NATURAL RESOURCES DEFENSE COUNCIL
THE EARTH'S BEST DEFENSE

Comments on two draft guidance documents describing how off-site spray drift will be evaluated for ecological and human health risk assessments for pesticides

EPA-HQ-OPP-2013-0676

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The following public interest groups support and contributed to these comments:

- Alaska Community Action on Toxics – Pamela Miller
- CATA - The Farmworker Support Committee/El Comite de Apoyo a los Trabajadores Agricolas – Nelson Carrasquillo
- California Rural Legal Assistance Foundation – Anne Katten
- Center for Effective Government – Ron White
- Citizens' Environmental Coalition, NY – Barbara Warren
- Commonweal Biomonitoring Resource Center – Sharyle Patton
- Concerned Citizens For Clean Air – Maxine Centala
- Deer Creek Valley Natural Resources Conservation Association – Mary Camp
- Ecology Center – Tracey Easthope
- Empire State Consumer Project – Judy Braiman
- Farmworker Association of Florida – Jeannie Economos
- Glynn Environmental Coalition – Daniel Parshley
- Green America – Alisa Gravitz
- Healthy Schools Network – Claire Barnett
- Indigenous Environmental Network – Tom Goldtooth
- Los Jardines Institute (The Gardens Institute) – Richard Moore
- Maryland Pesticide Network – Ruth Berlin
- Northwest Environmental Defense Center – Mark Riskedahl
- Northwest Environmental Advocates – Nina Bell
- Parents for Nontoxic Alternatives -- Yanna Lambrinidou
- Pesticide Action Network North America – Emily Marquez
- SafeMinds – Eric Uram
- Sciencecorps – Kathy Burns
- Toxic Awareness Body of Oregon – Jeff Schminisky

The Natural Resources Defense Council (NRDC) is a national, non-profit environmental organization of lawyers, scientists, and other professionals. NRDC presents these comments on behalf of our 1.3 million members and online activists. NRDC does not have any financial interest in the topic of these comments.

These comments address the following documents:

EPA-HQ-OPP-2013-0676-0001; FR Notice

EPA-HQ-OPP-2013-0676-0002; Guidance on Modeling Offsite Deposition of Pesticides Via Spray Drift for Ecological and Drinking Water Assessments (November 1, 2013)

EPA-HQ-OPP-2013-0676-0003; Residential Exposure Assessment Standard Operating Procedures. Addenda 1: Consideration of Spray Drift

EPA-HQ-OPP-2013-0676-0004; Use of AgDRIFT and AGDISP in OPP Risk Assessments

OVERALL COMMENTS ON THE MODELS

OPP should evaluate the AgDRIFT and AGDISP models according to CREM recommendations.

OPP should show how it has followed the recommendations and guidance of the EPA Council for Regulatory Environmental Modeling (CREM) to evaluate the model uncertainties, limitations, and appropriate applications using the CREM model evaluation tools. OPP should make this analysis publicly accessible. On the EPA website, the basic description of CREM states that, "Given the crucial role that models play in informing regulatory decision making, the EPA established the Council for Regulatory Environmental Modeling (CREM) in 2000 in an effort to improve the quality, consistency and transparency of the models for environmental decision making." EPA established CREM for the purpose of evaluating environmental models, and their approach should be incorporated by EPA OPP.

Use of models by the EPA should be to fill in data gaps when trying to set protective regulations, but not to overturn observations from laboratory, environmental monitoring, epidemiologic, or other relevant scientific studies.

Models can be highly subjective, and therefore correspondence from models developed by different sectors should be considered. Results from models are similar to a critical review of the overall scientific literature, in that they incorporate the results of many studies to generate an overall summary of the data. As such, models can be highly subjective, depending on the bias of the sponsor and any financial interests they may have in the regulations that may result. The scientific journals have recognized this reality, and many have strict guidelines against allowing financial interested parties to write scientific review papers.

The underlying assumptions that are used to build the model framework, and are used to define the parameters of the model, should be stated. We suggest that thorough documentation be provided of the underlying assumptions that are used to build the model framework, and are used to define the parameters of the model. Model parameters are terms in the model that are fixed during a model run or simulation, but can be changed in different runs to conduct sensitivity analysis or calibrate the model.

Parameters can be quantities estimated from sample data to characterize a statistical population, or known mathematical constants.

Any known limitations in the model should be stated, and thorough documentation should be provided.

Appropriate uses, and inappropriate uses, of the model should be stated, and thorough documentation should be provided.

Results of uncertainty and sensitivity analysis and validation tests should be provided. Sensitivity analysis evaluates the effects of changes in input values or assumptions on a model's results. Uncertainty analysis investigates the effects of database uncertainties, uncertainty associated with model parameter assumptions, uncertainty regarding appropriate application of the model, and other potential sources of error in the model. Structural uncertainty in the model can be addressed by comparing the ability of different model frameworks to model the same data sets, resulting in a quantitative range of uncertainty. If such comparisons have been done, these results should be documented. Comparing the ability of a model to handle multiple data sets, and comparing multiple models to handle the same data sets can test the uncertainty associated with a model. The resulting quantitative range of uncertainty should be documented.

Variability results from the inherent randomness of certain input parameters, such as fluctuations in seasonal conditions or genetic variances among populations. Variability in model parameters is largely dependent on the extent to which input data has been aggregated. While variability may not be able to be reduced, in should be characterized and represented to the public and stakeholders.

Model corroboration describes all the methods, both qualitative and quantitative, for evaluating the degree to which a model corresponds to reality. Any tests for model corroboration that have been performed should be documented, along with the results.

Application niche of the model should be stated. The application niche for a particular model is the set of conditions under which the use of the model is scientifically defensible.

Proprietary models must be extremely well documented, when used. EPA legally may not rely on a proprietary model without providing substantial detail about its built-in assumptions and calculation methodologies. As the D.C. Circuit has held, "EPA has undoubted power to use predictive models so long as it explains the assumptions and methodology used in preparing the model and provides a complete analytic defense should the model be challenged."[1] In so doing, EPA can keep proprietary data confidential, but must provide enough information about the underlying facts supporting its decision to the public to show that it has engaged in reasoned decision making.[2] We support the CREM recommendations that proprietary models be accompanied by comprehensive, publicly available documentation that describes the conceptual and theoretical basis for the model, the process used to

[1] *Appalachian Pwr. Co. v. EPA*, 249 F.3d 1032, 1052 (D.C. Cir. 2001) (internal punctuation and quotations omitted).

[2] *See NRDC v. Thomas*, 805 F.2d 410, 418 n.13 (D.C. Cir. 1986) (rejecting challenge to confidential data where EPA "combine[d] the data from the confidential reports . . . and plot[ted] them on a graph that was made part of the public record . . . then discussed the plotted data at some length").

evaluate the model, and access to input and output data such that the public can replicate results derived from the model.[3]

If OPP has evaluated the AgDRIFT and AGDISP models using CREM parameters, where can the public find this information? If OPP has not evaluated the models using CREM parameters, why not? Will OPP do this in a publicly transparent way, providing thorough documentation of its review?

The need to make EPA regulatory decisions as transparent as possible, and to allow others to reproduce EPA calculations and derivation of numbers, is essential to elevating the public confidence in EPA assessments. All models used to inform regulatory decisions should be accompanied by comprehensive, publicly available documentation that describes the conceptual and theoretical basis for the model, the process used to evaluate the model, and access to input and output data such that the public can replicate results derived from the model.

SPECIFIC COMMENTS ON THE MODELS

The following comments are specific to the EPA Guidance on Modeling Offsite Deposition of Pesticides Via Spray Drift for Ecological and Drinking Water Assessments.

EPA should not presume negligible spray drift in the absence of reliable evidence to support its presumption. Lines 84-88 – EPA states that it assumes that spray drift is negligible for those application methods and materials for which it does not have data, including applications of dry materials, drip chemigation, and for applications with hand held or back pack sprayers. It seems highly likely that applications with these methods will result in some spray drift, and without reliable data one way or the other EPA should not assume that drift is "negligible". For example, hand spray guns allow the applicator to alter both the spray pressure and the droplet size, both of which can alter drift potential. Hand spray guns can deliver a high-pressure stream to treat trees and shrubs, which seems likely to lead to off-site drift. Is EPA in the process of collecting these data and making it public? If not, what is the basis for EPA's decision to presume negligible spray drift from these methods?

Line 159: EPA should require that any changes to the input parameters be clearly and publicly noted, along with a statement showing exactly how this alters the output, and whether it makes the output more or less protective of the environment and human health.

Figure 3: EPA provides guidance to compare the amount of spray drift to a calculated Level of Concern (LOC). However, the guidance should also prevent spray drift that lead to damage to crops, damage to fish or wildlife or their habitat (even if the LOC is not exceeded), or illness in humans and domesticated animals. In addition, EPA's guidance should prevent a situation in which adverse outcomes can reasonably be anticipated, such as an application that might drift onto a school yard, whether or not any children are present at the time of the application. Spray drift exposures that are in excess of a tolerance, water quality criterion, maximum contaminant level, or other appropriate regulatory benchmark should also be prevented. For example, currently, Indiana regulations state: "A person may not apply a pesticide in a manner that allows it to drift from the target site in sufficient quantity to cause

[3] The Council for Regulatory Environmental Modeling. Draft Guidance on the development, evaluation, and application of regulatory environmental models. November, 2003. http://www.epa.gov/osp/crem/library/CREM%20Guidance%20Draft%2012_03.pdf

harm to a non-target site." "Sufficient Quantity to Cause Harm" means an amount of pesticide that results in any of the following:

(A) Pesticide residues in excess of tolerances or standards

(B) Documented health, illness, stunting, deformation, discoloration; or other effects that are detrimental to the non-target site.

This level of prevention is more stringent than the weak and limited consideration of LOC exceedances only.

The following comments are specific to the EPA Guidance on Residential Exposure Assessment Standard Operating Procedures

The paucity of toxicity data on inhalation exposures, the effects of simultaneous exposures to multiple pesticides, and the variability among different people in their sensitivity to pesticide exposure makes it impossible for EPA to definitively determine the extent of potential adverse effects from spray drift. In addition, epidemiological studies showing statistically significant adverse effects on humans are routinely omitted from risk assessments. This calls into question the validity of the toxicological endpoints selected by EPA. People living close to pesticide application sites and/or working with pesticides have significantly higher exposures than the average person and drift controls should protect these people as well.[4]

This is an environmental justice issue as communities near agricultural areas are predominantly low-income and minority. For farmworkers nationwide in 2001, about 83% identify as Latino and 30% had a total family income below federal poverty guidelines.[5] A significant issue that is not often adequately addressed is the pesticide drift exposures on tribal lands and tribal members living near agricultural areas. American Indian and Alaskan Native reservation communities maintain a close relationship to the land, water, and subsistence diets. According to the mandate set forth in Executive Order 12898, EPA must take steps to address disproportionate impacts on minority and low-income populations.

OVERALL COMMENTS ON SPRAY DRIFT

Chemical trespass should be prevented

Any amount of chemical that drifts away from the application site and makes its way into other fields, including organic fields, homes, residential gardens and yards, schools, or workplaces is potentially problematic and should be regulated as such. Neither the registrants nor EPA know the long-term effects of exposure to small amounts of spray drift many times per year, year after year, to many different chemicals. It is impossible to say that harm will not occur from low levels of off-target spray drift that may land near schools, yards, parks and homes. Many types of harm that have been linked to

[4] Dalvie MA, Sosan MB, Africa A, Cairncross E, London L. Environmental monitoring of pesticide residues from farms at a neighbouring primary and pre-school in the Western Cape in South Africa. Sci Total Environ. 2014 Jan 1;466-467:1078-84.

Gemmill A, Gunier RB, Bradman A, Eskenazi B, Harley KG. Residential proximity to methyl bromide use and birth outcomes in an agricultural population in California. Environ Health Perspect. 2013 Jun;121(6):737-43.

[5] U.S. Department of Labor, Findings from the National Agricultural Workers Survey (NAWS) 2001-2002: A demographic and employment profile of United States farm workers, Research Report No. 9 (March 2009)

chemical exposures may take time to manifest as something recognizable as harm, such as cancer, Parkinson's disease, or birth defects.[6] [7] In light of these unknowns, EPA should not endorse any level of off-target pesticide particle movement as acceptable.

The idea of accepting toxic drift as inevitable takes a narrow view of pest control. There are many ways to prevent toxic spray drift from impinging on neighboring properties, most notably by use of biological and cultural pest control methods wherever possible, by restricting the use of spray or blower technologies in the application of pesticides, by using the wind to ensure that off-target areas are not contaminated with pesticide spray, and by using substantial buffer zones around target areas. Neighboring properties should not be required to accept any level of chemical trespass.

Buffer Zone Protections for Pesticide Sprays Adjacent to Farms

Anyone residing on a farm adjacent to spraying can be subject to spray drift incidents, sustaining damages to livelihood as well as exposure to pesticide residues. Requiring buffer zones of those who might cause spray drift damage or exposures ensure that the applicator's actions are less likely to impact those around them, though groundwater contamination can still occur.

EPA, working together with the USDA, should institute and enforce standards adequately protecting neighboring farms – both conventional and organic - from pesticide drift of applications on adjacent property and should incorporate such standards into the current Guidances. Alternatively, EPA should immediately publish a separate Draft Guidance governing the economic livelihood and liability concerns related to spray adjacent to organic and conventional farms.

Organic farmers impacted by chemical drift bear heightened financial losses due to the special nature and premium prices of their crops, potentially causing severe damage to their livelihood and the quality of their land (i.e., chemical-free). Reports and news articles demonstrate these impacts occur often, but compensation is not easily obtained.[8] Organic farms can lose their organic status for several years after such events occur currently, the burden falls on organic farmers to establish buffer zones to protect their land from exposure to chemical pesticides. It is more reasonable to require buffer zones of those using these hazardous chemicals to ensure their actions minimize the impact on those around them, including organic farmers.

At a minimum and immediately, pesticide applicators should be required to take the steps outlined by the Purdue University Extension service.[9] Those steps include making a proactive determination whether and where organic farms are located adjacent to the spray area, and updating that

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[6] Grandjean P, Landrigan PJ. Neurobehavioural effects of developmental toxicity. Lancet Neurol. 2014 Mar;13(3):330-338. doi: 10.1016/S1474-4422(13)70278-3. Epub 2014 Feb 17. Review.

[7] Roberts JR, Karr CJ; Council On Environmental Health. Pesticide exposure in children. Pediatrics. 2012 Dec;130(6):e1765-88. doi: 10.1542/peds.2012-2758. Epub 2012 Nov 26. Erratum in: Pediatrics. 2013 May;131(5):1013-4.

[8] *See, e.g.,* Pesticide Drift: Response and Compensation, found at *http://practicalfarmers.org/farmer-knowledge/farminar-archive/pesticide-drift-response-and-compensation/* and a compilation of Iowa drift incidents at *http://practicalfarmers.org/blog/2014/01/17/idals-case-file-summary-pesticide-drift-2008-2012/*.

[9] Elizabeth Maynard, Bryan Overstreet, and Jim Riddle, *Driftwatch: Watch Out for Pesticide Drift and Organic Production*, Purdue University, 2012, *found at* https://www.extension.purdue.edu/extmedia/HO/DW-1-W.pdf.

determination on a regular basis. Wind speed and direction should be carefully monitored throughout the spray application. Additionally, EPA/USDA could establish an online buffer calculator or app to show what added buffers are necessary in particular meteorological conditions and when no spray is allowed at all. Such an online calculator/app is currently available in Canada and could be used as a template.[10] The NOAA directives related to this in critical vulnerable areas are discussed below.

Threatened, endangered, and candidate species should be protected

Pesticides and other chemicals are transported through the air and may later be deposited on non-target land and into waterways, affecting threatened, endangered, and candidate aquatic species identified under the Endangered Species Act (ESA). For example, the National Marine Fisheries Service (NMFS) point out that orthophosphate insecticides were detected in two Oregon streams, Hood River and Mill Creek, following periods of chemical applications on orchard crops, and may be related to atmospheric drift, mixing operations, or other aspects of pesticide use. Six biological opinions ("BiOps") completed pursuant to the ESA in 2008-2012 by NMFS for 28 insecticides, herbicides, and fungicides, addressed their entry into surface waters through spray drift. See NOAA Fisheries, Pesticide Consultations with EPA, available at http://www.nmfs.noaa.gov/pr/consultation/pesticides.htm.

Among NMFS' basis for finding that application of some pesticides in accord with EPA labels issued under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) would cause "jeopardy" and/or "destruction or adverse modification of critical habitat" was drift and runoff of pesticides from areas of intensive urban and agricultural development. As a result, the NMFS BiOps contained mandatory "reasonable and prudent alternatives" including requirements to prevent or limit the effects of pesticide drift on threatened and endangered salmonids. For example, NMFS required the use of no-application riparian buffers, prohibitions on pesticide use over specified wind speeds, an order of application to commence nearest aquatic habitat and proceed away from the habitat, agricultural vegetated buffers, and limits on pesticide application based on soil moisture levels.

EPA should test the efficacy of its labels

EPA does not currently conduct user testing of labels to observe whether or not the intent of EPA's control measures is understandable by applicators. To assess label effectiveness as a means of communicating important safety and use information, it would be necessary for EPA to carry out statistically valid field surveys that observe applicator interpretation and understanding of pesticide label instructions. It is difficult to anticipate the myriad ways that people can misinterpret a statement until you've actually observed their behavior and queried their understanding. One only has to note the range of mistakes people make in the application of pesticides and the associated adverse effects to see the inadequacy of the current approach that assumes perfect understanding of pesticide labels.

Penalties are an important disincentive for non-compliance

We agree that education and training are important components of a program to reduce drift. We also point out that substantial penalties for violations are an important component of a program to ensure applicator compliance and should be incorporated into US EPA's enforcement program.

[10] *See at* http://www.hc-sc.gc.ca/cps-spc/pest/agri-commerce/drift-derive/calculator-calculatrice-eng.php.

Drift Reduction Technology should be mandated

Advances in drift reduction technology (DRT) are a promising way to reduce spray drift over the long run. EPA's DRT project is intended to increase the adoption of DRTs by developing a standardized evaluation process so that incentives can be developed through government programs and through acknowledgement on pesticide labels. The adoption of new technologies will occur more rapidly if there are appropriate incentives for use, and disincentives for failures. EPA should conduct an assessment of the efficacy of those technologies and the economic impacts of their adoption, as a demonstration of the technology verification protocol under development. We are also concerned that EPA is incentivizing the use of new technologies to spray in conditions (wind speed, as an example) that currently exceed recommended standards, or to allow use of higher application rates than would otherwise be permitted, or to reduce the width of a required buffer zone. This is unacceptable and would almost certainly lead to even more harm from drift than we currently have now because it would be abused to push the limits of conditions under which applications could legally be made.

EPA should truth-test its drift reduction recommendations with real-world data and evidence.

EPA should strengthen the collection, use, and public availability of information regarding real world effects of its regulatory approaches, especially labeling, including: 1) collecting objective monitoring data of water quality and other environmental receptors, 2) information on enforcement actions by state regulatory agencies, 3) incident databases (including both proper use and misuse incidents), and 4) assessments of users' understanding of label statements. EPA should particularly emphasize the collection of data that are valid, robust, and publicly available. EPA should also work with stakeholders to identify and resolve information technology issues that might impede the collection of these types of data. By strengthening the use of these additional sources of information, the workgroup intends for EPA to evaluate, first, whether the data demonstrate that existing regulatory requirements are being successful in preventing harm from spray drift, as anticipated when EPA imposed them. In doing so, EPA should consider how the information not only sheds light on EPA assessments of individual pesticide chemicals but also what it indicates about the overall impact of pesticide use. Second, if the analysis of this information indicates that harm is occurring, EPA should attempt to discern the reasons that the existing regulatory requirements have failed to produce the expected levels of protection.

Avoid direct exposure to people from spray drift

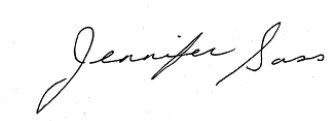
EPA should require at least 24-hour advance written notification of all residents, workers and property owners within 1/4 mile of the application site so they may take action to protect themselves and their families from potential harm. Information provided should include anticipated date and time of application, name of the pesticide product, a list of active ingredients and other "inert" ingredients, and a copy of the Material Safety Data Sheet (MSDS) for the pesticide product(s) being sprayed.

EPA should not disregard volatilization of pesticide in its definition of spray drift

EPA specifically defines spray drift as not including pesticide movement by volatility (FR Notice at 4691, Section I.D) However, attempts to reduce harm from off-site airborne pesticide movement through management of spray drift alone will be inadequate to address the issue of harm from drift. Volatilization drift is a major component of drift for volatile and semi-volatile pesticides (vapor pressure > 10-6 mm Hg) that contributes substantially to human and wildlife exposures and harm through inhalation. With a few exceptions, EPA does not yet routinely evaluate bystander inhalation exposures

from volatilization in the risk assessments, except for fumigant pesticides and pesticides used in ULV applications for mosquito control. For some pesticides and some populations, volatilization is the primary source of exposure. In many cases, volatilization drift has caused serious harm to people.[11] In monitoring studies conducted by the California Air Resources Board and Department of Pesticide Regulation[12] and PANNA,[13] concentrations have been measured above levels of toxicological concern for acute, sub-chronic, and/or chronic/cancer toxicity, determined by comparison of estimated doses received from inhalation to doses EPA designates as Levels of Concern in recent FQPA risk assessments.

Thank you for the opportunity to present these comments.



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[11] California Department of Pesticide Regulation Pesticide Illness Surveillance Program, http://www.cdpr.ca.gov/docs/whs/pisp.htm.

[12] California Department of Pesticide Regulation Toxic Air Contaminant Program, Monitoring Reports, http://www.cdpr.ca.gov/docs/empm/pubs/tac/tacstdys.htm.

[13] Drift Catcher Results, Pesticide Action Network North America, http://www.panna.org/campaigns/driftCatcherResults.html.