Application Parameters	Max Buffer (ft)		Drift at Max Buff.[1]	Drift at Max Buff. + 100 ft[2]
		EPA	CLA		
Aerial	Very fine to fine DSD	500	475	0.0693	0.0598
Aerial	Fine to medium DSD	300	275	0.0335	0.0242
Aerial	Medium to coarse DSD	300	200	0.0245	0.0146
Aerial	Coarse to very coarse DSD	200	175	0.0178	0.0097
Ground	Very fine to fine DSD; high boom	200	125	0.0198	0.0105
Ground	Very fine to fine DSD; low boom	100	75	0.0122	0.0058
Ground	Fine to medium-coarse DSD; high boom	100	50	0.0119	0.0051
Ground	Fine to medium-coarse DSD; low boom	100	25	0.0126	0.0038
Airblast	Sparse	100	100	0.0103	0.0023

1. Drift fraction at CLA's calculated Max Buffer distance

2. Drift fraction at CLA's calculated Max Buffer distance + 100 ft (fraction must be < 0.01 below the Max Buffer drift fraction)

Recommendation: The EPA should re-check their calculation of maximum buffer distances to confirm accuracy. If the EPA believes that their original calculations are correct, EPA should publicly provide additional data and information to support this, as our analysis shows different results.

2.2.2 A Maximum Buffer Distance Based on a 1% Drop in Drift Deposition Over 100 ft is Not Adequately Justified

The rationale behind choosing a maximum buffer distance based on a < 1% drop in drift deposition over 100 ft was not adequately justified or explained in the HS technical document. Specifically, why was a 1% drift deposition drop over 100 ft chosen as opposed to a 1% drop in drift deposition over 50 ft? Modifying the "small change" criteria to a 1% drop in deposition over 50 ft reduces the maximum buffer distances by as much as 125 ft in the case of the aerial very fine to fine DSD (from 475 ft to 350 ft). Buffer distances for other application scenarios decrease by smaller amounts of 75 ft or less.

Recommendation: The EPA should re-evaluate and explain the criteria used to establish a maximum buffer distance, including consideration of how the resulting distances compare with buffer distance requirements for currently registered herbicides.

2.3 Options to Reduce Buffer Distances and Efficacy Data (Section 6.3)

The EPA evaluated and quantified the efficacy of eight different spray drift mitigation options for each of the three application methods (aerial, ground, and airblast). Some of the mitigation options did not apply to one or more of the application methods or were not considered at this time. Comments concerning several of the eight mitigations summarized in Table 6.2 of the Draft Technical Support document (EPA, 2023b) are provided below.

2.3.1 Downwind Windbreak/Hedgerow

EPA determined that the presence of a windbreak or hedgerow will reduce a buffer by 50%. While this appears to be a reasonable initial assumption, the studies referenced by EPA (e.g., Lazzaro et al., 2008; Hancock et al., 2019) indicate that the drift-reduction efficacy of this mitigation can be considerably higher (up to 98%).

Recommendation: The windbreak/hedgerow mitigation efficacies should be further developed to provide multiple levels of efficacy based on the vegetation characteristics of the windbreak/hedgerow. Please refer to VSPP Comment 4 in Appendix A for further discussion and support for buffer reductions of greater than 50% for some application methods and hedgerow/windbreak situations.

2.3.2 Hooded Sprayer

The EPA determined that using a hooded sprayer reduces ground buffer distances by 50%. They also mentioned that hooded sprayers can also be a beneficial mitigation for airblast applications, but that the efficacy has not been quantified, citing Otto et al. (2015).

Recommendation: We agree that hooded airblast sprayer technology can greatly reduce off-field drift and the EPA should work on acquiring existing datasets and/or endorse new studies to collect data that will support the quantification of hooded airblast sprayer mitigation effectiveness.

Please refer to VSPP Comment 5 in Appendix A for a discussion concerning the correct interpretation of hooded spray drift reduction data and evidence to support at least a 75% reduction in buffer size for the hooded sprayer mitigation option.

2.3.3 Change from Fine to Coarse DSD

For aerial applications, the EPA suggested determining buffer size reductions associated with an increase in nozzle DSD from fine to coarse directly, by using the AgDRIFT Tier 1 aerial drift deposition curves. For ground spray applications, the EPA proposed a 25 ft reduction in buffer size for an increase in nozzle DSD from fine to coarse when the non-mitigated buffer is 75 ft or greater (Table 6.2, EPA, 2023b).

The mitigation proposed is defined as “Change from Fine to Coarse DSD”. This mitigation appears to be very specific to nozzles which produce ASAE DSDs of “Fine” (Dv50 of 180 mm) and nozzles which produce ASAE DSDs of “Coarse” (Dv50 of 385 mm). It is unclear whether mitigation credit would be given to, for example, a change of DSD from “Fine to Medium” to “Coarse to Very coarse”, or any other combinations of an increase in the DSD Dv50 associated with a change to a coarser droplet nozzle.

Recommendation: Considering the variety of nozzles and their associated DSDs used in practice for ground applications, the EPA should clarify this mitigation and provide explicit guidance on drift buffer reductions associated with specific nozzle alterations.

The ground spray data considered by the EPA to quantify buffer reductions associated with increases in spray nozzle DSDs was limited, with two sources cited in Section 6.3.6 (Wolf, 2016 and EPA, 2022d) neither of which had a matching reference provided in the document’s Literature Cited section. Given the very well-established science that larger spray droplets travel shorter distances than smaller droplets, a more comprehensive dataset (field collected or modeled) should be compiled and used to derive buffer reductions that are appropriate for a much more comprehensive list of nozzles and associated DSD ratings. Such a comprehensive analysis would be able to distinguish, for example, additional buffer reductions when choosing an Ultra Coarse DSD nozzle over a Coarse DSD nozzle.

Recommendation: The HS spray drift mitigation guidelines for ground spray changes in DSD should include a clear differentiation of how buffer size reductions correlate with incremental changes in the standard ASAE DSD categories.

The concerns and requests made in this comment around the mitigation credits given to different DSDs/spray qualities is echoed and further supported in the VSPP Comment 6 in Appendix A.

2.3.4 Accounting for Crop on Field

The EPA used AgDRIFT Tier III aerial modeling to determine buffer reductions for aerial applications when a crop is on the field, conservatively assuming a minimum crop height of 1 ft at the time of application. Using a medium DSD for these model simulations, the EPA determined buffer distances resulting in the same point deposition as the bare ground default modeling assumptions. Based on this analysis, the EPA determined that for non-mitigated buffer distances of >= 200 ft, the buffer could be reduced by 25 ft when crop was present during application. Examination of Table 6-6 (EPA, 2023b) shows that the proposed 25 ft reduction from a 200 ft buffer is appropriate under minimum crop conditions. This is because a 175 ft buffer in these conditions provides equivalent protection to a 200 ft buffer on bare ground. However, for a non-mitigated (bare ground) buffer of 300 ft, drift deposition under minimum crop conditions aligns with that at 250 ft, suggesting that a 50 ft reduction in spray buffer would be appropriate. Under "average" crop conditions, a larger buffer reduction of around 75 ft from the 300 ft would be selected using the same methodology.

Recommendation: Based on the data provided in Table 6-6, EPA should increase the in-field crop mitigation to a 50 ft buffer reduction when the non-mitigated buffer is >= 300 ft. While this is expected to impact only aerial applications with finer DSD nozzles, it may be important for some growers where coarser droplets are not efficacious for the targeted weeds.

2.3.5 Accounting for Lower Windspeeds, Aerial Applications

The EPA conducted AgDRIFT modeling (we assumed Tier III) to determine reductions in buffers with windspeeds below 10 mph (the default assumption used in AgDRIFT Tier I aerial models). The proposed buffer reduction of 25 ft is applicable to non-mitigated buffer distances of 75 ft to 175 ft and for windspeeds of 3 to 7 mph. The modeling used to arrive at a 25 ft reduction was based on a 7-mph wind speed. When a wind speed of 5 mph was modeled, a buffer reduction of 50 ft was determined for off-field distances between 50 ft and 150 ft. Given the clear positive correlation between wind speed and off-field drift distance, reductions in buffer sizes based on wind speed during pesticide applications are sensible. As such, tiered reductions in buffer size associated with incremental drops in wind speed would result in more appropriately sized buffers for locations where applications can be made during lower-end wind speeds.

Recommendation: Wind speed mitigation should be adjusted as follows: a 25 ft buffer reduction for applications made between 5 and 7 mph, and a 50 ft buffer reduction for applications made between 2 and 5 mph. The applicable non-mitigated buffer distance could be uniformly set at 50 ft to 175 ft. Alternatively, it can vary with wind speeds: 50 ft to 150 ft below 5 mph and 75 ft to 175 ft for 5 to 7 mph.

2.3.6 Accounting for Lower Windspeeds, Ground and Airblast Applications

The proposed buffer reductions associated with lower wind speeds were characterized as "Not Applicable" for ground spray and airblast applications. As has been discussed in previous comments, the available spray drift deposition data considered for ground and airblast applications were limited, thus reductions in buffers with lower wind speeds does not appear to have been evaluated. Ground application spray drift data contained within CLA's REGDISP tool (CLA, 2016) provide the capability to compare ground spray deposition for the same nozzle and boom height for different wind speeds. Based on trials from the 2011 Agriculture and Agri-Food Canada (AAFC) dataset, the XR80-03 nozzle (medium DSD) produced the same deposition at 100 ft under a 10.21 mph wind speed as the deposition at 32.8 ft under a 5.91 mph wind speed (a buffer reduction of 68.2 ft). For an extra-coarse DSD nozzle (the DR110-05), deposition at 100 ft under a 10.57 mph wind was the same as the deposition at 49.2 ft under a 4.68 mph wind speed (a buffer reduction of 50.8 ft).

Recommendation: Given the clear correlation between wind speed and off-field spray drift, the EPA should compile ground boom spray data (as well as airblast data) sufficient to quantify reductions in spray drift buffers with decreasing wind speed.

2.3.7 DRT Nozzles are not Included in Proposed Mitigations for Spray Drift Buffer Reduction

Absent from the mitigations summarized in Table 6.2 are options for using Drift Reducing Technology (DRT) nozzles. DRT nozzles have been shown by many researchers to offer substantial reductions in off-target spray drift compared to conventional flat fan nozzles of the same size. A recent study by Gil et al. (2014) compared drift potential between conventional flat fan nozzles and air induction nozzles and calculated the associated drift reduction for three different nozzle sizes with experiments conducted at two different sites. In these experiments, they found that drift for an ISO 03 nozzle size was reduced by 58.6% - 81.5% when using an air induction nozzle compared to a conventional flat fan nozzle. Gil et al. (2014) further evaluated drift potential and reductions in drift relative to a conventional nozzle for 8 different designs of DRTs for the same ISO 03 nozzle size. This experiment found drift reduction of between 48.4% and 88.5% across the eight nozzles, with five of the eight nozzles resulting in drift reduction of 77% or greater. As previously mentioned, the AgDRIFT model used for both determining buffer size and calculating buffer reductions from mitigations relies upon data with nozzle technology from the early 1990s and does not reflect current DRT nozzles.

Recommendation: Current DRT nozzles should be added to the menu of spray drift mitigations and options for buffer reductions. Please refer to VSPP Comment 3 in Appendix A for further data sources demonstrating the substantial reduction in drift using DRT nozzles and the importance of including this technology as a spray drift mitigation and option for reducing buffer sizes.

2.3.8 Reliance on Larger Spray Droplets as a Mitigation Will be Difficult for Control of Some Pests

There are multiple practical challenges associated with heavy restrictions placed on finer spray droplets. Please refer to VSPP Comment 21 in Appendix A for additional discussion regarding this concern.

2.3.9 The Proposed Aerial Buffers would Negatively Impact California Growers, Particularly Citrus Growers

Aerial buffers of 200 ft to 300 ft would be highly impractical in California. Please see VSPP Comment 22 in Appendix A for further discussion regarding this concern.

3 Determination of Runoff and Erosion Mitigations Requirements and Options

The effectiveness of runoff/exposure mitigation measures, whether singly or in combination, varies with pesticide, crop, and region (Reichenberger et al., 2007; Liu et al., 2008; Alix et al., 2017; Liu et al., 2017; Teed et al., 2023). There are often diminishing returns as more mitigations are added (Alix et al., 2017; Teed et al., 2023). Such factors need to be considered when developing suites of potential pesticide mitigation “menus” for the protection of threatened and endangered species in the U.S., particularly given the economic impacts to growers of modifying their agronomic practices, installing additional structural mitigations, and reducing their harvestable land. Section 7 in the Draft Technical Support document (EPA, 2023b) focuses on the literature review and modeling conducted to quantify the level of effectiveness of the runoff and erosion mitigation options proposed. This includes a discussion on the criteria used to determine a low, medium, or high efficacy rating and the support used to estimate a general reduction in exposure from each mitigation on the menu. Another critical component to the HS is how the level of mitigation requirements is determined. This process is not described in the Draft Technical Support document (EPA, 2023b), but rather is covered in the Draft Herbicide Strategy Framework document (EPA, 2023c) and the Herbicide Case Study Summary and Process document (EPA, 2023d). To put the mitigation effectiveness evaluation contained in the Draft Technical Support document into context it is necessary to review and comment on the key component to the methodology used to determine the Magnitude of Difference (MOD), Magnitude of Effect (MOE), and the resulting Mitigation Category. The comments on this section will first focus on elements of the exposure assessment that lead to the MOD/MOE and level of mitigation determinations. This will be followed by a review and discussion of the mitigation effectiveness assignments in the Draft Technical Support document. A final section of comments and recommendations will focus on the proposed determination of the geospatial extent of mitigations.

3.1 Exposure Assessment and Derivation of MODs

The methodology for the determination of MODs for each use pattern is a function of the exposure (EECs) and the 'population-level' toxicological endpoints. The methodology for the determination of MODs is described in Section 5 of the HS Framework document (EPA, 2023c) and in Section 3.3 of the HS Case Study document (EPA, 2023d). Several important premises of the current MOD approach include, 1.) population-level effects are only discernible within an order of magnitude (Section 4, page 42 (EPA, 2023d)). and 2.) exposure variability for a given use pattern across the CONUS typically varies by a factor of 2 (Section 3.3.2.4, page 37 (EPA, 2023d)). The magnitude of exposure used in calculating MODs for a given use pattern is critical, as the level of mitigation required for all occurrences of a given use pattern (crop) within the entire CONUS or within individual PULAs spanning much of the CONUS are the same (though some limited variability in requirements is provided through the "Field Characteristics" mitigations). The MOD determined for a use pattern will be largely driven by the highest exposure values within the CONUS or PULA (we acknowledge that EPA has incorporated a "line of evidence" approach to consider situations where the MODs span multiple orders of magnitude). The result of this approach is that the level of mitigations required for many regions and many specific fields within those regions will be considerably higher than what is necessary to protect listed species populations, resulting in a misallocation of mitigation resources. We provide several examples below that illustrate this situation, then provide recommendations on how to modify the proposed approach.

3.1.1 Variability in Exposure Across Standard Scenario is Significant, Leading to High Variability Mitigation Requirements

The exposure resulting from a given use pattern varies significantly across the CONUS or a Pesticide Use Limitation Area (PULA). In the HS Case Study (EPA, 2023d), EECs were provided for aquatic and wetland habitats based on EPA standard scenarios. Table 2 provides some examples of the ranges in wetland aquatic EECs for several of the pesticides and use patterns assessed. In these examples, the ranges in EECs span more than a full order of magnitude and in some cases, approach two orders of magnitude. This is significantly more variability than the 2x noted by EPA in the Case Study document

(EPA, 2023d). The variability shown in Table 2 is only reflective of variability associated with the EPA's high-end exposure scenarios (90th percentile) for the wetland water body across the 18 HUC2 watersheds covering the CONUS (i.e., the EPA standard scenarios) and does not account for additional within-HUC2 variability resulting from differences in soils, slopes, and weather. Furthermore, when EECs span even modestly above one order of magnitude, the range in MODs can span more than two orders of magnitude. As an example, this would occur when the low-end EECs result in an MOD of slightly below 1.0 (e.g., 0.9) and the high-end EECs result in an MOD of slightly above 10.0 (say 15). This situation would translate to exposure scenarios leading to mitigations ranging from 'None' (MOD < 1) to 'Medium' (MOD > 10), as specified in the HS Framework document (EPA, 2023c; Table 5-2). This significant variability in exposure necessitates the determination of mitigation levels at a more local geographic scale.

Table 2. Variability in wetland aquatic EECs for several pesticides and use patterns from EPA's HS Case Study.

Active	Use	Wetland Aquatic EEC (mg/L)		Max/Min Factor Diff.[4]
		Min	Max	
2,4-D[1]	Cereal Grain	75	2200	29.3x
	Field Corn	190	3000	15.8x
	Soybeans	110	1500	13.6x
Dicamba[2]	Barley, oat, small grains	50	4200	84.0x
	Sorghum	57	3700	64.9x
	Triticale	12	880	73.3x
MPCA[3]	Wheat, barley, oats, rye, trtiticale	26	970	37.3x
	Wheat-legume mixture	17	610	35.9x
	Flax	8.7	320	36.8x

1. 2,4-D EECs from the Herbicide Case Study, Table 6-7
2. Dicamba EECs from the Herbicide Case Study, Table 7-7
3. MPCA EECs from the Herbicide Case Study, Table 9-8
4. The ratio of the max to min EEC, or the factor difference between the high- and low-end EECs

An additional factor when considering the variability in exposure across the EPA's standard scenarios used to calculate MODs is that the variability in runoff/erosion-driven transport and exposure across the high-variability standard scenarios can be greater than the variability in total exposure (i.e., exposure from spray drift plus runoff/erosion). Aquatic Pesticide Exposure Zone (APEZ) simulations of 2,4-D for all standard soybean and deciduous orchards scenarios were conducted as an example to evaluate this. These simulations were made with default spray drift modeling assumptions and no spray buffer, as well as with drift into the adjacent receiving water body assumed to be zero. The ranges in EECs (1 in 10-year annual maximum 1-day concentrations) across all HUC2-level scenarios were compared between the simulations that included spray drift and those that did not. These results are summarized in Table 3 below. The difference between the minimum and maximum EEC increases from a 75.7% difference to an 85.5% difference for soybean scenarios and from a 65.7% difference to an 98.8% difference for deciduous orchard scenarios.

Table 3. Ranges in APEZ 2,4-D exposure across HUC2 scenarios, with and without spray drift.

Crop	App. Method	EEC With Spray Drift (mg/L)			EEC Without Spray Drift (mg/L)		
		Min	Max	% Diff	Min	Max	% Diff
Soybeans	Ground	6.5	26.8	75.7	3.4	23.3	85.5
Orchards, Deciduous	Ground	10.8	31.5	65.7	0.26	21.6	98.8

This example further supports the point that exposure (and therefore MODs) can be highly variable across standard scenarios, and that the level of variability in runoff/erosion-based exposure may be different (and in this example is higher) than exposure estimates that also include spray drift. Variability in exposure of one to two orders of magnitude can occur within a single use pattern based on only the high vulnerability standard scenarios.

Recommendation: This level of variability necessitates an approach to MOD and mitigation level determination that is more refined than the national or near-national level and should be determined at a more local geographic scale.

3.1.2 Local Runoff/Erosion Transport can Vary Significantly from Standard Scenarios, Further Increasing Variability in Mitigation Requirements

The EPA's standard scenarios used for calculation of wetland and aquatic plant EECs are representative of 90th percentile exposure for a given use pattern within a HUC2. These standard scenarios are almost always associated with a high runoff potential soil based on the soil's Hydrologic Soil Group (HSG) classification (i.e., having an HSG of either 'C' or 'D', which correspond to 'moderately high' and 'high' runoff potential respectively). Actual environmental and site conditions for a grower can vary substantially. Based on a spatial overlay of the 2018 Cropland Data Layer (CDL) Cultivated Cropland layer and the

2019 Gridded Soil Survey Geographic database (gSSURGO) layer, 32% of cultivated cropland in the CONUS is on HSG ‘A’ and ‘B’ soils (39% when you include the ‘A/D’ and ‘B/D’ soils),which correspond to ‘low’ and ‘moderately low’ runoff potential soils, respectively. There are other environmental characteristics that impact pesticide transport via runoff/erosion (including weather, soil organic carbon, and slope), however the HSG is one of the most important factors. To provide an example of this, the EPA standard scenarios for soybeans and deciduous orchards were run for an example pesticide (2,4-D) over 2 different HUC2 watersheds and compared with running the same scenarios for soils with lower runoff potential (HSG B and HSG A). To isolate the impacts of these different types of soils on runoff/erosion transport, drift was assumed to be zero and the metric for comparing the different soils was the “Fraction of Applied that Goes to Waterbody” model simulation output provided in PWC. This model output from PWC is most relevant to evaluating differences in potential exposure and the variability in required mitigation levels within a given geographic region (i.e., HUC2). The results of these simulations are provided in Table 4 below. Two HUC2 regions were picked for each crop, one wetter region (HUC2s 2 and 8) and one drier region (HUC2s 14 and 18). In three cases, the HSG for the standard scenario was HSG D and in one case, the standard scenario HSG was C. Based on the standard scenarios, runoff/erosion transport fractions are higher for soybeans than deciduous orchards, with variability between HUC2s for the same crop being nearly an order of magnitude or higher. For soybeans, the reduction in runoff/erosion transport for HSG B soils is 62% to 75.2% and for HSG A soils is 88% to 94.7% compared to the standard scenarios. For deciduous orchards, the reduction in runoff/erosion transport for HSG B soils is 93.4% to 100% and for HSG A soils is 100% compared to the standard scenarios. Looking at soybeans across HUC2s 8 and 14, there is more than a 100x difference between the runoff/erosion transport from the standard scenario in HUC2 8 (0.01397) and the HSG A soil in HUC2 14 (0.00013). For the deciduous orchards in HUC2 18 (California), runoff/erosion transport is effectively eliminated for HSG A and B soils, indicating no need for mitigations.

Table 4. Comparison of runoff/erosion off-field transport fractions of applied between high runoff potential standard scenarios and lower runoff potential soils (HSG-B and HSG-A).

Crop	HUC 2	STD Scenario HSG	Runoff/Erosion Off-Field Transport (fraction)[1]			Reduction from Standard Scenario (%)	
			STD Scen.	HSG-B	HSG-A	HSG-B	HSG-A
Soybeans	8	D	0.01397	0.00531	0.00168	62.0	88.0
Soybeans	14	D	0.00246	0.00061	0.00013	75.2	94.7
Orchards, deciduous	2	D	0.00346	0.00023	<0.00001	93.4	100.0

Orchards, deciduous	18	C	0.00011	< 0.00001	0	100.0	100.0

[1.] The runoff/erosion transport fraction for 'STD Scen.' is from the EPA standard scenario

This simple 2,4-D transport example for two crops and two HUC2 regions highlights further why a single level of mitigation per crop/use pattern across the entire CONUS or PULA is far too generalized, resulting in mitigation requirements for some fields that provide little to no benefit in reducing endangered species exposure to pesticides.

Recommendation: The determination of exposure potential, subsequent resulting MODs, and resulting mitigation levels should be tailored to match the transport potential of a given field, not be based almost entirely on the highest 90th percentile exposure scenario at a national or PULA scale.

The VSPP Comment 7 in Appendix A provides further support for the issues identified in this comment and the previous comment (comment 1 in Section 3.1 of this document) offers similar recommendations for improving the approach.

3.1.3 Runoff/Erosion Mitigation Levels Must Account for Spray Drift Mitigations

In Section 5.2 of the Draft Framework document (EPA, 2023c), the EPA says, “EPA is proposing that the MODs developed considering transport in both drift and runoff/erosion would be used to determine runoff/erosion points; however, EPA would select the spray drift mitigation measures which would result in deposition below the relevant toxicity endpoint. Spray drift mitigation is expected to result in reduced exposure in the receiving terrestrial, wetland, and aquatic habitats. The EPA does not revise model-based exposure estimates or recalculate the MODs for runoff considering the loading reductions afforded by the identified spray drift mitigation.” This approach does not provide any mitigation credit for reductions in exposure due to spray drift buffers and mitigations when determining the MODs. It is not uncommon for annual maximum 1-day EECs in plant habitats, particularly in the wetland habitat modeled using the PAT model, to be driven primarily by drift. In these situations, the EPA is asking that runoff mitigations be required to provide a level of mitigation necessary to reduce exposure that is resulting from spray drift transport. We find this approach to be flawed and respectfully request that EPA revise the approach to MOD calculations such that reductions in EECs resulting from spray drift buffers and mitigations are explicitly accounted for when determining the level of mitigation for runoff/erosion transport. Using an example pesticide from EPA’s Herbicide Case Study document (EPA, 2023d), we evaluated how required spray drift mitigations lead to reductions in EECs, which thereby reduce MODs and mitigation levels. The implementation of spray drift mitigations represents another factor that leads to increasing variability in EECs and MODs for a given use pattern (UDL) and mitigation region (CONUS or PULA).

The maximum spray drift buffer for an aerial application with the EPA's default 'Fine to Medium' DSD is 300 ft (EPA, 2023b). The maximum spray drift buffer for a ground application with the EPA's default 'Fine to Very Fine' DSD with a high boom is 200 ft (EPA, 2023b). The drift fractions used in aquatic exposure model for the EPA's wetland waterbody for aerial applications using the default DSD are 0.125 with no buffer and 0.0231 with the maximum 300 ft buffer. For ground application using the EPA's default DSD and boom height, the drift fractions used in aquatic exposure model for the EPA's wetland waterbody are 0.062 with no buffer and 0.0078 with the maximum 200 ft buffer. Aquatic EECs were generated for 2,4-D for the wetland water body using EPA's PWC and PAT models, both with and without spray drift mitigations based on the maximum buffer distances. Three different use patterns were simulated for all the HUC2 scenarios, soybeans with aerial application, soybeans with ground application, and deciduous orchards with ground applications. The percent reduction in EECs were calculated between the no mitigation scenario and the spray buffer mitigation scenario. These results are summarized in**Error! Not a valid bookmark self-reference.** Figure 1 below.

Depending upon the application method and use pattern, the wetland aquatic EECs drop by between 17% and 87% after spray drift mitigations. For ground applications to soybean, the reduction in EECs is from 17% to 84%, while for aerial application to soybeans, the reduction is between 31% and 82%. For ground application to orchards, the reduction in EECs with spray drift mitigation is between 49% and 87%. The significant variability across HUC2s (i.e., geographic region) is due to the difference in the proportion of exposure resulting from drift versus runoff/erosion transport. The reductions in EECs resulting from spray drift mitigations is generally higher for orchards compared to soybeans because less runoff and erosion is generated from orchard landscapes compared to soybean row crop agriculture, resulting in a higher proportion of transport occurring via drift for orchards.

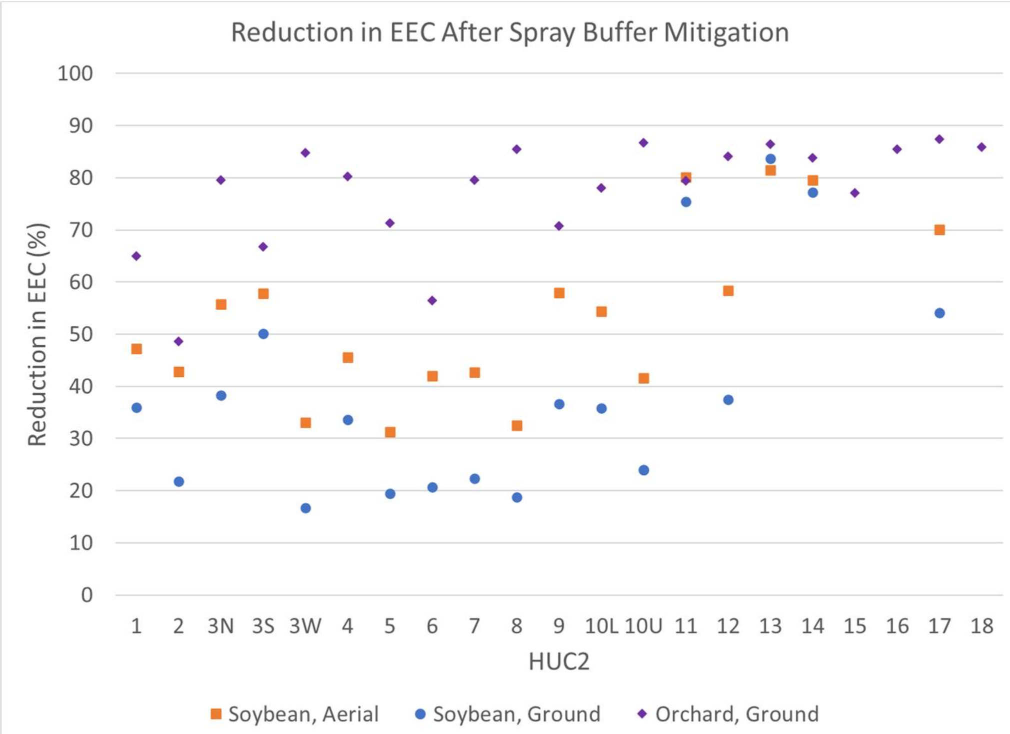

Figure 1. The effects of spray drift mitigations in reducing wetland 2,4-D aquatic EECs, prior to consideration of runoff/erosion mitigations.

The importance of considering the impacts of spray drift on overall exposure when deciding upon required levels of runoff/erosion mitigations is further explained by examining the fraction of aquatic exposure due to spray drift for several of the EPA's standard scenarios, as well as modified scenarios that represent a low runoff potential soil (HSG A). Four of the soybean scenarios for 2,4-D that were included in Figure 1 were also simulated with a low runoff (HSG A) soil, and the PWC "Relative Transport" outputs for drift transport contribution were tabulated in Table 5. As shown in the table, spray drift accounts for 31% to 72% of total exposure for the standard (high runoff) scenarios and for between 79% and 99% of the total exposure for low runoff conditions represented by HSG A soils (which are not considered in EPA's exposure modeling, calculation of MODs, and determination of mitigation levels). The current approach for determining the level of runoff/erosion mitigations described in the HS (EPA, 2023c; EPA, 2023d) explicitly ignores the fact that spray drift can account for 50% or more of exposure in many situations. We believe that these situations require different mitigations and levels of mitigation than those where runoff/erosion dominate pesticide transport and exposure.

Table 5. Variability in fraction of 2,4-D aquatic exposure originating from spray drift for soybeans in different HUC2s, different application methods, and different HSG soils.

Crop	App. Method	HUC2	Aquatic Exposure Fraction from Spray Drift	
			STD Scen.[1]	HSG A
Soybeans	Aerial	8	0.49	0.89
Soybeans	Ground	8	0.31	0.79
Soybeans	Aerial	14	0.84	0.99
Soybeans	Ground	14	0.72	0.98

1. The runoff/erosion transport fraction for 'STD Scen.' is from the EPA standard scenario

This one example for two use patterns for 2,4-D clearly demonstrates the necessity of considering the beneficial impacts of spray drift mitigations prior to determining the number of runoff/erosion mitigation points required for a given use pattern. This example further demonstrates that the same level of runoff/erosion mitigations is not necessary in all geographic locations. In the case of aerial applications to soybeans, following spray drift mitigations would lead to greater than 50% exposure reduction (equivalent to a 3-point runoff/erosion mitigation) in HUC2s 3N, 3S, 9, 10L, 11, 12, 13, 14, and 17. For the other HUC2s, reductions were within the 25% to 50% range (equivalent to a 2-point runoff/erosion mitigation).

Recommendation: EPA should modify the methodology for calculating MODs to adjust the EECs used in the calculation to account for the reduction in EECs resulting from required spray drift mitigations. This will allow growers to direct resources effectively to mitigating transport pathways causing higher exposure.

3.2 Effectiveness of Mitigation Menu Options

The Draft Technical Support document (EPA, 2023b) describes the determination of runoff/erosion mitigation effectiveness in Section 7. The comments provided in this section address the criteria for categorizing the efficacy of mitigations, as well as the evaluations of effectiveness for specific mitigations.

3.2.1 The Efficacy Strength of Evidence Approach May Require Refinement

The EPA followed the same strength of evidence approach as was described in the MAgPIE Workshop (Alix et al. 2017). This approach assigns a Strength of Evidence Category depending upon the number of literature studies available describing the efficacy of a given practice (low = 1 – 10 studies, medium = 10 – 20 studies, and high = > 20 studies). The EPA acknowledges that this approach does not consider the size of a study or the quality of the study.

Recommendation: Given that studies can vary greatly in both size and quality, EPA should adjust their Strength of Evidence scoring system to assign higher value/importance to studies with higher numbers of sites and/or more events and consider the quality of the study in determining the final Strength of Evidence category.

An simple example of how the Strength of Evidence Category could be adjusted to account for the size of the study could be to assign points per study based on the volume of efficacy data measurements in the study, then sum the points across all studies for the mitigation practice. This approach could be structured as follows:

- Study Efficacy Data Volume Points:
  - 1 to 2 independent efficacy data measurements in study: 1 point
  - 3 to 4 independent efficacy data measurements in study: 2 points
  - 5 to 7 independent efficacy data measurements in study: 3 points
  - 8 to 10 independent efficacy data measurements in study: 4 points
  - 11 or more independent efficacy data measurements in study: 5 points
- Strength of Evidence Category:
  - Low: Summation of all study efficacy data volume points of 1 to 10
  - Medium: Summation of all study efficacy data volume points of 11 to 20
  - High: Summation of all study efficacy data volume points of > 20

3.2.2 The Matrix Defining the Mitigation Practices Efficacy Rating Requires Clarity

The Mitigation Practice Efficacy Rating (Table 7-2 (EPA, 2023b)) is determined as ‘low’, ‘medium’, or ‘high’ based on a combination of the Line of Evidence Score and the ‘Average Percent Reduction’ from field data or modeling. The matrix in Table 7-2 seems to provide contradictory ratings and seems to omit some important combinations of line of evidence score and average percent reduction. For example, it is unclear how a mitigation with a medium line of evidence score, with an average reduction of > 50% would be classified. Likewise, it remains unclear how a mitigation with a high line of evidence score, and a 25%-50% average reduction would be classified.

Recommendation: The EPA should modify the communication of the Mitigation Efficacy Rating criteria in a structure as shown in Table 6 below. The matrix below presents CLA's recommendation on rating efficacy based on the line of evidence and average reduction.

Table 6. Mitigation efficacy rating matrix proposal from CLA.

Line of Evidence	Average Reduction (%)	Mitigation Efficacy Rating
+	10 - 25	Low
+	25 - 50	Low
+	> 50	Medium
++	10 - 25	Low
++	25 - 50	Medium
++	> 50	High
+++	10 - 25	Low
+++	25 - 50	Medium
+++	> 50	High

3.2.3 Completeness of Sources for Mitigation Effectiveness

The EPA relied extensively on reviewing available literature to quantify the effectiveness of many mitigation options. Recommendations on additional sources that should be considered for mitigation practice effectiveness quantification are provided in VSPP Comment 8 in Appendix A.

3.2.4 Modification to the Rain Restriction Requirements

The rainfall restriction requirement described in Table 7-3 of the Draft Technical Support document (EPA, 2023b) uses a rainfall restriction of a "50% chance or greater of 1 inch or more of rainfall to occur with 48 hours following application." This criteria for determining a rainfall restricted application will be very difficult to implement in practice for many growers. Please refer to the VSPP Comment 9 in Appendix A for details regarding the justification for modifying the rainfall restriction criteria to better align with grower operations and local knowledge.

3.2.5 Clarification is Required Regarding EPA's Consideration of Effectiveness of Non-Independent Mitigations

On page 39 of the Draft Technical document (EPA, 2023b), the EPA notes that, "There is limited evidence supporting the reduction in exposure that may occur when combining practices (Alix et al., 2017; Reichenberger et al., 2007). It is expected that when mitigation practices are not independent of each other, the efficacy reduction will not be additive (Alix et al., 2017; Reichenberger et al., 2007)."

Recommendation: The EPA should provide clarification on how the effectiveness of mitigation practice combinations that are not independent will be rated within the HS framework and how practice combination effectiveness will be further analyzed and refined in the future.

3.2.6 Field Characteristics - Application Area is to the West of the I-35 and East of the Sierra Nevada Mountains and Cascade Mountains or Highway 395

The EPA created a field characteristic mitigation with a 'low' effectiveness based on runoff vulnerability, which was defined as the geographic area west of I-35 and east of the Sierra Nevada/Cascade mountains. This is effectively a mitigation associated with lower rainfall agricultural areas. The geographic area associated with this mitigation is shown in Figure B1 of the Draft Technical document (EPA, 2023b). While it is true that the areas specified for this mitigation will have lower runoff/erosion potential, we disagree with both the level of mitigation assigned to this mitigation ('low') and how the mitigation is geographically defined.

The 'low' level of mitigation indicates a 10% to 25% reduction in runoff/erosion off-field transport. Looking at one example provided earlier in these comments (Table 4 above), we see that the runoff/erosion transport for 2,4-D use on soybeans varies significantly between locations with higher rainfall (HUC 2 number 8, the Lower Mississippi) and lower rainfall (HUC2 number 14, the Upper Colorado). For the Lower Mississippi, runoff/erosion transport for the HSG D soil was 1.397% of applied, while for the Upper Colorado it was 0.246% of applied (an 82% difference). This level of mitigation effectiveness would classify well into the 'high' category of > 50%. In the Draft Technical document, Section 7.3.3 (EPA, 2023b) the EPA states that this low rainfall mitigation is given a 'low' effectiveness because, "much of the mitigating benefit of these regions is already included in the modeling of the EECs." This is not true, because the MODs are based on the national-level exposure modeling, and the highest EECs for a use pattern drive the MOD and hence the level of mitigation (points) required. The rationale made by EPA would only be partially valid if mitigation levels were determined at the HUC2 scale, which they are not (we say partially valid because even within a large HUC2, rainfall and thus runoff potential can vary considerably).

Recommendation: MODs and the level of runoff/erosion mitigations required be determined at the HUC2 or finer scale. This would potentially eliminate the need for a low rainfall mitigation credit. If rainfall were to vary considerably within a HUC2 (such as within the western US HUC2s or very large HUC2s like the Missouri Basin), the HUC2-specifc low rainfall mitigation factors could be developed.

The concerns and recommendations expressed in this comment concerning the EPA's proposed approach to account for rainfall variability in mitigation requirements are echoed and further supported in the VSPP Comment 14 in Appendix A.

3.2.7 Field Characteristics - Application Area has Predominantly Sand, Loamy Sand, or Sandy Loam Soil without a Restrictive Layer that Impedes the Movement of Water through Soil

This field characteristic accounts for lower runoff/erosion potential from sandy soils and was assigned a 'low' effectiveness by the EPA. In Section 7.3.3.2 of EPA (2023b), the soils defined as qualifying for this mitigation are sand, loamy sand, and sandy loam. While the EPA states that these textures correspond to HSG A and HSG B soils, this is not fully accurate, as the sandy textures listed are most typically associated with HSG A, with the HSG B soils including the silt loam and loam textures (NRCS, 1986). While we agree that the HSG A and HSG B soils have less runoff/erosion potential than the higher vulnerability soils that comprise the EPA's standard PRZM scenarios, we don't agree with the 'low' mitigation effectiveness assigned to these soils.

The reduction in runoff/erosion transport for HSG B and HSG A soils is considerably higher than the 10% - 25% implied by the 'low' efficacy rating. Referring to the previous example in these comments shown in Table 4, the runoff/erosion transport for soybeans moving from an HSG D soil to an HSG B soil was reduced by between 62.0% - 75.2%, and by 88.0% - 94.7% for an HSG A soil. For the deciduous orchard simulations, runoff/erosion transport reduction was 93.4% – 100% for an HSG B soil and 100% for an HSG A soil. The simulation examples shown in Table 4 are a small sample of all the standard scenarios, and representative of one pesticide; however, they do represent wet and dry HUC2 regions, and we would expect similar findings across other crops and HUC2 regions.

In Section 7.3.3.2 of the Draft Technical document (EPA, 2023b), the EPA notes that the lower runoff potential of the HSG B and HSG A soils are, "for the most part … already considered in the modeled EECs." As explained in the previous comment on the mitigation effectiveness of low rainfall, this assertion is not valid because MODs and mitigation levels are determined at the national scale, with the most vulnerable soils (HSG C and HSG D) driving highest EECs across all the 18 HUC2 regions. Therefore, assigning only a ‘low’ mitigation efficacy to soils that are producing 62% to 100% lower runoff/erosion than the soils used to define the MODs/mitigation levels is not appropriate and a potential significant misallocation of mitigation resources.

Recommendation: MODs and mitigation levels should be defined at the HUC2 or finer scale. Mitigation credits for soils with lower runoff potential relative to EPA’s standard scenario for a given crop and HUC2 should be determined through modeling, similar to the example provided in these comments (see Table 4). We expect the level of mitigation provided by HSG B and HSG A soils to be classified as ‘high’ for many crops and geographic regions.

The concerns and recommendations expressed in this comment concerning the EPA’s proposed approach to account for field soil characteristics in mitigation requirements are echoed and further supported in the VSPP Comments 11 and 13 in Appendix A.

3.2.8 Field Characteristics - Overall, the application area has a slope of less than 2%

The EPA assigned a ‘low’ mitigation credit for fields with slopes of < 2%. In Section 7.3.3.1 of the Draft Technical document (EPA, 2023b), the EPA noted that 60% of the new PWC scenarios have slopes of < 2%, with 40% of scenarios having higher than 2% slopes (up to 48% slope). The EPA also explained that “credit should be given for fields with low slopes of 2% or less, but because modeled slopes are also typically low, this mitigation credit is low.”

As has been discussed in the previous two field characteristics comments, the MODs and levels of mitigation determined for a given crop/use pattern is largely driven by the highest exposure scenarios at the national level. Thus, for erosion-prone compounds, the potential exists for a few high slope scenarios within specific HUC2 regions to determine the mitigation requirements for other HUC2s, resulting in an inappropriate level of mitigation determination.

Recommendation: Mitigation credit for reduced slope should be offered to growers by crop group on a HUC2-level basis, with the mitigation efficacy class based on the difference in runoff/erosion transport between the EPA’s standard scenario slope and a grower’s field slope. We expect this to be important for erosion-prone compounds (e.g., Koc >= 1000 L/kg).

3.2.9 Application Parameters - Reduction in Maximum Single Application Rate

In the Draft Technical document (EPA, 2023b), the EPA described an application rate reduction mitigation with efficacy proportional to the percentage of rate reduction. This proposed mitigation is specific to reductions in a single application rate. We agree with this mitigation and the methodology for quantifying its effectiveness. However, this mitigation should be expanded to account for reductions in annual application rate, which reflects a combination of the single application rate and number of applications per year.

The EPA has specified that the quantification of mitigation effectiveness is based on the reduction in off-field runoff/erosion transport (EPA, 2023b). As such, reducing the total amount of pesticide applied annually will directly reduce the amount of off-field transport and potential impacts to sensitive species.

Recommendation: The application parameters mitigation options should be extended to include reductions in the number of applications and annual application rates. This additional application mitigation option would be consistent with EPA's recent Enlist decision (EPA, 2022c), which provides mitigation credits for reducing the number of applications in a year.

3.2.10 Application Parameters - Soil Incorporation

The EPA determined that soil incorporation results in a 'medium' level of mitigation efficacy. This mitigation, as presented in Section 7.3.4.2 (EPA, 20203b), specifies that incorporation must be at least 1 inch in depth. The effectiveness of soil incorporation is a function of the depth on incorporation, with deeper incorporation depths leading to higher efficacy in reducing off-field runoff/erosion transport.

Recommendation: The EPA should expand the soil incorporation mitigation to include an option for incorporation below 2 inches, which would provide a higher level (> 50% reduction) of mitigation efficacy.

3.2.11 In-Field Mitigation - Cover Crop/Continuous Ground Cover

A 'low' mitigation efficacy was assigned to the cover crop/continuous ground cover mitigation in the Draft Technical Document (EPA, 2023b), despite an average effectiveness from reviewed studies of 50% and multiple studies citing effectiveness of > 80%. The primary reason given to the 'low' efficacy rating was the timing of the cover crop relative to pesticide application and resulting uncertainty of the mitigation relevance. While the EPA's concern is valid, there are multiple situations where a cover crop would be a very effective and practical mitigation and offer at least a medium level of efficacy. Examples include herbicides applications late in the crop growing season (prior to cover crop establishment) and pesticides with slower soil degradation rates. Furthermore, ‘continuous ground cover’ (which could include inter-seeding of a cover crop during the growing season) would provide substantial year-long benefits and should be treated separately from a seasonal cover crop.

Recommendation: The cover crop/continuous ground cover mitigation should be refined to provide greater specificity concerning the mitigation efficacy for timing of the herbicide application relative to cover crop establishment, as well as consider the persistence of the pesticide. We would expect that the cover crop mitigation would receive a higher efficacy rating (‘medium’ or ‘high’) when the pesticide is more persistent and when application timing is during or close to cover crop establishment. This refinement would require additional modeling and/or review of the scientific literature to determine more specifically the combinations of aerobic soil metabolism rates and application timing that qualify for the higher mitigation efficacy ratings.

Further support for a reassessment of cover crops and their effectiveness is provided in the VSPP Comment 10 in Appendix A.

3.2.12 In-Field Mitigation - Grassed Waterway

A ‘low’ mitigation efficacy was assigned to the grassed waterway mitigation in the Draft Technical Document (EPA, 2023b). The research summarized in the EPAs discussion (Section 7.3.5.4, EPA, 2023b) included studies of sediment load reduction that reported 77% to 97% reductions with grassed waterways.

Recommendation: The grassed waterway mitigation effectiveness rating distinction should be considered for sediment-bound pesticides with high Koc (> 1000 L/kg) and that literature focused on sediment removal efficiency of this practice provide the additional support for this efficacy refinement.

3.2.13 In-Field Mitigation – In-Field Vegetative Filter Strip

An in-field vegetative filter strip was described as providing a high level of mitigation efficacy. However, it is unclear how this practice would pertain to some types of fields, such as orchard crops. Additional description of this issue is provided in the VSPP Comment 19 in Appendix A.

Recommendation: The EPA should provide more specificity regarding what cropping situations qualify for the in-field vegetative filter strip mitigation.

3.2.14 In-Field Mitigation - Mulching with Natural Materials

In Table 7-4 in the Draft Technical document (EPA, 2023b), the Efficacy Score column for the mulching with natural materials mitigation is specified as being ‘high’. However, in the justification of the same table, the efficacy is listed as ‘medium’.

Recommendation: The EPA should clarify the efficacy rating intended for the mulching with natural materials mitigation.

3.2.15 In-Field Mitigation - Residue Tillage Management

A ‘medium’ mitigation efficacy was assigned to the residue tillage mitigation in the Draft Technical Document (EPA, 2023b). The strength of evidence score was rated as ‘high’, with average reductions of pesticides in the range of 50% - 75%. According to the criteria used by EPA in rating mitigation efficacy (Table 7-2 (EPA, 2023b), a ‘high’ efficacy should have been assigned to this mitigation practices.

Recommendation: The EPA should update the efficacy rating of the residue tillage mitigation practice to be consistent with the rubric described in Table 7-2 (EPA, 2023b).

3.2.16 Feasibility of Runoff/Erosion Mitigations for Many Growers

While many of the proposed mitigations are feasible for large area row crop agriculture, many of these mitigations are infeasible or impractical for many growers. Please refer to VSPP Comment 22 in Appendix A for additional discussion and support for this concern.

3.2.17 Proposed Exemptions from Needing to Follow the Mitigation Menu – Field Distance from Habitat

One of the exemptions described in Table 7-5 in the Draft Technical Support document (EPA, 2023b) was for fields more than 1000 ft away from terrestrial or aquatic habitat for listed species. This 1000 ft distance, associated with an assumed maximum overland flow distance, contradicts previous EPA analysis and Fish and Wildlife Service (FWS) Biological Opinions that determined a maximum sheet flow distance of 100 ft. Additional discussion and justification for maintaining the previously accepted 100 ft distance is provided in the VSPP Comment 12 in Appendix A.

Recommendation: The EPA should consider previous analyses and decisions arriving at a 100 ft distance from edge-of-field for potential runoff concerns to listed species.

3.2.18 Proposed Exemptions from Needing to Follow the Mitigation Menu –Subsurface Drainage/Tile Drains

Fields that have subsurface or tile drains are exempt from the runoff/erosion mitigation requirements. Instead, these fields are required to be controlled by detention ponds or saturation buffers. We have significant concerns regarding the feasibility of the required mitigations for these fields.

Recommendation: Please refer to the VSPP Comment 20 in Appendix A for additional discussion and support for our significant concerns regarding the feasibility of the required mitigations for fields with subsurface or tile drains.

3.2.19 Proposed Exemptions from Needing to Follow the Mitigation Menu – Expert Conservation Specialist Recommendations

One of the proposed exemptions to the mitigations menu includes "following recommendations from an expert conservation specialist to reduce offsite transport from the field" (EPA, 2023c) This is an important option for growers as these plans use local knowledge, grower input, and are responsive to field-level conditions. However, there is no evaluation of the capacity of NRCS, Conservation Districts, Technical Service Providers, or other "expert conservation specialists" to respond to a potentially large influx of requests for such plans in a manner timely enough to inform application decisions.

Furthermore, in its proposed mitigations menu Table 6-9, the EPA states that "Voluntary programs implemented by the National Resource Conservation Service, and state programs help farmers with implementation of some of these mitigation measures. These programs are voluntary and not linked to label requirements." (EPA, 2023c). Because of the voluntary and confidential nature of the NRCS conservation planning program, and other similar programs, it is unclear whether this exemption would be available for products that require national-scale label mitigations or how they would be evaluated for site-specific (PULA) mitigations.

3.3 Geospatial Extent of Mitigation Requirements

The geographic extent of mitigations includes both national-scale label mitigations and mitigations that are specific to four Pesticide Use Limitation Areas (PULAs). These geographic regions are described and shown in Figure 7-1 and Figure 7-2 in the Draft Herbicide Strategy Framework document (EPA, 2023c). As has been discussed in the previous comments in Section 3.1 and Section 3.2, national-scale mitigations and PULA-scale mitigations based on the geographical designation provided in Figures 7-1 and 7-2 do not sufficiently account for variability in exposure and mitigation effectiveness. As the examples in our previous comments have demonstrated, runoff/erosion transport and exposure vary by over two orders of magnitude across the geographic regions being proposed for a single level of mitigation requirements (see soybeans example in Table 4). This is not an acceptable situation for many growers, and it does not result in the most effective allocation of resources to reduce pesticide exposure to protect endangered species.

We recommend that both the level of mitigation requirement and mitigation effectiveness be determined at a more locally-relevant scale. Methods and tools using the USDA supported APEX model (Tuppad et al., 2010; Steglich et al., 2019; NRCS, 2022; Teed et al., 2023) have been developed to quantify field-specific runoff and erosion transport and in-field/adjacent-field mitigation effectiveness (Stryker et al., 2023), allowing the determination of both appropriate mitigation requirements and mitigations that are effective at reducing exposure to endangered species. Adopting such an approach would avoid much of the apprehension associated with broadly generalized mitigation requirements and concerns within the grower communities of excessive land management requirements when it is unnecessary and/or ineffective.

Recommendation: The level of mitigation requirement and mitigation effectiveness be determined at a more locally-relevant scale as described in the VSPP Comment 7 in Appendix A. The narrative provides further support for the issues concerning the geographic resolution and relevance of mitigation requirements identified in this comment and offers similar recommendations for improving the approach.

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4.1.1 Adjacent to the Field - 30-Foot Vegetative Filter Strip

A 'medium' mitigation efficacy was assigned to the 30-foot VFS mitigation in the Draft Technical Document based on VFSMOD simulation (EPA, 2023b). The discussions in Section 7.3.6.2 and in Appendix D indicate that the efficacy of a VFS varies depending upon the type of field and buffer conditions (slope and soil texture) and the pesticide characteristics, and VFSMOD has the capability to predict the VFS efficacy under field-specific conditions. The application of the mechanistic model VFSMOD (Muñoz-Carpena et al., 2021) has been supported by CLA and recent collaborations with the EPA, PMRA, and academia has resulted in a consistent approach to parameterizing VFSMOD for use in regulatory pesticide exposure assessments (Ritter et al., 2023). We encourage that EPA continue to explore the use of VFSMOD for estimation of VFS efficacy using the best available scientific approach.

In addition, it's unclear how EPA developed Table D4 in the Draft Technical Document (EPA, 2023b). It was mentioned that the 50th percentiles of total pesticide mass reduction across all the PWC scenarios were selected to represent each soil texture. However, it's unclear which Koc/VFS width combinations were used in this step. In the following step, it seems that EPA identified the lowest pesticide reduction across Koc and VFS class groups. Does that mean for "Low VFS Class" and "Low Koc", the result is based on a 20-foot VFS and the lowest reduction across Koc values of 1, 10, and 100 L/kg-oc? More intuitive interpretation of modeling results could be achieved by first setting the Koc and VFS width, and then running VFSMOD across PWC scenarios with different soil textures. More clarity concerning the modeling process and rationale are needed to better understand EPA's VFSMOD evaluation methodology.

Recommendation: The EPA should continue to explore the use of VFSMOD for estimation of VFS efficacy using the best available scientific approach and the EPA should provide additional clarification regarding their VFSMOD modeling methodology. Additional detailed supporting comments and recommendations concerning the use of VFSMOD in quantifying VFS effectiveness are provided in the VSPP Comments 15 through 18 in Appendix A.

Appendix A

Related Comments Submitted to VSPP Docket on Draft Technical Support for Runoff, Erosion, and Spray Drift Mitigation Practices to Protect Non-Target Plants and Wildlife

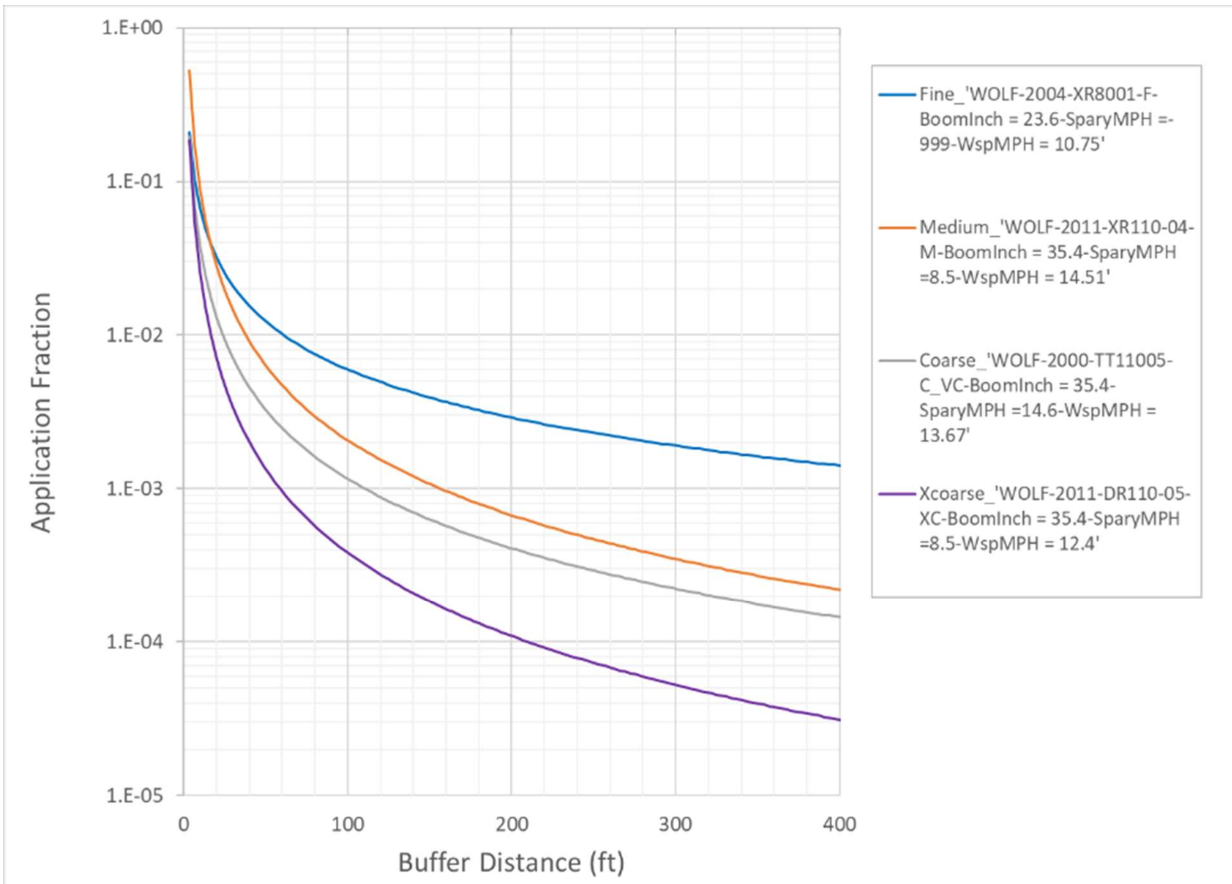
VSPP Comment: 1

Comment Provider: Bayer

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 1 (Page 4): EPA used AgDRIFT to determine a maximum buffer distance for aerial, ground boom, and airblast application beyond which the reduction in exposure is small over a large distance.

BCS Comment: AgDRIFT provides spray drift estimates for only two drop size categories: ASAE Very Fine to Fine and ASAE Fine to Medium/Coarse. Lumping of Medium and Coarse droplet size into one category can create over or under prediction of drift. Also, this prevents the use of this model for Very Coarse, Xtra Coarse, and Ultra Coarse droplet sizes which are required on certain pesticide labels. To illustrate the significant difference of spray drift from droplet size ranging from Fine to Extra Coarse, the graph below showed representative curves from a well known dataset generated by Agricultural Canada. It clearly shows each droplet size category should be considered. Lumping them together introduces uncertainty and can overestimate drift for coarser droplet significantly.



Therefore, we urge the EPA to use data from other field trials, including those that have been submitted as part of previous assessments as another line of evidence. If necessary, Bayer can gather drift data from previously submitted studies by Bayer into a user-friendly database to support this assessment. This is particularly important for those nozzle classes that are not explicitly considered in AgDRIFT. Buffer distances should be set by nozzle class, and not the current approach of lumping into categories.

VSPP Comment: 2
Comment Provider: Bayer
VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 6.2.2: Identifying the Maximum Spray Drift Buffer Distance for Each Curve (Page 21): The simple approach involves setting maximum spray drift buffer distances where the predicted fraction of deposition declines by <1% over the prior 100 ft.

BCS Comment: It is unclear how the 1% decline threshold or 100 ft distance was arrived at and what the scientific basis is to support this threshold. We noted that this threshold is dataset dependent. Looking at drift curves of Spray Drift Task Force ground data, many coarse or coarser nozzles have less than 1% drift at the edge of the field. In the spirit of science-based assessment, we propose using a mathematical approach as follows. It should be noted that by no means Bayer supports the 1% decline threshold or 100 ft resolution. They are just used as an example to illustrate the proposed approach.

The drift curve can be defined as:

y = f(x), where y = drift deposition, x = distance

Typically drift curves can be represented by a function: $f(x) = ax^{-b}$

For the ground, medium/coarse, high boom curve in AgDRIFT, we can fit this as :

$y = 0.44x^{-0.99}$ (R^2 = 0.99 for distance between 1.64 ft to 301.83 ft)

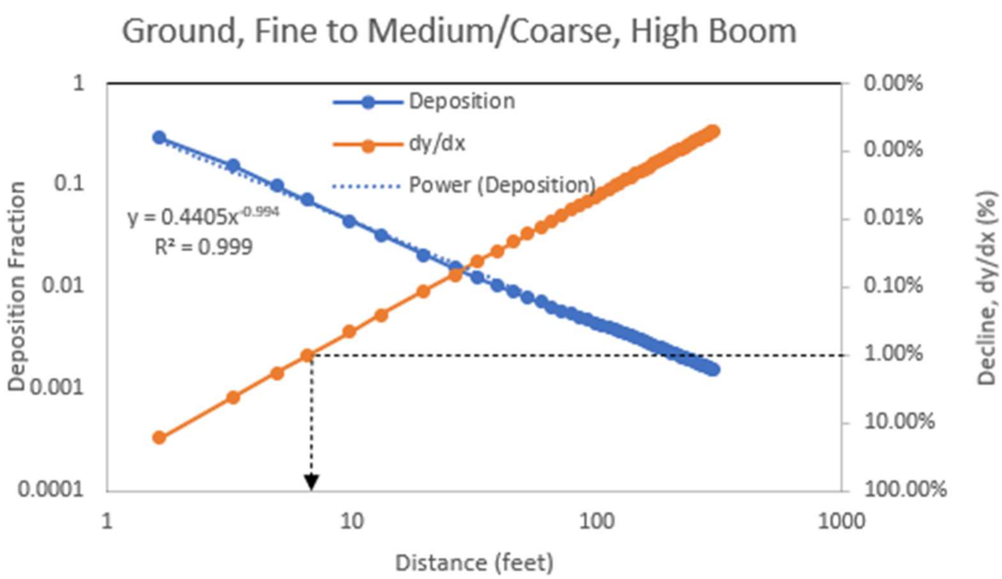
To calculate the decline per unit distance, take first ordered derivate of this function:

$dy/dx = (a*b)\ x^{(b-1)}$

For the ground, medium/coarse, high boom curve,

$dy/dx = -0.43x^{-1.99}$

Below is a chart which shows the ground, medium/coarse, high boom drift curve and decline (i.e. dy/dx). The decline is normalized by distances provided by the model itself, instead of a subjective 100 ft. We can also use it for determining distances at different thresholds. For the case of the ground applications, medium/coarse, high boom curve, if we use a threshold of 1% per unit distance, that distance would be about 7 ft. See figure below.



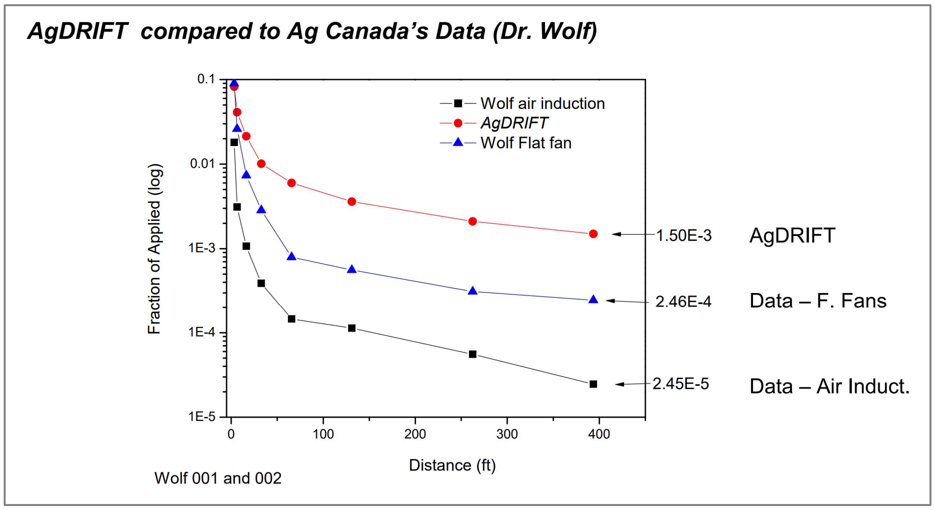
VSPP Comment: 3

Comment Provider: Bayer

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 6.3 Options to Reduce Buffer Distances and Efficacy (page 24): Data (Table 6-2)

BCS Comment: It's important for growers that EPA provide options to reduce the buffer distance based on site-specific conditions and application practices. Nozzle technology continues to improve with focus on improving coverage and reducing off-target movement. Table 6-2 provides an option for reduced buffers when changing from fine to coarse DSD. This is a good first step and Bayer requests EPA to consider additional reductions when using ultra-coarse or newer drift reducing technology nozzles (DRT), as an option to further reduce buffer distance for ground applications. The ground application component of AgDRIFT (v2.1.1) is a model developed based on the Spray Drift Task Force (SDTF) data generated in 1992 and 1993. The SDTF data was generated using old nozzle technology (e.g. flat fan). DRT nozzles (e.g., air induction), commonly used today, are not represented by AgDRIFT. Many data available confirm the drift reduction benefit of DRT nozzles. As an example, the figure below shows a comparison of spray drift between AgDRIFT prediction, field data using flat fan nozzles and air induction nozzles by Agricultural Canada. The benefit of DRT nozzles is considered by regulators worldwide (e.g. LERAP in UK).



VSPP Comment: 4

Comment Provider: Bayer

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 6.3.1 (Accounting for Hedgerow/Windbreak (page 25): Due to limited amount of data and likelihood that newly established hedgerows will be less than 7 m (22 ft) tall, EPA assumes a 50% reduction in spray when growers utilize a hedgerow or wind break taller than the spray nozzle release height.

BCS Comment: Bayer welcomes EPA initiative in recognizing the drift-reducing effects of border vegetation. This is supported by robust peer-reviewed literature from field trials that confirm the benefits of vegetation on drift mitigation. However, it appears that section is leaning mostly on aerial applications where the release height of droplets is much higher. For example, the section describes release heights that are relative to a vegetation height of 22 ft. For ground applications, where boom heights are much lower, it is more likely that existing bordering vegetation, if present, will be above the release height. As noted by EPA, the reduction will be much higher than 50% when release height of sprays is lower than vegetation. A study from the University of Nebraska (Viera et al., 2018; doi: 10.1002/ps.5041) also confirmed this when they measured the drift reduction in ground applications when the vegetative barrier was 0.91, 1.22, and 1.98 m and with two types of nozzles. They reported 7-fold (fine nozzles) and 10-fold (ultra-coarse nozzles) reduction in drift from ground applications. Similarly, van de Zande et al. (2000) reported 80 to 90% reduction in drift in ground applications with medium nozzles when grass strip barriers were present. Studies conducted in New Zealand and The Netherlands also supports 80-90% drift reduction (Ucar and Hall, 2001). Bayer requests EPA to consider the possibility of higher drift reduction from hedgerows particularly when applied through ground boom.

VSPP Comment: 5
Comment Provider: Bayer
VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 6.3.2 Accounting for Hooded Sprayers (Page 25): For ground applications, Foster et al. (2018) shows a 50% reduction is spray drift for applications of fine to medium droplet sizes up to 30 m offsite when hooded sprayers are used.
Section 6.3.2 Accounting for Hooded Sprayers (Page 25): This 50% reduction is consistent with prior EPA assessment conclusions.....

BCS Comment: There is an error in the interpretation of data in Table 3 of Foster et al. (2018). Since all data points are normalized to the drift for *Open Sprayer* with *Fine Droplets* at 2 m, the % reduction is calculated as the ratio of difference in hooded and open to the open sprayer drift. The table below summarizes the % reduction in spray drift at various distance downwind and is developed from Table 3 in Foster et al. (2018). In summary, for the fine nozzles, the drift reductions ranged from 67% to 86% and for the medium nozzle, from 38% to 82%. The generic 50% spray reduction proposed by EPA is an underestimate at all distances for fine nozzle and 3 out of the 5 distances for Medium.

Spray quality	% Reduction in Drift at Distance Downwind (m)				
	2	4	6	14	31
Fine	86*	84	81	73	67
Medium	82	78	72	45	38

*As an example, the 86% reduction is derived as follows from Table 3 data in Foster et al. (2018): (100 – 14)/100 = 86%.

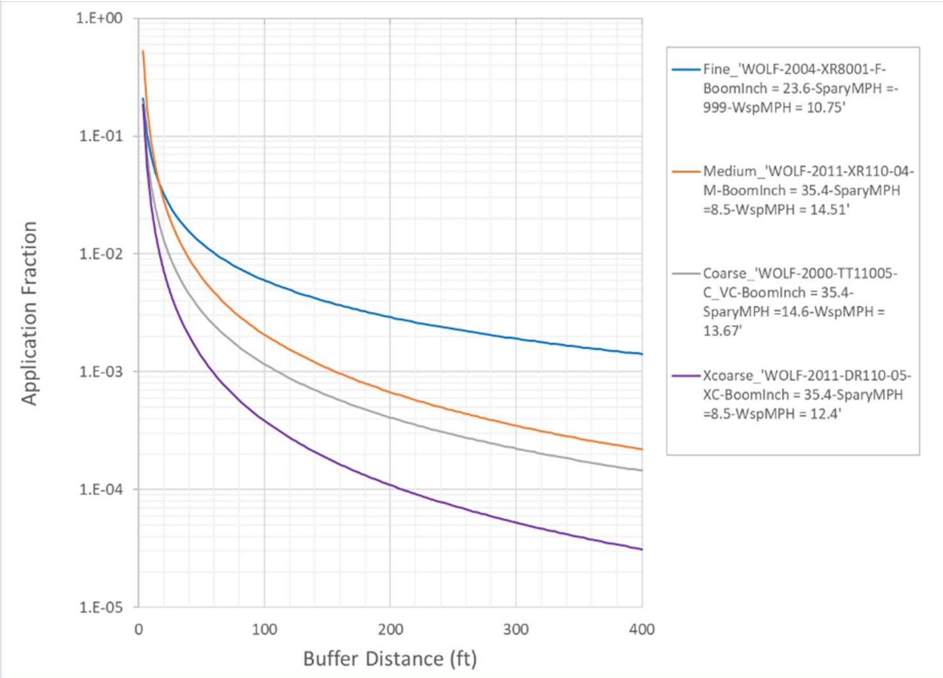
EPA provided an additional citation (USEPA, 2020b) supporting their analysis that a 50% reduction is consistent with prior EPA assessment conclusions which allowed for an effects distance reduction from 240 feet to 110 feet (73 to 34 m) when hooded sprayers are utilized. Bayer wanted to provide some additional context to that analysis in that their review of the field data, the “distances to a soybean NOAEL would not extend beyond 20 ft with 95% certainty“. However, EPA cited a limited number of studies as one of the reasons for uncertainty, and then even though they had 95% certainty of not needing a greater distance they applied a 5x safety factor, and increased the buffer distance from 20 ft to 110 ft.

Subsequently, Bayer in collaboration with several academic researchers conducted and submitted to EPA several additional hooded sprayer field trials, which confirmed that 15 to 20 ft was sufficient with the ultra-coarse nozzles (MRID51907701). Considering the body of data and assuming EPA's review similarly found that 20 ft is appropriate, use of hooded sprayer should be credited with ~90% reduction (i.e. 240 ft to 20 ft) for ultra-coarse droplet size. Bayer has also submitted data for coarse and extremely coarse nozzles (MRID51907701). Across all the spray nozzles and applications conducted/supported by Bayer (total 58 hooded sprayer applications), the 90th percentile buffer distance is 38 ft or 84% reduction (i.e. 240 ft to 38 ft) which is consistent with the reduction in Foster et al. (2018) as described in the previous comment. Therefore, Bayer proposes the use of hooded sprayers as a mitigation option be given at least 75% reduction credit.

VSPP Comment: 6
Comment Provider: Bayer
VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 6.3.6 on Accounting for Coarser Droplets in Ground Application: EPA does not propose that the coarse buffer droplet buffer reduction be used in conjunction with the high humidity buffer reduction if the initial buffer is <125 ft because the final buffer (after all mitigation is accounted) should not be <75 ft.

BCS Comment: We agree that increasing the spray quality from Fine to Medium/Coarse/Extremely Coarse/Ultra-coarse will reduce drift. In the mitigation options table (Table 6-7), it is suggested that the buffer can be reduced by 25 ft, if nozzles are changed to achieve a Coarse spray quality. However, as noted in the sentence in Section 6.3.5 (noted above), this credit can only be taken if the final buffer is not less than 75 ft. We are concerned that the program as defined does not incentivize applicators to utilize the best technology available (e.g., newer nozzles with less fines) since they do not get credit for doing so. Bayer requests some clarification on: (a) Is there a scientific rationale for choosing a lower-bound of 75 ft for the final buffer?, (b) Why did EPA default to an unsupported 25-ft reduction, when field drift data suggest a higher reduction is realistic. For example, data from Wolf (picture below) suggests that at 100-ft from the field edge, growers who switch from Fine nozzles to Medium, Coarse, and Extra-Coarse nozzles will see 66%, 84%, and 94% reduction, respectively, in spray drift deposition. The 25-ft (i.e. 25% reduction) greatly underestimates the drift reducing potential of these nozzles. (c) Can EPA include in Table 6-7, the buffer reduction possible for all ASABE S572 spray qualities?



VSPP Comment: 7

Comment Provider: Bayer

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 7.1 and 7.2 on Runoff/Erosion Mitigation Practices (Page 36-37): General background and approaches of efficacy of runoff and erosion mitigation practices

BCS Comment: Overall, we agree with the Agency's statement that efficacy of mitigation practices can be highly variable depending on the properties of pesticides, land management and site-specific conditions including soil, slope, and climate. Due to this complexity and lack of robust mitigation practice evaluation tool, EPA's has defaulted to qualitatively categorizing the efficacy of mitigation measures as high, medium, and low. Overall, those qualitative evaluations of mitigation practices provide a general idea on the exposure reduction potential of mitigation practices based on evidence from literature or modeling. However, to mandate mitigation practices as part of ESA process, quantitative evaluations of mitigations practices effectiveness that are also compound-and site-specific relative to listed species in consideration are still needed to ascertain their efficacy relative to meeting required species protection goals.

EPA has used a regulatory PWC model and VFSMOD (specifically for vegetative field strips) to evaluate the effectiveness of pesticide mitigation efforts for which the model(s) are capable of simulating mitigation practices. The Agency recognizes that PWC is not capable of simulating many mitigations in its current modeling framework. Considering the model's limitations, the Agency is encouraged to review other available models that can be potentially useful for evaluating the effectiveness of pesticide mitigation practices. Various models are becoming more available, particularly the USDA CEAP (Conservation Effect Assessment Project) have been developing tools involving modelling (e.g., SWAT, APEX) that aid at quantifying effectiveness of mitigation practices in reducing mainly sediment and nutrient runoff losses. These tools and methodologies could be further developed to address the data gaps regarding quantitative effectiveness of mitigation practices to reduce potential pesticide runoff losses.

Moreover, efforts are ongoing to develop tools aimed specifically to pesticides at quantitatively estimating the effectiveness of mitigation practices for site-and pesticide -specific applications. For example:

1. Recently a new web-based tool named CalBMP was developed for evaluating pesticide offsite movement and best management practices in California agriculture (Xue et al., 2023, https://www.sciencedirect.com/science/article/pii/S0378377423000045#da0005; access the CalBMP tool at http://42.192.44.35/userInputStep1). This tool provides quantitative assessments of various mitigation practices in reducing offsite movement of pesticide applications that are tailored to agricultural production system in California.

2. Bayer Crop Science and Syngenta in collaboration with Stone Environmental Inc. have also been developing a web-based mitigation practices effectiveness tool aimed at quantitatively estimating the efficacy of mitigation practices on runoff and associated pesticide losses, both for 1) EPA's "standard" ecological PWC scenarios, selected based on HUC2(s) of interest, and 2) user-specified field(s) local soils, topography, and weather. This tool is aimed at quantitatively evaluating the efficacy of various mitigation practices in reducing the pesticide runoff loses in agricultural fields located within the contiguous USA. The preliminary modeling approach was presented at the EPA's May 2022 Environmental Modeling Public Meeting (EMPM) and at the American Chemical Society (ACS) 2022 fall annual meeting. Bayer is open to receiving feedback from the Agency.

These two example efforts are timely and have great potential for ESA applications in providing data associated with reduction in exposure that would be expected to occur from specific practices. These tools are intended to be publicly available, thus, we also encourage EPA to review and evaluate their potential to aid in the quantitative evaluation of mitigation practices.

VSPP Comment: 8

Comment Provider: Bayer

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 7.1 and 7.2 on Runoff/Erosion Mitigation Practices (Page 37-39): Comprehensiveness of the mitigation effectiveness literature data

BCS Comment: The Agency made great efforts with regard to reviewing available literature on mitigation practices effectiveness, including mitigation practices effectiveness summarized in the MAgPIE (Mitigating the Risks of Plant Protection Products in the Environment) tool (Alix et al., 2017) and other publications (Reichenberger et al., 2007 and Yuan et al., 2022, among others). Bayer acknowledges and appreciates these literature reviews for mitigation practices effectiveness; however, we also recommend the Agency to create a mechanism that allows for capturing additional literature reviews data updates to ensure comprehensiveness of the data. We recommend the Agency consider the additional sources of data below to further improve the comprehensiveness of the reviewed available data on mitigation practices effectiveness.

- The USDA NRCS database in the "Conservation Practice Physical Effects (CPPE) document (https://www.nrcs.usda.gov/getting-assistance/conservationpractices#effects) provides a list of USDA NRCS measures and associated ratings that qualitatively indicate the potential for these measures to prevent or reduce pesticides transported to surface water.
- The USDA Conservation Practice Effectiveness (CoPE) Database: a conservation practice effectiveness database compiled by USDA aggregates information on the effectiveness of a number of conservation practices implemented to reduce pollutants to surface runoff and tile drainage water from agricultural landscapes.

VSPP Comment: 9

Comment Provider: Bayer

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 7.2 Efficacy of Runoff and Erosion Mitigations Summary (Table 7-3):

Regarding the 48-hour rainfall restriction, EPA proposed the following label language:

> "Do not apply when soil in the area to be treated is saturated (if there is standing water on the field or if water can be squeezed from soil) or if NOAA/National Weather Service predicts 50% chance

> or greater of 1 or more inches of rainfall to occur within 48 hours following application. Detailed National Weather Service forecasts for local weather conditions may be obtained on-line at: http://www.nws.noaa.gov, on NOAA weather radio, or by contacting your local National Weather Service Forecasting Office."

BCS Comment: Bayer believes that while statements regarding 48-hour rainfall has been standard on some labels, the inclusion of a 50% prediction does not offer flexibility or sufficient confidence at a field-level weather given that weather prediction can have a wide spatial variability. In addition, it may not be reasonable to assume that slightly greater than 1 inch of rain, light or low intensity rainfall, may not exceed the infiltration capacity of the soil within a 48-hour period enough to lead to significant runoff. Applicators may not necessarily rely on the NOAA for weather information so other weather applications with Doppler radar technology or even onboard equipment technology (Climate FieldView[3]) can be relied on for local and real-time weather predictions. Bayer suggests that the statement regarding "50% chance or greater of 1 or more inches of rainfall to occur within 48 hours following application" be replaced with label language that indicates a high potential (chance of 80% or greater) of heavy precipitation (2 inches or more) that would result in major surface runoff. Applicators are knowledgeable and better understand the local field conditions that would result in significant runoff. In addition, some herbicide products are formulated with adjuvants (rainfast) and can withstand wash-off shortly after application.

VSPP Comment: 10
Comment Provider: Bayer
VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 7.2 Efficacy of Runoff and Erosion Mitigations Summary (Table 7-4, page 43): Potential runoff/erosion mitigation practices

BCS Comment: Practices of cover crop, double cropping, relay cropping received a low efficacy score and could discourage the use of these types of mitigation practices with the additional benefits to soil health and regenerative agriculture. In the Updated Workplan (Nov 2022) EPA stated that:

> "Cover crop must be planted and remain on the field up to the field preparation for planting the crop. Common cover crops include cereal rye, oats, clover, crown vetch, and winter wheat or

[3] https://climate.com/getting-started/fieldview-101/

combinations of those crops. Cover crops are most often used when low residue-producing crops are grown on erodible land. Cover crops increase soil stability, reduce runoff, and reduce erodibility of field soils."

In the Table 7-4 and page 57, EPA's justification for the low efficacy score was based on a generic pesticide that degrades before the cover crop is installed without any mention of benefits to pesticides that may not degrade as rapidly and would profit from a cover crop installation. The open literature cited by EPA, on page 57, alludes to the fact that cover crop implementation should be further explored and recommendations provided, given the range of percent reduction. In addition, the justification for low efficacy was based on 'professional judgment' and not clearly supported by EPA's open literature review or the justification provided in the 2,4-D document. Bayer believes that, at a minimum, cover crop should be given a medium efficacy score as stated by the EPA in the 2,4-D mitigation document[4] and given its benefits to soil stability, reduce runoff, and reduce soil erodibility.

VSPP Comment: 11
Comment Provider: Bayer
VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 7.3 Summaries of Each Mitigation Practice and Justification for Efficacy and/or Inclusion as a Mitigation Option (Table 7-4 and page 51): Field characteristics: "Application area has predominantly sand, loamy sand, or sandy loam soil without a restrictive layer that impedes the movement of water through soil", …. .. "fewer runoff mitigation are necessary in these areas."

BCS Comment: We agree with EPA that minimal runoff mitigation will be necessary for agricultural fields with moderately low surface runoff potential (hydrologic Group A and B soils). However, in the document it is not clear how these agricultural fields (within the minimization PULA) would be credited since the modeled ECCs and ascribed mitigation requirements are currently done based on risk assessment that are based on worst case scenario representing worst case soil characteristics (e.g., Hydrologic soil C or D).

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[4] USEPA. 2022. 2,4-D Choline Salt and Glyphosate Dimethylammonium Salt: Evaluation of Mitigations on Enlist One and Enlist Duo Labels to Address Listed Species Risks Identified in the 2022 Ecological Risk and Endangered Species Assessment for Use on Genetically-Modified Herbicide-Tolerant Corn, Soybean, and Cotton in Support of Registration Renewal Decision for Enlist One and Enlist Duo Products. DP barcode 464071. January 10, 2022. United States Environmental Protection Agency. Office of Pesticide Programs. Environmental Fate and Effects Division.

In addition, characteristics of agricultural fields, such as their slope, hydrologic group type, and soil erodibility are important factors in influencing surface runoff and erosion processes. These key landscape characteristics within species habitat need to be considered in the front end using higher-tier exposure modeling before determining if mitigation practices are to be promoted as well as in determining their associated potential to alleviating the risk from potential pesticide exposure.

VSPP Comment: 12
Comment Provider: Bayer
VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 7.3.2.1 Application Area is More than 1000-feet From Protected Habitat for Listed Species (Table 7-5 and page 45): EPA states in Table 7-5 " Maximum overland flow distances are commonly assumed to be approximately 1000 to 1200 feet in engineering handbooks (TXDOT, 2019; USDA, 2010; VADEQ, 1992).

BCS Comment: First, in Table 7-5, the statement “Maximum overland flow distances are commonly assumed to be approximately 1000 to 1200 feet in engineering handbooks (TXDOT, 2019; USDA, 2010; VADEQ, 1992).” should be clarified to indicate that the overland flow distance includes both sheet flow and shallow concentrated flow distances. Sheet flow is limited to 100 ft, and sheet flow typically becomes shallow concentrated flow after around 100 ft. Second, EPA’s consideration of 1000 ft, the maximum distance for runoff exposure route due to shallow concentrated flow, ignores the dilution and dissipation processes that occur within this distance. Based on the Enlist Biological Opinion (see below), FWS recommended the maximum distance for likely runoff exposure to be 100 ft, because (1) sheet flow is limited within 100 ft, and (2) although shallow concentrated flow can reach 1000 ft, the likelihood of significant exposure is minimized due to complicated factors and processes involved, including degradation, dissipation and dilution, and others.

> *“ The EPA expects typical environmental conditions would limit the extent of runoff to areas close to treatment sites as runoff would be intercepted by physical features like vegetation or other physical obstacles, redirected by local topography, and lost through penetration into the soil column and sorption onto sediment. While runoff may reach further than 30 meters through channelized flow, the EPA expects this runoff will similarly dissipate, degrade, or dilute with distance from treatment sites such that concentrations of Enlist pesticides will be below levels expected to cause adverse effects to the environment. Thus, we agree with EPA’s assessment that 30 meters is a sufficient estimate of the extent of off-field exposure“.*

BCS recommends that EPA consider their previous work and update the analysis to reflect 100 ft (30 m) distance as sufficiently protective of runoff.

VSPP Comment: 13

Comment Provider: Bayer

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Section 7.3.3 Field Characteristics (Page 51-52): Agency identified three categories of field characteristics, <2% slope, soils with Hydrologic group A & B, and western agricultural, that have less potential for pesticide loss in runoff.

BCS Comment: We agree with EPA that those field characteristics (<2% slope, soils with Hydrologic group A & B, and western agricultural) should be given credit for having low potential for pesticide runoff losses. However, it is ambiguous as to how these fields characteristics are credited, especially when EPA's modelled EECs are not spatially explicit exposure estimates for a particular field, instead are high-end estimates for a Hydrologic Unit Code 2 level (HUC2, or subregion). If spatially explicit exposure estimates were to be done, modeled EECs from some fields with hydrologic soils A and B and/or slope <2% may not result in exceedances in the first place. In these circumstances, there needs a mechanism for such fields to be exempted from additional mitigation practices requirement.

VSPP Comment: 14

Comment Provider: Bayer

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Appendix B: Vulnerability Maps for Pesticide Transport Offsite by Runoff and Erosion (Page 83-86):

BCS Comment: The vulnerability maps presented resemble more like annual precipitation map of the contiguous United States. At the scale where the analysis is made, they are not informative to indicate areas within potential pesticides uses areas that may be more vulnerable than others. In other words, the 16 by 16 miles (256 sq mile (163,840 acres) data resolution used in the analysis is too crude to discern areas of pesticide potential use areas that may be potentially more vulnerable for surface runoff, as at that scale the maps fails to capture the local inherent variabilities including soils, slope, and drainage networks that are key in identifying runoff vulnerable areas.

In addition, EPA used inverse distance weighted (IDW) interpolation technique to derive a continuous vulnerability map. However, interpolating gridded EECs to areas where pesticide uses may unlikely creates a misleading data visualization, resulting in uninformative vulnerability maps for pesticide loss, as demonstrated by the high vulnerability assigned to the high rainfall mountainous areas (e.g. Sierra Nevada and Appalachian Rocky Mountains) where use of pesticides is less likely.

Bayer urges EPA to generate vulnerability maps for pesticide losses that are conducted at local or watershed scales (e.g. species habitat scale) rather a national scale in order to capture local variabilities (of soil, slope, and land management) and identify specific areas where pesticides losses are expected higher and those needing mitigation practices.

VSPP Comment: 15
Comment Provider: Bayer
VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Appendix D (Page 92-95): Use of the Vegetative Filter Strip Model to Estimate Vegetative Filter Strip Efficacy Using Event Based Assumptions

BCS Comment: Bayer acknowledges EPA's efforts to include VFSMOD to quantify the efficacy of vegetative filter strip (VFS) as a mitigation measure to protect non-target species and their habitats. However, there are several areas where major improvements and clarification to the current approach are needed:

- The pesticide removal efficacy of VFS depends on site-specific characteristics such as soil texture, slope, and rainfall. Selecting the 95th percentile runoff events by HUC2 regions is overly conservative and can lead to unnecessarily large VFS. As species range and habitats are also geographic specific, site-specific VFS modeling can provide more accurate and realistic estimation of pesticide reductions within the areas where mitigations are needed for species protection.

An event-based approach was used in which single runoff events were modeled using VFSMOD. However, this approach does not align with the existing exposure modeling framework where long-term simulation is used to derive EECs. Over the last couple years, there have been considerable advances in science-based approaches to incorporating VFSMOD into risk assessment and risk management of pesticides[5]. Bayer encourages EPA to consider the best available scientific information and tools when developing mitigation strategies for protection of both listed as well as non-listed species.

VSPP Comment: 16
Comment Provider: Bayer
VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Appendix D (Page 92): "the silty clay and clay had a 0% reduction in the EEC."

BCS Comment: VFS pesticide reduction efficiency is unlikely to be zero except for extreme conditions (e.g., very low soil conductivity, heavy rainfall). The full model input dataset used by EPA should be added to the report for reproducibility of the work. It is important that VFSMOD is correctly parameterized based on the best available scientific approach (Ritter et al., 2023).

VSPP Comment: 17
Comment Provider: Bayer
VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Appendix D (Page 92): "Therefore, VFS were assumed to not be applicable for sand, silty clay, and clay soils." and P95 "Therefore, VFSMOD predicted runoff reductions for clay and silty clay soils are not recommended for use in mitigation."

[5] Chen H, Seth Carley D, Muñoz-Carpena R, Ferruzzi G, Yuan Y, Henry E, Blankinship A, Veith TL, Breckels R, Fox G, Luo Y, Osmond D, Preisendanz HE, Tang Z, Armbrust K, Costello K, McConnell LL, Rice P, Westgate J, Whiteside M. 2023. Incorporating the benefits of vegetative filter strips into risk assessment and risk management of pesticides. Integr Environ Assess Manag. (accepted; in press)

BCS Comment: These general statements should be removed as previous research shows that VFS can reduce pesticide runoff in silty clay or soils[6,7]

VSPP Comment: 18

Comment Provider: Bayer

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0143

Appendix D (Page 93): "VFSMOD assumes a densely planted turf vegetation occurring immediately in between a treated agricultural field and a receiving waterbody."

BCS Comment: VFSMOD does not make assumptions about the configuration of the field and the waterbody. Instead, when applying VFSMOD to regulatory pesticide risk assessment, assumptions need to be made about the field and VFS configuration. In a recent publication developed based on multi-stakeholder technical discussion (Ritter et al., 2023), a square field configuration was used (Figure 1) and uniform sheet flow was assumed across the entire width of VFS, consistent with the conceptual model in Plant Assessment Tool (PAT) developed by USEPA to evaluate potential risk to non-target plants [8]. The pond geometry, however, does not impact VFSMOD simulation. More details can be found in Ritter et al. (2023).[9]

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[6] Chen H, Grieneisen ML, Zhang M. 2016. Predicting pesticide removal efficacy of vegetated filter strips: A meta-regression analysis. Sci. Total Environ., 548-549:122-130. https://doi.org/10.1016/j.scitotenv.2016.01.041

[7] Luo Y. 2020. Modeling pesticide removal efficiency by vegetative filter strip under PWC scenarios. California Department of Pesticide Regulation, Sacramento, CA. [accessed 2023 Apr 20]. https://www.cdpr.ca.gov/docs/emon/surfwtr/vfs_modeling.pdf

[8] USEPA. 2022. Plant Assessment Tool (PAT) Version 2.7 user's guide and technical manual for estimating pesticide exposure to non-target terrestrial, wetland, and aquatic plants. U.S. Environmental Protection Agency, Office of Pesticide Programs, Environmental Fate and Effects Division. Washington DC. [accessed 2023 Jul 26]. https://www.epa.gov/endangered-species/provisional-models-and-tools-used-epas-pesticide-endangered-species-biological

[9] Ritter A, Muñoz-Carpena R, Chen H, Tang J, Westgate J, Henry E, Wente S, Guevara M, Winchell M, Luo Y, Truman C, Whiteside M, Seth Carley D. 2023. VFSMOD input definitions, literature references and sensitivity analyses for evaluating vegetative filter strips in pesticide risk assessment. NC State Center of Excellence for Regulatory Science in Agriculture (CERSA). https://doi.org/10.5281/zenodo.7789811

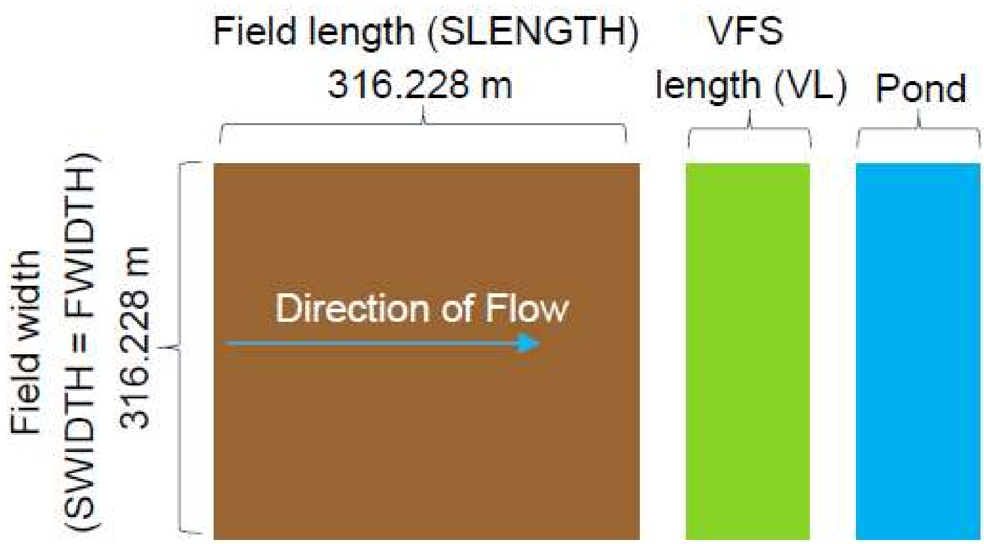

Figure A-1. Configuration of a square field with downslope VFS adjacent to a pond based on USEPA pesticide aquatic ecological risk assessment framework (a 10-ha treated field draining into a 1-ha pond)[9].

VSPP Comment: 19

Comment Provider: Syngenta

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0145

Another example of an unclear option is related to in-field vegetative and typical vegetative filter strips. In orchard crops for instance, a grower may have uncultivated areas between rows however a particular product label could require a 30 ft vegetative filter strip. If the row middles are uncultivated, it could be excessive to require a VFS at the edge of the field. EPA needs to provide more specificity about how proposed mitigations will interact with the already labeled requirements.

VSPP Comment: 20

Comment Provider: BASF

VSPP Docket Document: EPA-HQ-OPP-2023-0327-0115

The draft VSPP indicates that in-field runoff/erosion mitigations are not applicable to tile-drained fields. This means that growers with tile-drained fields located within minimization PULAs will not be able to make pesticide applications unless the effluent is released into controlled drainage structures or saturation buffer zones. While concrete data on the implementation of these measures for tile-drained fields is not available, it is likely that the vast majority of tile-drained fields will not meet the mitigation exemption requirements specified by EPA (i.e., that they release water into a saturated buffer or a controlled retention basin), since most drains probably empty release water into agricultural ditches. Therefore, growers with tile-drained fields will be left with limited or no options for conventional pesticide applications. USDA data show high adoption (37-53 percent of agricultural areas) of tile drainage in Midwestern states that are impacted by the VSPP, and estimated total acreage of tile-drained fields ranges from 56 to 63 million acres. Therefore, it is imperative that additional mitigation options are made available for tile-drained fields as the draft guidance essentially proposes a near ban of conventional pesticide application to tile-drained fields within the minimization PULAs.

VSPP Comment: 21
Comment Provider: Pesticide Policy Coalition
VSPP Docket Document: 8 6 23 Pesticide Policy Coalition Vulnerable Species Pilot Comments

We are also concerned with the practicality of prohibiting the use of finer droplet sizes, as would occur through the pilot, for several reasons. First, while applicators can use spray nozzles that produce coarser droplets, there are circumstances that can result in finer droplets even while using these tools. For example, if a sprayer exceeds certain applicator speeds droplets will naturally become finer, even if equipment is used for producing coarser droplets. Additionally, there are some types of pesticides which are more effective with certain droplet sizes. For example, contact herbicides require a more thorough coating on a weed to maintain product efficacy. The outright prohibition of fine and very fine droplets under the pilot may not be possible at all times and could diminish the efficacy of crop protection products, exposing users to greater pest damage.

VSPP Comment: 22
Comment Provider: Pesticide Policy Coalition
VSPP Docket Document: 8 6 23 Pesticide Policy Coalition Vulnerable Species Pilot Comments

For most row crop growers, several of the proposed erosion mitigation options are practical, such as reduced tillage and potentially cover crops. However, these practices may not be suitable for all grower operations – for example, growers in drier or northern regions would have trouble using cover crops, which could deplete soil moisture needed for primary crops or are challenging because of shorter growing seasons, respectively. The remaining options quickly become exorbitantly expensive to implement, as we discuss further below, or are impractical for other reasons. It would be incredibly difficult for many growers to adopt four of these practices, as the pilot requires. … Other user groups face similar challenges with the appropriateness of proposed mitigations. Some crops, such as onions, peanuts, potatoes, or sugarbeets necessitate soil disturbance as a means of production. … As we have previously advised to the agency during other ESA-related comment periods, some producers may be prohibited from implementation of mitigation practices entirely because of contractual obligations. In 2014, 39 percent of U.S. croplands were rented, for which 80 percent of landlords are absent and outside the local economic region where the rented property is located. Many agricultural producers who farm on these lands may not know their landlord or have a relationship with them. In these instances, it could be burdensome for the farmer to get permission to make structural modifications to rented land (e.g. installing riparian buffers, contour terracing), or it may even be prohibited by their contract.

VSPP Comment: 23
Comment Provider: Minor Crop Farmers Alliance
VSPP Docket Document: Final MCFA VSPP Comments Aug 5 2023

In California, the draft pilot would negatively impact growers including citrus growers. Specifically, 200-to-300-foot buffers for aerial applications are too great to make applications to a significant portion of impacted citrus groves. In some cases where the dimensions of the grove are narrow or a grove is small, it could be impossible to make applications to that acreage. During the winter months when there can be significant rainfall, growers make aerial fungicide applications to comply with quarantine protocols that are mandated by foreign governments as a condition for market access. If the Agency maintains these buffers, impacted growers would be unable to make applications and could lose access to important export markets which are desirable for their high revenue as compared to shipments to the domestic market.