If you have any questions, please contact pesticidequestions@epa.gov

PESTICIDE ECOLOGICAL SPRAY DRIFT BUFFER CALCULATION WORKSHEET

When the pesticide product label or endangered species protection bulletin, found on the Bulletins Live! Two website[1], includes an ecological spray drift buffer requirement, this worksheet can be used to assist the user in determining the size of the required buffer. This worksheet can be used to calculate ecological buffer size in lieu of the Microsoft Excel calculator[2] or the Pesticide App for Label Mitigations (PALM)[3] EPA has also developed for this purpose. The calculator and descriptions of mitigation measures are found on EPA's Mitigation Menu Website[4]. This worksheet can be found online at https://www.epa.gov/pesticides/mitigation-menu

General Field/Management Unit Information (Optional Information – Does Not Impact Calculation)			
Name:			
Today's Date:			
Field/Management Unit Identification(s)[5]			
Crop(s)			
Pesticide Product Name(s)			
Target Application Date(s)			
Application Type (circle one)	Ground boom	Aerial	Airblast

For this application, do any labels or bulletins for the products used reference EPA's Mitigation Menu Website when describing ecological spray drift buffer requirements? If yes, proceed. If no, this calculator cannot be used.

You may not have to use an ecological spray drift buffer if the answer is "yes" to any one bullet in any one of the following questions:	**Yes**	**No**
Do the planned application conditions fit any of these descriptions: • Chemigation methods, including: micro-sprinklers, drip-tape, drip emitters, subsurface or flood, and under non-permeable plastic surfaces • In-furrow sprays when nozzle height is <8 inches above soil surface; • Tree trunk drench, tree trunk paint, tree injection; • Soil injection; • Solid formulations that are used as a solid; • Less than 1/10 acre (<4356 square feet) treated and Spot treatment: <1000 square feet treated (e.g., when applied with backpack or hand held sprayers).	No ecological spray drift buffer required*	Continue calculating buffer size below
Are managed areas the only landscapes downwind for at least the length of the label required buffer? Managed areas are defined as: • Agricultural fields, pastures, forage fields, and private rangelands, including untreated portions of the treated field; • Roads, paved or gravel surfaces, mowed grassy/fallowed areas adjacent to field, and areas of bare ground from recent plowing or grading that are contiguous with the treated area; • Buildings and their perimeters, silos, or other man-made structures with walls and/or roof; • Areas present and/or maintained as a runoff/erosion measure as listed on EPA's Mitigation Menu website. Examples include vegetative filter strips (VFS), field borders, grassed waterways, vegetated ditches, riparian areas, managed/constructed wetlands, or other areas of intentional habitat improvement; • Areas present and/or maintained as a drift buffer reduction measure as listed on EPA's Mitigation Menu website. Examples include vegetative windbreaks, hedgerows, shelterbelts, riparian areas, private forests, woodlots, and shrublands; • Conservation Reserve Program (CRP) and Agricultural Conservation Easement Program (ACEP) lands (applicators may need to ensure that pesticide use does not cause degradation of the CRP habitat). • On-farm contained irrigation water resources that are not connected to adjacent water bodies, including on-farm irrigation canals and ditches, water conveyances, managed irrigation/runoff retention basins, farm ponds, and tailwater collection ponds."		

*Note: Spray drift buffers may be required for other reasons (e.g. protection of human health).

[1] https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins
[2] Excel Mitigation Points Calculator available for download at https://www.epa.gov/pesticides/mitigation-menu
[3] https://www.epa.gov/pesticides/pesticide-app-label-mitigations
[4] https://www.epa.gov/pesticides/mitigation-menu and https://www.epa.gov/pesticides/menu-measure-descriptions. If the state has a more restrictive requirement, that must be followed instead. Not all measures are applicable to all fields and crops.
[5] A field or management unit is defined as the single contiguous piece of land that is managed as a single unit in production or in preparation for production of a single crop. A uniform field may be sub-divided based upon different crops (e.g., vegetables and leafy greens) or sub-divided based upon different features (e.g., flat portion and contoured portion).

Ground Applications				
Ecological Spray Drift Buffer Distance from Label (default or product specific) NOTE: IF SPRAY DRIFT BUFFERS ARE NOT REQUIRED ON THE PRODUCT, THEN NO SPRAY DRIFT BUFFERS ARE NEEDED.				
Ecological Spray Drift Buffer Reduction Option		**% Reduction in Distance**		**Add % reduction**
Application Rate Reductions				
Reduced Single Application Rate		% reduction in buffer size = % reduction in application rate (*e.g.,* 50% reduction in application rate corresponds with a 50% reduction in buffer size)		
Larger Droplet Reductions for Maximum Buffer Distances (check label buffers for each droplet size)				
Starting buffer	**Starting DSD**	**Larger DSD used**	**Adjusted buffer or % reduction for adding to total below**	
90ft to 100ft	Fine	Medium	25 ft or ~75%	
90ft to 100ft	Fine	Coarse or Coarser	15 ft or ~85%	
19ft to 25ft	Medium	Coarse or Coarser	15 ft or ~10%	
Boom Height	**Starting DSD**	**Larger DSD Used**	**Reduction**	---
High boom	Fine	Medium	75%	
	Fine	Coarse or Coarser	85%	
	Medium	Coarse or Coarser	10%	
Low boom	Very fine	Fine	50%	
	Fine	Medium	75%	
	Fine	Coarse or Coarser	85%	
	Medium	Coarse or Coarser	10%	
Additional Application Parameters				
High boom to low boom	Fine	Fine	50%	
Hooded sprayer, layby or drop nozzles		Over-the-top Hooded Sprayer	50%	
		Row-middle Hooded Sprayer	75%	
		Sprays below crop using drop nozzles or layby nozzles	50%	
Use of Adjuvants (Herbicide Applications Only)		Herbicides using Medium DSD	30%	
		Herbicides using Coarse or Very Coarse DSD	15%	
Reduced proportion of field treated (number of tractor passes[1])				
Field border application (or 1/10 acre to 1 acre)		75%		
2-4 passes (or >1 acre to 4 acres)		35%		
5-10 passes (or 4 acres to 10 acres)		15%		
Other Mitigation Measures				
Downwind windbreak/hedgerow/riparian/forest/woodlots/shrubland		Basic windbreak/hedgerow	50%	
		Advanced windbreak/hedgerow	75%	
		Riparian/forests/shrubland/woodlots ≥60ft width	100%	
Relative humidity is 60% or more at time of application		10%		
			Add up all percent reductions	
If the percentage reductions are ≥ 100% then the adjusted ground spray drift buffer is 0 ft				
Original Ground Spray Drift Buffer (ft)		**Adjusted Ground Spray Drift Buffer (ft) (rounded down to the nearest 5ft increment)**		

DSD = droplet size distribution; Low boom height=release height is less than 2 feet above the ground; high boom=release height is greater than 2 feet above the ground

[1] A spray drift buffer applies to downwind non-target areas. The reduced number of passes or area treated applies to the upwind part of the treated field. Pass to area conversion is 45 ft per pass multiplied by the swath length used in SDTF trials (1,000 ft).

Aerial Applications				
Ecological Spray Drift Buffer Distance from Label (default or product specific) NOTE: IF SPRAY DRIFT BUFFERS ARE NOT REQUIRED ON THE PRODUCT, THEN NO SPRAY DRIFT BUFFERS ARE NEEDED.				
Ecological Spray Drift Buffer Reduction Option		**% Reduction in Distance**		**Add % reduction**
Application Rate Reductions				
Reduced Single Application Rate		% reduction in buffer size = % reduction in application rate (*e.g.,* 50% reduction in application rate corresponds with a 50% reduction in buffer size)		
Larger Droplet Reductions for Maximum Buffer Distances (check label buffers for each droplet size)				
Starting buffer	**Starting DSD**	**Larger DSD Used**	**Adjusted buffer or % reduction for adding to total below**	
370-400ft	Fine	Medium	300ft or ~25%	
370-400ft	Fine	Coarse	170ft or ~55%	
370-400ft	Fine	Very Coarse	110ft or ~70%	
270-300ft	Medium	Coarse	170ft or ~40%	
270-300ft	Medium	Very Coarse	110ft or ~60%	
135-170ft	Coarse	Very Coarse	110ft or ~20%	
Droplet Size	**Starting DSD**	**Larger DSD Used**	**Reduction**	**---**
	Fine	Medium	25%	
	Fine	Coarse	55%	
	Fine	Very Coarse	70%	
	Medium	Coarse	40%	
	Medium	Coarser/Very Coarse	60%	
	Coarse	Coarser/Very Coarse	20%	
Additional Application Parameters				
Use of Adjuvants[2] (Herbicide Applications Only)		Medium DSD	30%	
		Coarse or Very Coarse DSD	15%	
50% Reduced Boom Length During Application		Wind speed is <10 mph	65%	
		Wind speed is 10-15 mph	50%	
Reduced proportion of field treated (number of airplane/helicopter passes[1])				
1 pass (or ≤1.5 acres)		55%		
2-4 passes (or 1.5 to 6 acres)		20%		
5-8 passes (or 6 to 12 acres)		10%		
Other Mitigation Measures				
Downwind windbreak/hedgerow/riparian/forest/woodlots/shrubland		Basic windbreak/hedgerow	50%	
		Advanced windbreak/hedgerow	75%	
		Riparian/forests/shrubland/woodlots ≥60ft width	100%	
Relative humidity is 60% or more at time of application		10%		
			Add up all percent reductions	
If the percentage reductions are ≥ 100% then the adjusted ground spray drift buffer is 0 ft				
Original Aerial Spray Drift Buffer (ft)		**Adjusted Aerial Spray Drift Buffer (ft) (rounded down to nearest 5 ft Increment)**		

DSD = droplet size distribution

[1]A spray drift buffer applies to downwind non-target areas. The reduced number of passes applies to the upwind part of the treated field.

Notes:

Airblast Applications			
Ecological Spray Drift Buffer Distance from Label (default or product specific) NOTE: IF SPRAY DRIFT BUFFERS ARE NOT REQUIRED ON THE PRODUCT, THEN NO SPRAY DRIFT BUFFERS ARE NEEDED.			
Ecological Spray Drift Buffer Reduction Option		**% Reduction in Distance**	**Add % reduction**
Application Parameters			
Reduced Single Application Rate	Non-targeted application equipment[1]	Divide % reduction in application rate by 2 (*e.g.*, 50% reduction in application rate corresponds to 25% reduction in buffer size)	
	Targeted application equipment[1,2]	% reduction corresponds to application rate[1] (*e.g.*, 50% reduction in application rate corresponds with a 50% reduction in buffer size)	
Targeting application by turning off nozzles spraying above crop canopy combined with use of deflectors[1]		10%[1]	
Reduced proportion of field treated (number of tractor passes[3])			
1 row		70%	
2-4 rows		30%	
5-10 rows		15%	
Other Mitigation Measures			
Downwind windbreak/hedgerow/riparian/forest/ woodlots/shrubland	Basic windbreak/hedgerow, or use of artificial screen ≥ height of orchard[1]	50%	
	Advanced windbreak/hedgerow	75%	
	Riparian/forests/shrubland/woodlots ≥60ft width	100%	
Skipping last downwind row of orchard/vineyard[1]		50%	
		Add up all percent reductions	
If the percentage reductions are ≥ 100% then the adjusted ground spray drift buffer is 0 ft			
Original Airblast Spray Drift Buffer (ft)		**Adjusted Airblast Spray Drift Buffer (ft) (rounded down to nearest 5 ft Increment)**	

[1]New airblast buffer reduction mitigation

[2] Targeted application equipment is defined as airblast equipment with pulse-width modulated (PWM) nozzles with canopy sensing equipment that turns nozzles off when crop canopy is not present.

[3] A spray drift buffer applies to downwind non-target areas. The reduced number of treated rows applies to the upwind part of the treated field.

Notes: