- Scientific principles, the mitigation resulted in meaningful reductions in pesticide spray drift, and runoff/erosion based upon the design, placement, and characteristics of the mitigation;
- Existing EPA models indicated a potential reduction in environmental exposure if the mitigation were in place;
- Empirical studies described the reductions in pesticide concentration as a result of the mitigation;
- The mitigation is similar to other mitigations such that they are functionally equivalent.

Sections 3.2.1 and 3.2.2 discuss the spray drift mitigation measures and runoff/erosion mitigation measures, respectively, that EPA identified in this strategy to address potential population-level impacts to listed species.

3.2.1 Spray Drift Mitigation Measures

Spray drift exposures are a potential concern for pesticide applications made via broadcast spray (aerial and ground equipment), airblast, and some chemigation methods (overhead sprayers such as center pivot and traveler sprayers). This section first describes a suite of baseline mitigation measures applicable to most herbicides to reduce exposure to non-target species via spray drift (**Section 3.2.1.1**). The remainder of this section discusses use of a combination of buffers and/or other mitigations to reduce low, medium, or high potential for population-level impacts associated with spray drift identified in **Step 1**. The currency of spray drift mitigations to address potential population-level impacts is expressed as a distance from the edge of the field (where there are population-level concerns and exposures need to be reduced). **Section 3.2.1.2** explains how EPA selects that distance based on the MoDs calculated in **Step 1** and **Section 3.2.1.3** discusses mitigation measures for reducing exposures within that distance so that there are no longer concerns for population-level impacts to listed species. **Section 3.2.1.4** also explains how, if a buffer is used to represent that distance, what types of areas can represent that buffer so that in-field buffers are not needed in all fields. **Section 3.2.1.5** discusses spray drift mitigations for some mitigation methods (*e.g.*, overhead sprinklers).

There are herbicide application methods in addition to ground, aerial, airblast, and overhead/traveler sprayer chemigation. EPA's evaluation described in the **Ecological Mitigation Support Document** indicates that spray drift exposure from these application methods would be limited and thus the potential for population-level impacts is unlikely. These application methods include:

- 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; and
- 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).

3.2.1.1 Baseline Spray Drift Mitigations

EPA has identified several mitigations that it generally includes on pesticide product labels to reduce spray drift exposure to non-target species. When considering the potential for population-level impacts, EPA includes these mitigations as baseline application assumptions. These common mitigations typically include:

- restricting the maximum windspeed to 10 to 15 miles per hour,
- prohibiting applications during temperature inversions,
- boom length restrictions and swath displacements for aerial applications,
- maximum release heights for ground and aerial applications, and
- directing sprays into the canopy for airblast and turning off the outer nozzles at the last row.

3.2.1.2 Spray Drift Mitigation Distances

If EPA determines the potential for population-level impacts (MoD category) associated with spray drift exposure to be low, medium, or high, EPA then identifies the level of mitigation needed to address the potential for population-level impacts. To address potential ecological impacts via spray drift exposure, EPA typically identifies a spray drift buffer. For this strategy, for aerial, ground, and airblast sprays, the distance associated with that buffer increases with the level of mitigation (low, medium, and high) and that the buffer be located on the downwind edge of the field. EPA is also identifying mitigation measures (described in **Section 3.2.1.3**) that a pesticide applicator can employ to reduce any identified buffer distance because these mitigation measures are likely to reduce exposure within that buffer distance. For chemigation, EPA did not identify a spray drift distance, but rather mitigation measures to reduce exposure to non-target areas. The **Ecological Support Document** describes how EPA determined the efficacy of the mitigation measures included, which EPA expresses as a percentage decrease in any identified buffer distance.

To address a low potential for population-level impacts for aerial, airblast and ground applications, EPA has identified what it refers to as lower limit buffers. If EPA identifies a medium potential for population-level impacts for aerial, airblast and ground applications, EPA identifies that buffer distance by calculating a chemical-specific distance based on the toxicity of the pesticide and estimated off-field deposition. If EPA identifies a high potential for population-level impacts for aerial, airblast and ground applications, EPA identifies a maximum buffer distance that varies depending on the application method. See **Table 6**.

EPA recognizes that for a pesticide application, droplet size can impact the distance which spray drift travels, with larger droplets generally not traveling further than finer droplet sizes. As shown in **Table 6**, EPA identified a single distance based on how pesticides are typically applied for each type of application method. If a smaller droplet size is needed for a particular pesticide, EPA may identify a larger buffer distance. If a pesticide applicator can use a larger droplet size or a low boom, as described in **Section 3.2.1.3**, they would be able to decrease the identified buffer distance. The text below and the

Ecological Support Document provide additional discussion and details about the distances to mitigate potential low, medium and high population-level impacts.

Table 6. Potential for population-level impacts identified in Step 1 and corresponding spray drift distance to reduce impacts.

Potential for Population-Level Impacts from Step 1	Distance from Edge of Treated Area (ft)		
	Aerial Spray[1]	Ground[2] Spray	Airblast
Not Likely	None	None	None
Low	50	10	25
Medium	Calculated for specific chemical[3]		
High	320	230	160

MoD = Magnitude of Difference

[1] EPA based aerial distances on the assumption that most aerial applications in agricultural settings will use a medium droplet size distribution. If very fine or fine applications are needed for a pesticide, EPA may increase the distance. There are mitigation measures for reducing this distance when using droplets larger than medium.

[2] EPA based these distances on the assumption that ground applications are made using a high boom and very fine to fine droplet size distribution. There are options for reducing this distance when using larger droplets and a low boom.

[3] EPA anticipates that chemical specific buffers will be between the lower limit (used for low potential population-level impacts) and at or lower than the maximum (used for high impacts) buffer distances.

Where there is a low potential for population-level impacts, EPA identifies a low level of mitigation for aerial, airblast, and ground applications using a lower limit distance. EPA based the identified distances in **Table 6** on the distance where the deposition fraction is estimated to be 10% of the application rate for the different application methods. This equates to 50, 25, and 10 feet, for aerial, airblast, and ground applications, respectively. EPA based these distances on the common droplet size distribution for aerial (medium), the common droplet size distribution for ground (fine) and high boom and on the sparse orchard setting for airblast.

Where EPA identifies medium potential for population-level impacts, EPA uses AgDRIFT® to calculate the chemical specific buffer distance for aerial, airblast, and ground applications. EPA will calculate the distance where the deposition exposure is equal to the toxicity threshold (discussed above for **Step 1, Section 3.1.3**).

Where EPA identifies high potential for population-level impacts, the Agency identifies a maximum spray drift distance beyond which exposure does not substantially change using the AgDRIFT® model for aerial, airblast, and ground applications. The main reasons for determining a maximum buffer distance include:

1) The impact of the buffer in reducing exposure decreases with distance, such that at distances far offsite there is only a small change in the spray drift deposition,
2) Uncertainty for exposure estimates predicted by the model increases with distance, and
3) The larger a buffer distance is, the less feasible it is to implement for many applicators.

In many cases, the likelihood that spray drift will be partially intercepted by a drift barrier (*e.g.,* trees, crop canopy or other vegetation, buildings) increases with distance, and, as such, the model may overestimate the maximum spray drift buffer because it assumes a bare treated area with no obstructions to intercept

spray droplets that drift off-field. The maximum spray drift buffer will be different for different application equipment (*i.e.*, aerial, ground and airblast).

3.2.1.3 Spray Drift Mitigation Measures for Reducing Buffer Distance

EPA reviewed available mitigation measures for reducing the distance of identified ecological spray drift buffers on a site-specific basis. Mitigation measures for reducing the distance include application parameters (such as specific application equipment, reducing application rate, and/or droplet size distribution), the width of the treated area, use of a windbreak/ hedgerow or forested/shrubland area as a physical barrier or the relative humidity. While many of these measures apply to all spray drift application methods, some application parameters are specific to the application method. For example, the applicator may choose larger droplet size distributions to reduce the aerial or ground drift, and buffer, distances. For ground applications, the applicator may reduce the buffer distance by using hooded sprayers or drop nozzles that result in applications under the crop canopy. For all types of applications, the buffer distance can be reduced by using a lower application rate than the maximum rate on the label or by using a windbreak or hedgerow on the downwind side of the application area. **Tables 7-9** summarize the ecological spray drift mitigation measures for reducing the distances associated with aerial, ground and airblast applications. The **Ecological Mitigation Support Document** has detailed information describing the basis for each percent reduction in distance.

Table 7. Mitigation measures identified when making broadcast aerial applications.

Mitigation Measures	% Reduction in Distance[5]
Application Parameters	
Reduced single application rate	% reduction corresponds to application rate reduction from maximum on pesticide product label[2]
Coarse DSD[1]	20%
Very coarse DSD[1]	40%
Spray drift reducing adjuvants, Medium DSD	30%
Spray drift reducing adjuvants, Coarse or Very coarse DSD	15%
Reduced Proportion of Field Treated (# of Airplane/Helicopter Passes)[3]	
1 pass	55%
2-4 passes	20%
5-8 passes	10%
Other Mitigation Measures	
Downwind windbreak[4]/hedgerow/riparian/forest/ woodlots/shrubland	50% for basic windbreak/hedgerow 75% for advanced windbreak/hedgerow 100% for riparian/forests/woodlots/shrubland ≥ 60 ft width
Relative humidity is 60% or more at time of application	10%

DSD = droplet size distribution

[1] This % reduction is based on the assumption/baseline of using medium droplet size for aerial.

[2] Example 10% reduction in the spray drift buffer for 10% lower single application rate than labeled maximum single application rate.

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

[4] Artificial windbreaks (*e.g.,* a curtain or netting) are also applicable.

[5] After mitigation reductions in the spray buffer are applied, round to the nearest 5ft increment (*e.g.*, 50ft, 35ft)

Table 8. Mitigation measures identified when making broadcast ground applications.

Mitigation Measures	% Reduction in Distance[5]
Application Parameters	
Reduced single application rate	% reduction corresponds to application rate reduction from maximum on pesticide product label[2]
High boom, fine to medium-coarse DSD[1]	55%
High boom, coarse DSD[1]	65%
Low boom, very fine to fine DSD[1]	40%
Low boom, fine to medium-coarse DSD[1]	65%
Low boom, coarse DSD[1]	75%
Over-the-top Hooded Sprayer	50%
Row-middle Hooded Sprayer	75%
Sprays below crop using drop nozzles or layby nozzles	50%
Spray drift reducing adjuvants, Medium DSD	30%
Spray drift reducing adjuvants, Coarse or Very coarse DSD	15%
Reduced Proportion of Field Treated (Number of Ground Application Equipment Passes)[3]	
1 pass	75%
2-4 passes	35%
5-10 passes	15%
Other Mitigation Measures	
Downwind windbreak[4]/hedgerow/riparian/forest/woodlots/shrubland	50% for basic windbreak/hedgerow 75% for advanced windbreak/hedgerow 100% for riparian/forests/woodlots/shrubland ≥ 60 ft width
Relative humidity is 60% or more at time of application	10%

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] This % reduction assumes use of high boom, very fine to fine droplet size for ground.

[2] Example 10% reduction in the spray drift buffer for 10% lower single application rate than labeled maximum single application rate.

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

[4] Artificial windbreaks (*e.g.*, a curtain or netting) are also applicable.

[5] After mitigation reductions in the spray buffer are applied, round to the nearest 5ft increment (*e.g.*, 50ft, 35ft)

Table 9. Mitigation measures identified when making airblast applications

Mitigation Measure	% Reduction in Distance[3]
Application Parameters	
Reduced single application rate	Divide % reduction in application rate by 2
Reduced Proportion of Orchard Treated (Number of Treated Rows[1])	
1 row	70%
2-4 rows	30%
5-10 rows	15%
Other Mitigation Measures	
Downwind windbreak[2]/hedgerow/riparian/forest/woodlots/shrubland	50% for basic windbreak/hedgerow 75% for advanced windbreak/hedgerow 100% for riparian/forests/woodlots/shrubland ≥ 60 ft width

[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.

[2] Artificial windbreaks (*e.g.,* a curtain or netting) are also applicable.

[3] After mitigation reductions in the spray buffer are applied, round to the nearest 5ft increment (*e.g.*, 50ft, 35ft)

For aerial, ground and airblast applications, EPA based the ecological spray drift buffer distances (**Table 6**) on assumed swath widths and the number of passes, flight lines, or rows treated. EPA assumes the size and number of pesticide application equipment passes for the airplane/helicopter, tractor and airblast sprayer results in spray drift that deposits on the downwind side of the field/orchard. On a site-specific basis for a broadcast application, if the number of rows treated for an orchard is fewer than EPA's assumptions, there will be less spray drift deposition in the non-target area on the downwind side of the field. For aerial, ground and airblast applications, the applicator could reduce any identified spray drift buffer by the percent shown in **Tables 7-9** depending on the number of passes or treated rows (parallel to the wind direction, perpendicular to the downwind side of the treated field/non-target area). **Figure 6** illustrates such an example. **Tables 7-9** includes the percent reductions associated with different numbers of passes/treated rows of the treated field/orchard.

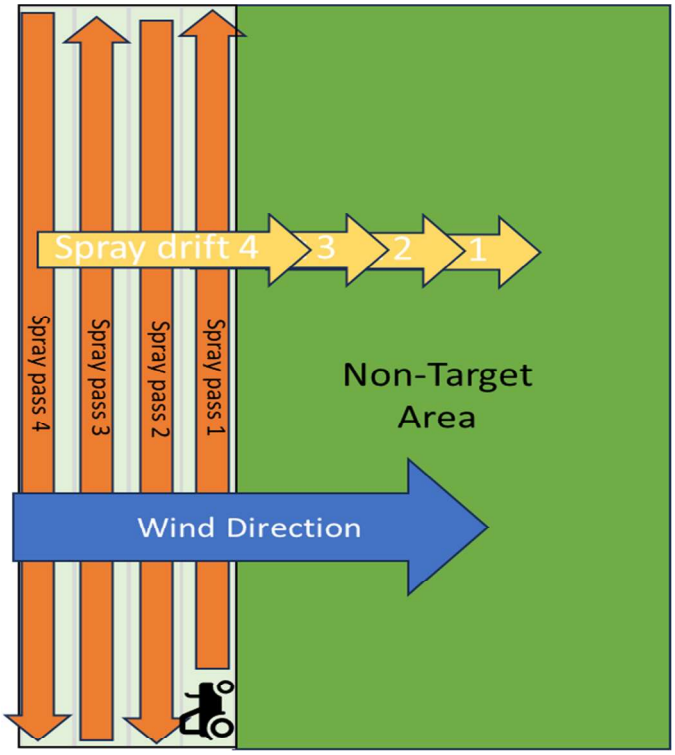

Figure 6. Cumulative spray drift in non-target area from tractor passes on four parallel rows on treated area. For example, if this was a ground application and the applicator only made 4 passes of their field, then they could reduce identified spray drift buffer distance by 35%.

To use mitigation measures to reduce the spray drift distance (**Tables 7-9**), the applicator should first consider the application equipment that they plan to use for the application. With this information and the directions for use on the pesticide labeling, the applicator could identify the appropriate spray drift distance for the pesticide and use (determined by EPA as either lower limit, chemical specific or maximum, **Table 6**). The applicator could then select from any of the appropriate mitigation measures relevant to the application type (either aerial, airblast, or ground). The applicator could add up the corresponding percent reductions for all the mitigation measures selected. This total percent could be applied to the spray drift buffer distance. If the percent is 100% or more, the applicator would not need a buffer as the mitigations put in place already address the potential for population-level impacts. If the percent is above zero and less than 100%, a buffer would be identified but the distance could be reduced from that specified on the pesticide product label. For example, if the pesticide product label specifies a 230-foot buffer and there is a downwind windbreak (50% reduction) and the relative humidity is 70% at the time of the application (10% reduction), the label would allow for a 60% (50%+10%) reduction in the buffer. The remaining spray drift distance would be 90 feet (100%-60% = 40% * 230 ft)[24]. If the applicator used a low boom instead of a high boom, an additional 40% reduction in distance could be used and no buffer distance would be identified (50%+10%+40% = 100%).

[24] After applying mitigations to reduce the spray drift buffer distance, the final calculated distance should be rounded to nearest 5 ft increment. (*e.g.,* 32 ft is rounded to 30 ft; 48 ft is rounded to 50 ft)

3.2.1.4 Description of Managed Areas that can be Subtracted from Spray Drift Distances

As described above, EPA relies upon the AgDRIFT® model for ground and aerial spray drift estimations. The models for ground and aerial drift were developed based on several underlying assumptions, including drift depositing onto a bare field, no obstructions to intercept spray droplets that drift off-field, and a prevailing wind direction. In practice, farms may have managed lands in areas adjacent to a pesticide application. While these managed practices may not be intentionally created for the purpose of mitigating pesticides, their composition and size on the landscape could act like a buffer (*e.g.,* roads) or intercept spray drift (which the model does not take into account) and reduce the distance it may travel. Therefore, to the extent that such managed areas are downwind and immediately adjacent to a pesticide application (provided that people are not present in those areas and they themselves not being treated with the pesticide), EPA has included these areas in what can be considered within the buffer distance. In other words, growers/applicators could subtract managed areas immediately adjacent to treated field from their identified buffer distance. See **Table 10**.

Table 10. Downwind managed areas that can represent ecological spray drift buffers.

When spray drift buffers are identified as mitigations, the following managed areas can be included in the buffer if they are immediately adjacent/contiguous to the treated field in the downwind direction and people are not present in those areas (including inside closed buildings/structures). Any label requirements that prohibit or restricts spray drift in any of these specific managed areas (*e.g.,* to protect human health) must also be followed.

a. Agricultural fields, including untreated portions of the treated field;
b. Roads, paved or gravel surfaces, mowed grassy areas adjacent to field, and areas of bare ground from recent plowing or grading that are contiguous with the treated area;
c. Buildings and their perimeters, silos, or other man-made structures with walls and/or roof;
d. Areas maintained as a mitigation measure for runoff/erosion or drift control, such as vegetative filter strips (VFS), field borders, hedgerows, Conservation Reserve Program lands (CRP)[1], and other mitigation measures identified by EPA on the mitigation menu;
e. Managed wetlands including constructed wetlands on the farm; and
f. 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, and tailwater collection ponds.

[1]Growers may need to ensure that pesticide use does not cause degradation of the CRP habitat.

In some cases, areas maintained as a mitigation measure for spray drift or runoff/erosion control, managed areas, and CRP lands could potentially represent habitat for listed species. There can be significant benefits of these habitats to listed species, with a net gain to the species when considering benefits vs. impacts of pesticides. Not all of these areas represent high quality habitat for listed species (*e.g.*, listed plants are not expected to occur within these areas). In some cases, individuals of a species may be attracted to an area that represents habitat (*e.g.*, insects may be attracted to habitat created for pollinators); however, not enough individuals are expected to be impacted within the portion of the exposed area of the habitat such that there would be an impact on the population that would outweigh the overall benefit provided by creation of the habitat. EPA does not want to disincentivize grower/applicators from providing such habitats, which may have considerable benefits to species, their environment, and pesticide use reductions. Therefore, managed areas that include habitat may be part or all of the spray drift buffer.

Figures 7 and 8 represent examples of how ecological spray drift buffers can be reduced where a pesticide product label identifies a 50-foot downwind spray drift buffer. The grower/applicator could subtract the 10 foot off-field area downwind where the grower has CRP land and the 20-foot-wide downwind windbreak, leaving only a 20 foot in-field buffer to meet the identified buffer distance (**Figure 7**). In contrast, if the off-field downwind areas of the CRP land and windbreak totaled 50 feet or more this would equal the identified spray drift buffer distance (as shown **Figure 8**).

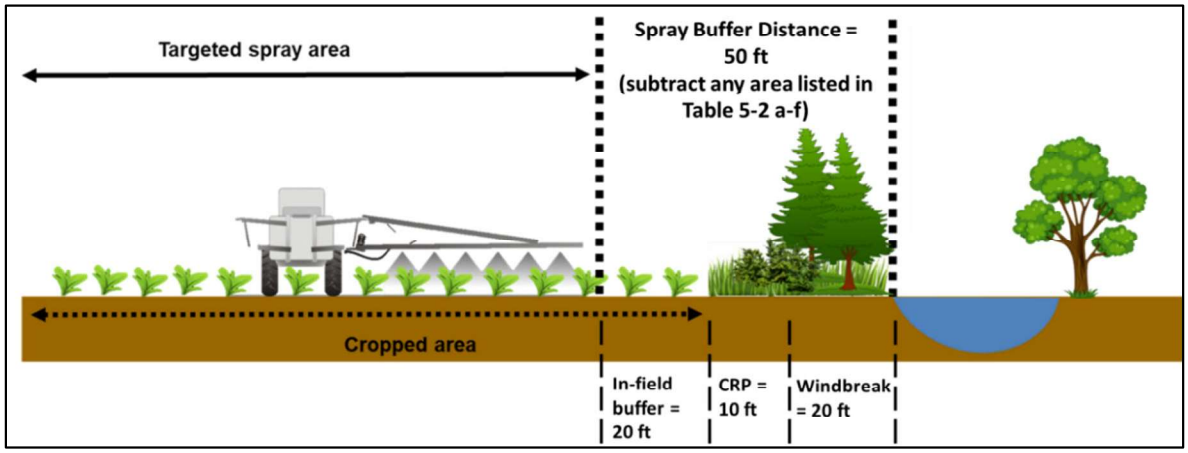

Figure 7. Diagram of the field (cropped area) with a downwind ecological spray drift buffer which includes a portion of the cropped area because the adjacent managed areas are less than the identified spray drift buffer distance.[25]

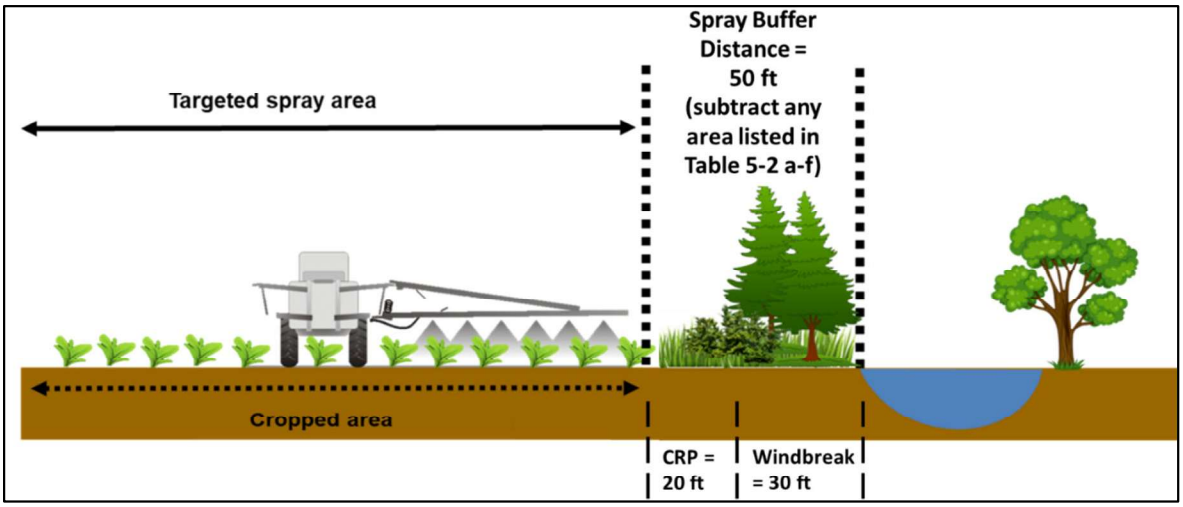

Figure 8. Diagram of the field (cropped area) with no cropped area included in the downwind ecological spray drift buffer because adjacent managed areas are equal to the identified spray drift buffer distance.[25]

[25] This figure is based on a diagram from the Pest Management Regulatory Agency of Health Canada (2020), which EPA was permitted to reproduce. The original figure is available at: https://www.canada.ca/en/health-canada/services/consumer-product-safety/pesticides-pest-management/growers-commercial-users/drift-mitigation/protecting-habitats-spray-drift.html. EPA has edited the original figure to provide an example of the areas that can be subtracted from spray drift buffer distances.

3.2.1.5 Spray Drift Exposure Associated with Overhead and Impact Sprinkler Chemigation Systems

Overspray from overhead and impact sprinkler chemigation systems can expose non-target species to herbicides. EPA identified mitigation measures for overhead and impact sprinkler chemigation equipment to address identified potential for population-level impacts to listed species. The measures are listed below in **Table 11**. Unlike aerial/ground or airblast applications, it does not include identified spray drift distances (buffers), but rather measures intended to reduce the potential for irrigation overspray into non-target areas. The type and extent of the identified measures depends on the level of the potential for population-level impacts as well as the type of chemigation equipment. The table below and the **Ecological Mitigation Support Document** provides additional discussion and details about the measures identified to mitigate low, medium and high population-level impacts.

Table 11. Mitigation measures identified when making pesticide applications via overhead and impact sprinkler chemigation systems.

Potential for Population-level Impacts from Step 1	Mitigation Measures	
	Overhead Chemigation[1]	Non-End Gun Impact Sprinklers
Not Likely	None	None
Low	No end gun	Limit throw distance to edge of field (treated area)[2]
Medium	No end gun and one of the following: reduce pressure (<20 psi); reduce release height (<5 ft); have a windbreak[3]	
High	No end gun and two of the following: reduce pressure (<20 psi); reduce release height (<5 ft); have a downwind windbreak[3]	Limit throw distance to edge of field (treated area) AND have downwind windbreak[3]

[1] Refers to *e.g.*, center pivot, overhead systems, traveler systems that have sufficient pressure/end guns.
[2] This can be accomplished by either reduced pressure and/or reduced throw angle.
[3] This can be a windbreak/hedgerow/riparian/forest/shrubland/woodlots. See Ecological Mitigation Support Document for additional details.

3.2.2 Runoff/Erosion Mitigation Measures

EPA developed a runoff/erosion mitigation menu that included mitigations for non-target species, including listed species. As this strategy is implemented through FIFRA actions, pesticide product labeling would direct the user to the mitigation menu website (see **Section 3.2.2.2**). EPA elected to develop a mitigation menu to provide flexibility for growers/applicators to use mitigations that are best for their situation when a pesticide product they want to use includes the requirement to achieve a level of mitigation and directs the user to the menu. These measures are identified in **Table 13** and described in more detail in the **Ecological Mitigation Support Document** Version 1.0. EPA categorized these runoff/erosion mitigation measures as follows:

- **Application Parameters** that growers/applicators may elect to employ to reduce potential pesticide runoff and erosion (annual application rate reduction, partial field treatment, soil incorporation).
- **Field Characteristics** that are likely to indicate the field will have less runoff and erosion than other fields and thus need fewer mitigation measures to reduce runoff/erosion transport (*e.g.,*

fields with a low slope likely have less runoff/erosion, permeable sandy soils have less runoff than high clay content soils).

- **In-field Mitigation Measures** that users may elect to employ to reduce potential pesticide runoff and erosion are those that involve the management of the field. (*e.g.,* management of irrigation water, cover crops, or reduced tillage).
- **Adjacent to the Field Mitigation Measures** are those that occur next to the field and down-gradient from where the pesticide application occurs and between the treated field and species' habitat (*e.g.,* grassed waterway, VFS). Some measures may occur on the field and also adjacent to the field, so they are included in both categories (*e.g.,* VFS).
- **Systems that Capture Runoff and Discharge** are those that capture, collect, and discharge runoff through discrete conveyances (*e.g.,* water retention systems such as ponds and sediment basins).
- **Other Mitigation Measures** are those that may be considered but that do not fit into the categories above.

Additional considerations associated with the extent of mitigation associated with any particular field/area include:

- **Pesticide Runoff Vulnerability**: an analysis of pesticide runoff vulnerability across the lower 48 states that may influence the amount of runoff/erosion mitigation for a particular site.
- **Areas 1000 feet Down-Gradient from Application Areas**: areas where there is not a potential for population-level impacts from off-site exposure to runoff/erosion from pesticide applications.
- **Conservation Program and Runoff/Erosion Specialists/Mitigation Tracking:** recognition that growers/applicators that work with a runoff/erosion specialist or participate in a conservation program would likely achieve higher than average mitigation measure efficacy and benefits of mitigation tracking.

As described in **Section 3.2.2.5,** EPA has identified several mitigation measures that when employed on a field by themselves, would result in runoff/erosion exposures that would not likely have a potential for population-level impacts. If the following mitigation measures are employed, then no further runoff/erosion mitigations would be needed:

- systems with permanent berms;
- tailwater return systems; and
- subsurface tile drains, *with* controlled drainage structures

In addition, EPA's evaluation indicated the run-off/erosion exposure from several herbicide application methods would be limited and thus the potential for population-level impacts is unlikely. These application methods include the following:

- tree injection;
- some chemigation methods, including subsurface and under non-permeable plastic surfaces;
- soil injection; and

- 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;

As detailed in the **Ecological Mitigation Support Document,** for each of the measures included in the runoff/erosion mitigation menu, EPA evaluated their effectiveness at reducing offsite transport via runoff/erosion (high, medium, or low). In general, a mitigation with a low, medium, or high efficacy achieves an average of 10-30%, 30-60%, and greater than or equal to 60% reduction, respectively. EPA's evaluation of the efficacy for each mitigation measure is based on empirical evidence, modeling, the efficacy of functionally equivalent measures, and EPA's best professional judgment of the mitigation's potential to be effective at reducing offsite transport of pesticides.

In order to include as many options as feasible across dozens of measures with varying degrees of efficacy, EPA utilized a point system for runoff/erosion mitigations to 1) associate the number of points with each MoD category for runoff/erosion; and 2) assign lower or higher point values to mitigation practices that are less or more effective, respectively, in reducing runoff/erosion. EPA assigned efficacy points to each of the measures on the runoff/erosion mitigation menu based on the efficacy of reducing exposure of the mitigation measure. High efficacy mitigation measures are worth 3 points, medium efficacy measures are worth 2 points, and low efficacy measures are worth 1 point (**Table 13**).

3.2.2.1 Level of Mitigation Identified for Runoff/Erosion

Where EPA determines a potential for listed species population-level impacts associated with runoff/erosion to be low, medium, or high, EPA would identify the level of mitigation needed to reduce exposures so that population-level impacts are no longer likely. EPA determines this first based upon the MoDs associated with the use of the pesticide being evaluated, which are related to the potential for population-level impacts. Mitigation measures (or combination of mitigation measures) that achieve three points are functionally equivalent to approximately an order of magnitude (*i.e.,* 10x) reduction in off-field exposure concentrations of pesticides transported via runoff. For erosion-prone chemicals, and those bound to sediment, EPA adjusts the points required to achieve an order of magnitude reduction in exposure concentrations. For erosion, 2 points are generally equivalent to an order of magnitude reduction in exposure concentration given the lower mobility of soil particles relative to water and increased effectiveness of mitigation practices at reducing soil in runoff. This order of magnitude reduction is equivalent to the reduction needed to drop from one category of potential for population-level impacts to a lower category (*e.g.,* from high to medium). **Table 12** presents the number of points EPA has identified to address potential for population-level impacts of runoff/erosion to wetland and aquatic habitats used by plants.

Table 12. Number of mitigation points identified to reduce exposure via runoff and erosion.

Potential for Population-level Impacts	Magnitude of Reduction in Exposure Needed to Result in a Not Likely Potential for Population-Level Impacts Conclusion	Mitigation Points Identified	
		Runoff-Prone [K_{OC} <1000 or K_d <50][1]	Erosion-Prone [K_{oc} ≥1000 or K_d ≥50][1]
Not Likely	None	None	
Low	10 x	3	2
Medium	100 x	6	4
High	1000 x	9	6

[1] The soil-water distribution coefficient (K_d) and organic-carbon normalized soil-water distribution coefficient (K_{OC}) are measures of the propensity of a chemical to be dissolved in water or sorbed to soil or sediment. K_{OC} and K_d values are measured in studies conducted under OCSPP Guideline 835.1230 (USEPA, 2008). The average K_{OC} or K_d is used to distinguish between runoff-prone and erosion-prone pesticides.

While a multitude of factors determine the fate and transport of a pesticide in the environment, one fundamental physio-chemical property of a pesticide is the sorption coefficient, otherwise known as the Koc[26]. This property describes whether a chemical tends to adsorb (*i.e.,* bind to) to soil particles or remain in water (USEPA, 2006). Chemicals with a higher Koc tend to adsorb to soil and are more likely to be transported by soil erosion, while chemicals with lower Koc tend to partition to water and are more likely to be present in runoff. Several of the runoff/erosion mitigation measures listed in the **Ecological Mitigation Support Document** function by removing soil, and therefore soil-sorbed pesticides, from runoff. This difference between chemicals results in runoff and erosion mitigations being inherently more effective for erosion prone pesticides. Examples of this phenomena can be seen in the literature for various mitigation measures, including vegetative filter strips, sedimentation basins, and cover crops/mulching. Across these three examples, the mitigations were found to be 20-30% more efficacious for erosion-prone pesticides compared to runoff-prone pesticides (**Ecological Mitigation Support Document**). EPA used this difference as the basis for the reducing the number of mitigation points erosion-prone pesticides.

3.2.2.2 Runoff and Erosion Mitigation Measures Menu

EPA identified runoff/erosion mitigations that would be included on EPA's mitigation menu website for growers/applicators to employ when EPA identifies mitigations for non-target species, including listed species, are needed to address population-level impacts from runoff/erosion. EPA assigned efficacy points to each of the runoff/erosion mitigation measures based on the efficacy of the mitigation measure to reduce exposure. The mitigation menu website will show the efficacy points assigned to each mitigation. The identified mitigation measures included on the menu and associated point values are presented in **Table 13.** EPA will update the menu with additional mitigation measures when appropriate (see **Section 4.0**).

[26] The organic-carbon normalized soil-water distribution coefficient (K_{OC}) is a measure the propensity of a pesticide to be dissolved in water or sorbed to soil or sediment. For some pesticides, sorption is described using the soil-water distribution coefficient (K_d) without organic-carbon normalization. K_{OC} and K_d values are measured in studies conducted under OCSPP Guideline 835.1230 (USEPA, 2008).

Mitigation measures that have been identified as of July 2024 are described in the **Ecological Mitigation Support Document** Version 1.0, and the mitigation list and point system outlined in that document are expected to be incorporated into the mitigation menu website later in 2024.

EPA has identified runoff/erosion mitigations for which efficacy data is available to provide options and flexibility to the grower.[27] EPA welcomes input on the efficacy of additional measures that growers may be using that the Agency did not include. EPA acknowledges that the mitigation menu will continue to evolve over time and the Agency plans to update the mitigation menu website with additional measures or refinements to those identified to date as new information becomes available.

[27] The Herbicide Strategy provides mitigation points for measures growers/applicators already employ if the measures are known to be efficacious for reducing runoff/erosion. If a grower/applicator is already implementing a mitigation measure on the menu, they may be able to implement fewer additional measures on their field to achieve the identified by the Herbicide Strategy.

Table 13. Runoff/erosion mitigation measures and associated point-values for reducing exposures. [28]

Mitigation Measure Title[1]	Conditions that Qualify[1,2]	Efficacy Classification	Points
Application Parameters			
Annual Application Rate Reduction	Any application 10% to <30% less than the maximum labeled annual application rate	Low	1
	Any application 30% to <60% less than the maximum labeled annual application rate	Medium	2
	Any application ≥60% less than the maximum labeled annual application rate	High	3
Reduction in Proportion of Field Treated[29]	10 to <30% of Field Area treated (Banded application, partial treatment, precision sprayers)	Low	2
	30 to <60% of Field Area treated (Banded application, partial treatment, precision sprayers)	Medium	3
	≥60% of Field Area treated (Banded application, partial treatment, precision sprayers)	High	4
Soil incorporation	Watering-in or mechanical incorporation before runoff producing rain event	Low	1
Field Characteristics[3]			
Field with slope ≤ 3%	Naturally low slope or flat fields; flat laser leveled fields	Medium	2
Predominantly Sandy Soils[4]	Fields with sand, loamy sand, or sandy loam soil without a restrictive layer that impedes the movement of water through the soil	Medium	2
In-Field Mitigation Measures[3]			
Reduced Tillage Management	Reduced tillage, mulch tillage, strip till, ridge tillage	Medium	2
	No-till	High	3
Reservoir Tillage	Reservoir tillage, furrow diking, basin tillage	High	3
Contour Farming	Contour farming, contour tillage, contour orchard and perennial crops	Medium	2
In-field Vegetative Strips	Inter-row vegetated strips, strip cropping, alley cropping, prairie strips, contour buffer strips, contour strip cropping, prairie strip, alley cropping, vegetative barrier (occurring in a contoured field)	Medium	2
Terrace Farming	Terrace farming, terracing, field terracing	Medium	2

[28] Current as of Herbicide Strategy Publication Date. The actual menu should be consulted from the website: https://www.epa.gov/pesticides/mitigation-menu At the time of the release of this document, the website reflects the ecological mitigation associated with the FIFRA IEM effort. EPA will periodically update the website with additional mitigation measures as the mitigation options and efficacy evaluation evolves. EPA will also provide details on how this website should be used for these strategies.

[29] See the **Ecological Mitigation Support Document** for an explanation of the points for this mitigation measure.

Mitigation Measure Title[1]	Conditions that Qualify[1,2]	Efficacy Classification	Points
Cover Crop/Continuous Ground Cover	Cover crop, double cropping, relay cropping	Low (tillage used)	1
		Medium (no tillage, short term)	2
		High (no tillage, long term)	3
Irrigation Water Management	Use of soil moisture sensors/evapotranspiration meters with center pivots & sprinklers; above ground drip tape, drip emitters; micro-sprinklers	Medium (general irrigation management)	2
	Below tarp irrigation, below ground drip tape; dry farming, non-irrigated lands	High (subsurface irrigation; no Irrigation)	3
Mulching with Natural and Artificial Materials	Mulching with artificial materials (*i.e.,* landscape fabrics, synthetic mulches)	Low	1
	Mulching with natural materials	High	3
Erosion Barriers	Wattles, Silt Fences	Medium	2
Adjacent to Field Mitigations[5]			
Grassed Waterway	Grassed waterway	Medium	2
Vegetative Filter Strips - Adjacent to the Field	20 to <30 ft Vegetative filter strip (VFS), field border	Low	1
	30 to <60 ft Vegetative filter strip (VFS), field border	Medium	2
	≥60 ft Vegetative filter strip (VFS), field border	High	3
Vegetated Ditch	Vegetated ditch	Low	1
Riparian Area	20 to <30 ft Riparian forest buffer, riparian herbaceous cover Riparian forest buffer, riparian herbaceous cover	Low	1
	30 to <60 ft Riparian forest buffer, riparian herbaceous cover	Medium	2
	≥60 ft Riparian forest buffer, riparian herbaceous cover	High	3
Constructed and Natural Wetlands	Constructed wetlands, Wetland and Riparian Landscape/Habitat Improvement	High	3
Terrestrial Habitat Landscape Improvement	20 to <30 ft Terrestrial Landscape/habitat improvement	Low	1
	30 to <60 ft Terrestrial Landscape/ habitat improvement	Medium	2
	>60 ft Terrestrial Landscape/ habitat improvement	High	3
Filtering Devices with Activated Carbon or Compost Amendments	Filters, sleeves, socks, or filtration units containing activated carbon	High	3
	Filters, sleeves, socks, or filtration units containing compost	Low	1
Systems that Capture Runoff and have Controlled Discharges			
Water Retention Systems	Retention pond, sediment basins, catch basins, sediment traps	Medium	2
Subsurface Drainages and Tile Drainage Installed *without* Controlled Drainage Structure	Subsurface tile drains, tile drains	Low	1

Mitigation Measure Title[1]	Conditions that Qualify[1,2]	Efficacy Classification	Points
Other Mitigation Measures			
Mitigation measures from multiple categories (*i.e.*, in-field, adjacent to the field, or water retention systems) are utilized.[6]	See measures in categories above.	Low	1

[1] Proposed mitigation measures descriptions specific to pesticides were published in the Ecological Mitigation Support Document to Support Endangered Species Strategies Version 1.0 (USEPA, 2024). Not all measures are applicable to all fields and crops.

[2] Only one of the practices that qualify from a 'mitigation measure' can be used. For example, a user could get mitigation points for cover cropping or double cropping but not both.

[3] Multiple field characteristics may apply to an individual field.

[4] Soil texture is as defined by USDA's soil classification system. See USDA's Web Soil Survey tool to determine soil texture: https://websoilsurvey.nrcs.usda.gov/app/.

[5] Adjacent to the field mitigations should be located downgradient from a treated field to effectively reduce pesticide exposure in runoff and erosion.

[6] For example, if a cover cropping and adjacent to the field VFS are both utilized, the efficacy of the mitigation measures in combination may be increased.

3.2.2.3 Mitigation Relief based on Pesticide Runoff Vulnerability

The amount of runoff and erosion transport differs across the contiguous U.S., especially due to differences in frequency and amount of rainfall. EPA evaluated the scientific literature and developed analyses to differentiate geographical areas by runoff vulnerability and reduced the amount of runoff/erosion mitigation identified in those areas. In practice, this is county level relief points that reduces the amount of additional mitigation that would be needed in areas that do not have high pesticide runoff vulnerability. A list of counties and associated relief points (**Appendix B**) will be provided on the mitigation menu website[30]. As described in more detail in the **Ecological Mitigation Support Document**, EPA evaluated the relative vulnerability of areas across the lower 48 states to pesticide runoff using PWC. EPA used a generic runoff-prone chemical with approximately three million scenarios across the lower 48 states to rank runoff vulnerability relative to the modeled maximum scenario. The scale of this modeling simulation was conducted at a much finer resolution than that of EPA's standard aquatic modeling for regulatory actions (*i.e.,* 2-digit HUC resolution).

The evaluation of this information resulted in a determination that pesticide runoff vulnerability can be defined at a county level with four categories (very low, low, medium and high) representing spatially where exposures of pesticides in runoff may be representative of EPA's upper bound estimates (*e.g.,* high pesticide runoff vulnerability counties) compared to areas where concentrations in pesticide runoff are likely being overestimated (*e.g.,* counties with very low pesticide runoff vulnerability). The relative level of pesticide runoff vulnerability that EPA expects for each of these categories is summarized in **Table 14**.

Counties classified as highly vulnerable to pesticides occurring in runoff would reflect those that have greater potential for population-level impacts. EPA chose the county level scale to communicate runoff vulnerability to balance ease of communication, data resolution, and environmental variability. For medium, low, and very low vulnerability areas, EPA's evaluation shows the potential for population-level impacts may be increasingly overestimated. To account for this overestimation, EPA will provide mitigation relief in the form of points. EPA assigned relief[31] points to all counties with medium (2 points), low (3 points), or very low (6 points) pesticide runoff vulnerability (**Table 14, Figure 9; Appendix B**). This county-level relief reduces the amount of additional mitigation that would be identified in areas that do not have high pesticide runoff vulnerability. This approach represents a spatially refined analysis (compared to EPA's national-level screening assessments; **Ecological Mitigation Support Document**) where EPA can consider differences in exposure across the country and the amount of relief points align with the magnitude of difference methodology described in **Step 2 (Figure 9)**. Just as in **Step 2**, each order of magnitude reduction is equivalent to 3 relief points, so EPA assigned areas with very low pesticide runoff vulnerability 6 relief points (approximately 2 orders of magnitude reduction), 3 relief points to areas with low pesticide runoff vulnerability (approximately 1 order of magnitude reduction), and 2 relief points to areas with medium pesticide runoff vulnerability (approximately ½ order of magnitude reduction).

[30] Mitigation menu website: https://www.epa.gov/pesticides/mitigation-menu

[31] EPA defines relief as a level of reduction for required points of a given pesticide and is based on a field's geographic location.

EPA estimates that these relief points may reduce the additional runoff mitigation burden (level of mitigation points identified) for approximately 80% of cultivated agriculture acres and 95% of specialty and minor crop production acres. Relief points can be used when mitigations are implemented on the general pesticide product label or on PULAs that fall within counties where relief points are available.

Table 14. Categories of magnitude of difference from nationwide maximum pesticide runoff vulnerability score with corresponding percentiles and classifications.

Order of Magnitude Lower than Max	Pesticide Runoff Vulnerability	
	Percentile	Classification
~2	0 – 9%	Very low
~1	10 – 49%	Low
~Half	50 – 84%	Medium
Maximum	85 – 100%	High

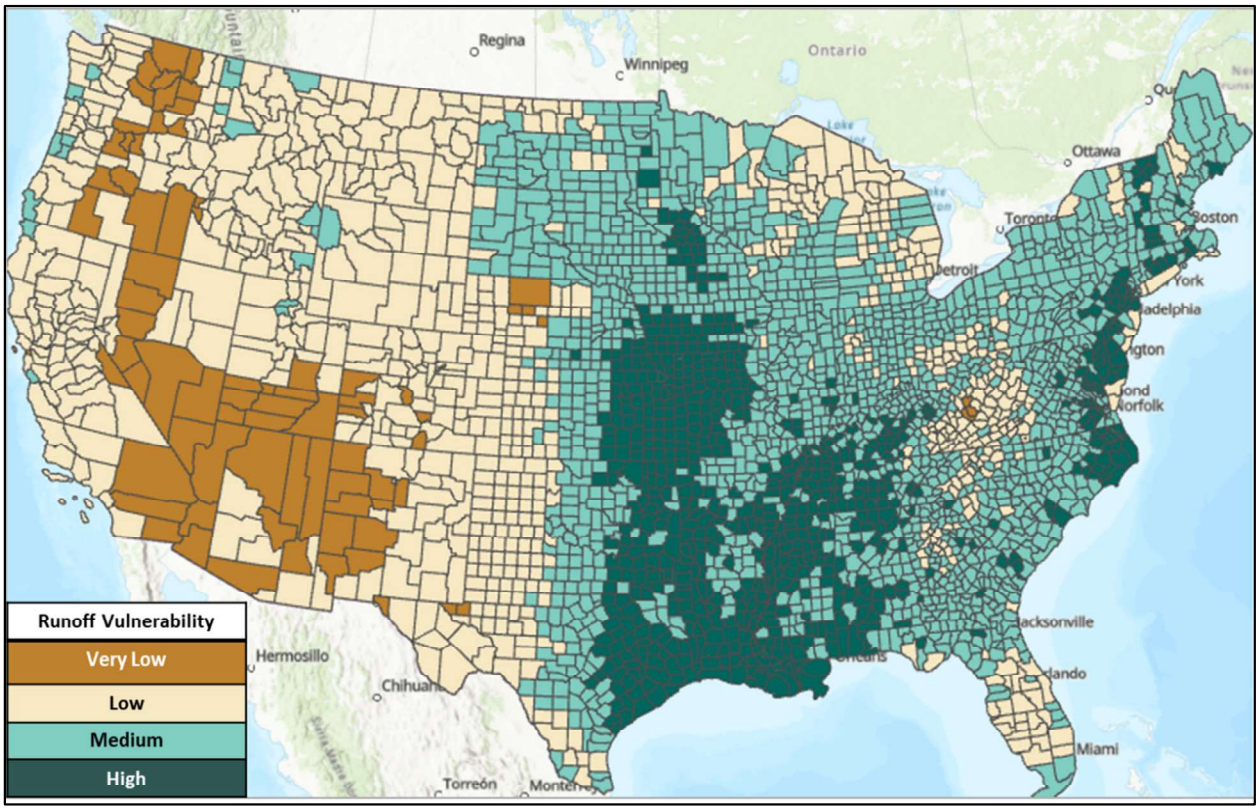

Figure 9. Pesticide runoff vulnerability at the county level.

3.2.2.4 Run-Off/Erosion Mitigation Relief for Areas 1000 feet Down-Gradient from Application Areas

Pesticide exposure to non-target organisms and their habitat via runoff/erosion is highest the closer the non-target species are to the pesticide application area. Runoff and erosion are directional, meaning off-site transport occurs when an adjacent area is at a lower elevation than a pesticide application area. As described in the **Ecological Mitigation Support Document**, based on an analysis of overland flow and sheet flow and the distance to various watersheds and waterbodies, EPA concluded that pesticide concentrations in runoff that have the potential to rise to population-level impacts can extend up to 1,000 feet downslope from a pesticide application. Accordingly, areas beyond 1,000 feet are likely to receive less runoff and erosion from the treated field, if at all, making the potential for population-level impacts unlikely. EPA does not identify runoff/erosion mitigations for pesticide applications areas more than 1,000 feet downwind from a terrestrial or aquatic habitat for listed species. EPA received comments from a wide variety of stakeholders that EPA should not rely on habitat descriptions to determine if an application is within 1,000 feet of such habitats because stakeholders could not readily identify them based on those descriptions. When EPA develops PULAs for geographically specific runoff/erosion mitigations, it ensures the geographic extent of the mitigations does not extend beyond 1,000 feet from those areas it identifies for conservation of a listed species and its critical habitat (See **Section 3.3.3** for additional information on PULA development). However, in **Step 3** of the Herbicide Strategy and as described in **Section 3.3.1**, in some cases, when this strategy is applied to a FIFRA action, EPA expects to identify mitigations for listed species that would apply across the full spatial extent of a use pattern (*e.g.*, specific crops) within the contiguous U.S., specifying the mitigations on the general pesticide product label. In this case, EPA's assessment similarly does not show that growers/pesticide applicators should need to implement mitigations unless they are within 1,000 feet of habitat or a waterbody. To account for this and in light of the stakeholder comments, rather than describe habitats, EPA is relying on managed lands as described in **Section 3.2.1.4** above for spray drift. Many farms have highly managed lands in areas adjacent to a pesticide application and EPA does not expect these managed lands to contain sufficiently suitable species habitat that enough individuals would be exposed to rise to a potential population-level impact. This similarly extends to mitigation measure for drift or runoff/erosion or drift control, and CRP lands (See **Section 3.2.1.4**). Therefore, to the extent that managed areas represent the entirety of 1,000 feet downslope and immediately adjacent to a pesticide application (and they themselves not being treated with the pesticide), EPA did not identify a potential for population-level impacts. Therefore, EPA did not identify runoff/erosion mitigations. **Table 15** describes the managed areas that EPA has identified for purposes of runoff/erosion mitigation.

Table 15. Downslope managed areas within 1000 feet downslope of treated area where runoff/erosion mitigations were not identified.

a. Agricultural fields, including untreated portions of the treated field; b. Roads, paved or gravel surfaces, mowed grassy areas adjacent to field, and areas of bare ground from recent plowing or grading that are contiguous with the treated area; c. Buildings and their perimeters, silos, or other man-made structures with walls and/or roof; d. Areas maintained as a mitigation measure for runoff/erosion or spray drift control, such as vegetative filter strips (VFS), field borders, hedgerows, Conservation Reserve Program lands (CRP)[32], and other mitigation measures identified by EPA on the mitigation menu; e. Managed wetlands including constructed wetlands on the farm; and f. 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, and tailwater collection ponds.

3.2.2.5 Mitigation Measures that in and of Themselves Reduce Exposure Such That Potential Population-Level Impacts are Unlikely

In some instances, EPA may determine that growers and applicators would not need additional runoff/erosion mitigation measures because a particular measure in and of itself reduces exposure such that potential population-level impacts are unlikely. Each of these measures is described in more detail in the **Ecological Mitigation Support Document** and summarized below.

Systems with permanent berms are treated fields that are surrounded by an elevated border or perimeter (*e.g.,* berms) are in place at the time of application and carried through the cropping season. Under these conditions rainfall and irrigation water is expected to be kept on the treated field. Example cropping systems include cranberry bogs, rice paddies, and drainage ditch & berm systems.

For treated fields with irrigation tailwater return systems, all runoff water from rainfall or irrigation is collected and stored on site for later use. Thus, runoff and/or erosion offsite from the field is not expected. Tailwater return systems are frequently paired with furrow and border-strip irrigation systems in both row and field crop agriculture.

If the field has subsurface drainage installed and maintained (*e.g*., tile drains), runoff from the field will be greatly reduced. To maintain protection of non-target taxa, the subsurface tile drains must release the effluent (water) into water-controlled drainage structures or a saturation buffer zone that do not release water into downstream off-farm aquatic areas. Runoff from the entire field would need to be controlled and directed into a pond/saturation zone.

[32] Although some areas associated with mitigation or conservation measures (*e.g.,* Conservation Reserve Program (CRP), Agricultural Conservation Easement Program (ACEP) areas) may be attractive to species such as pollinators, these areas may be included in the identified buffer distance because EPA does not want to disincentivize growers from providing such habitats, which may have considerable benefits to species, their environment, and pesticide use reductions. Growers may need to ensure that pesticide use does not degrade the degradation of the CRP habitat.

3.2.2.6 Conservation Program, and Runoff/Erosion Specialist, and Mitigation Tracking

EPA's evaluation of available efficacy data for many of the runoff/erosion mitigation measures demonstrates that the efficacy of many mitigations is highly variable from one study to the next (and from site to the next). For example, for some measures, studies show that efficacy may range from 0% to 100%. For any given mitigation measure, a range of efficacy is expected depending on the specific implementation of the measure, the environmental conditions of the area, site and soil characteristics of the treated field, maintenance, upkeep of the mitigation measure, and the physical-chemical properties of the pesticide.

Often, grower/applicators work with a technical expert in runoff/erosion control or a conservation program with a goal of reducing runoff/erosion. Because these experts consider and make recommendations for the site-specific conditions, when a grower/applicator installs a runoff/erosion measure to the specifications from such an expert, EPA has higher confidence that mitigation measures identified and implemented at the field level would achieve the higher end of the available efficacy data. As such, EPA identified mitigation points available for grower/applicators that work with a qualifying technical expert **or** participate in a qualifying conservation program.

A grower/applicator may receive mitigation points working with a technical expert or participating in a conservation program, but not both. The grower/applicator would receive points for any of their fields that are included in the expert consultation or conservation program, which could be an entire farm or a fraction of it (*e.g.*, some fields, but not all within a farm). The grower/applicator would not get additional points for both working with an expert/specialist and for participating in a conservation program, since the expert/specialist is inherently part of the program. Additionally, these points are not applicable to each mitigation measure but rather would be in addition to the points a grower/applicator obtains from other mitigation menu items (*e.g.*, if the farm is located in an area of low pesticide runoff vulnerability) and for implementing mitigation measures. Each of these options and the associated mitigation points are described in more detail below.

3.2.2.6.1 Follow Recommendations from a Runoff/Erosion Specialist

Grower/applicators may work with a technical expert to develop mitigation plans that work for their field and that are efficacious in reducing runoff and/or erosion. As described above, when a grower/applicator is working with a technical expert who embodies the characteristics below, EPA expects that the mitigation measures would be selected and implemented considering site-specific conditions, including the soil type, field slope, hydrology, local climate, crop(s) grown, pest concerns, drainage systems, irrigation needs, and equipment availability. Specific cropping systems and regions have established norms and practices based on real-world experience that on-site professionals (*i.e.*, technical experts) can account for in the planning process. In this case, EPA expects the efficacy of runoff/erosion mitigation measures would be on the higher end of the range of efficacy. To account for this, EPA identified **one runoff/erosion mitigation point** available to grower/applicators that work with a runoff/erosion technical expert that meets the characteristics described below. The point for working with the technical expert is in addition to the points for implementing mitigation measures identified in the strategy.

EPA has reviewed available information regarding characteristics that often apply to meet the description of a technical expert. At a minimum, there is usually an education (and a continuing education) and an experience component. Based on this review, EPA identified three benchmarks for technical experts, which include:

- Have technical training, education and/or experience in an agricultural discipline, water or soil conservation, or other relevant discipline that provides training and practice in the area of runoff or erosion mitigation technologies/measures; **And**
- Participate in continued education or training in the area of expertise which should include run off and erosion control; **And**
- Have experience advising on conservation measures designed to develop site specific runoff and erosion plans that include mitigation measures described in EPA's Mitigation Website.[33]

EPA has identified the following examples of technical experts: NRCS and similar state or regional level program staff, Certified Crop Advisor, Pesticide Control Advisor, Certified Professional Agronomist, National Alliance of Independent Crop Consultants (NAICC), EnviroCert International, Inc., Certified Professionals in Erosion and Sediment Control, Technical Service Providers, and extension agents. **EPA acknowledges that this list is not exhaustive, and the inclusion of an organization should not be construed as an endorsement of any particular group by EPA.**

3.2.2.6.2 Participate in a Conservation Program

Conservation programs provide technical expertise as described above, as well as additional support to grower/applicators. Based on EPA's review of available information on existing programs, this support may include oversight in the form of a review of design, installation, and upkeep/maintenance plan for the identified mitigations. In addition, the programs typically include documentation demonstrating the site-specific plan meets any program requirements.

While conservation programs are not solely designed to reduce offsite transport of pesticides, several of the same types of mitigations that reduce offsite transport of nutrients and/or soil erosion from an agricultural field also reduce offsite transport of pesticides. Evaluating a field for the purpose of reducing nutrients in runoff and/or soil erosion is likely to result in similar recommended mitigations as those included in the runoff mitigation menu.

However, with few exceptions, EPA is not aware of any conservation programs that are designed specifically to reduce offsite transport to an extent where population-level impacts to listed species are unlikely. Therefore, while existing conservation programs may recommend similar mitigation measures, these measures may or may not be enough to address potential impacts to listed species. In addition, data is not readily available on the extent to which grower/applicators that participate in these conservation programs (and participation is voluntary) implement all program recommendations. For

[33] EPA's mitigation menu is available at: https://www.epa.gov/pesticides/mitigation-menu and a description of the mitigations is available at https://www.epa.gov/pesticides/menu-measure-descriptions.

these reasons and given the goals of the strategies, EPA is not able to provide a full exemption for these programs at this time. Rather, EPA identified **two runoff/erosion mitigation points** available to grower/applicators that participate in a conservation program. The additional mitigation point for participation in a conservation program over consulting a technical expert is because programs include some additional minimum characteristics summarized below.

EPA has developed the following minimum characteristics for a conservation program to receive the two points. Only programs that include all of these characteristics are eligible for the points.

- The program provides advice from individuals who meet the same benchmarks provided above for technical experts; **And**
- The program provides site-specific guidance tailored to the grower/applicator's crop and/or location; **And**
- The program focuses on reducing or managing runoff and/or erosion (including for example, soil loss, soil conservation, water quality protection) from agricultural fields or other pesticide use sites; **And**
- The program provides documentation of program enrollment. EPA is **not** suggesting that this documentation be provided to EPA; **And**
- The program includes verification of implementation of the recommended measures or activities (measures were established and maintained). Verification can be done through the conservation program and provided to the program enrollee. Verification is **not** required to be submitted to EPA.

Note: EPA identified that mitigation points should be available for past participation in programs that meet the minimum characteristics, provided that measures are currently on the field, have been maintained over time, and are recertified by a runoff and erosion technical expert [federal, state, or local; *e.g.*, Certified Crop Advisor, Pesticide Control Advisor, Conservation Crop Protector, Certified Professional Agronomist, National Alliance of Independent Crop Consultants (NAICC), agronomists that are part of grower cooperatives].

3.2.2.6.3 Mitigation Tracking

All of the mitigation measures identified for the Herbicide Strategy and described in the Mitigation Support Document have been determined by EPA to provide some level of reduction of the potential for population-level impacts to listed species from pesticide exposure in runoff/erosion. Consistent with typical agricultural practices, EPA expects that mitigation tracking would be done on paper or on an electronic format. Tracking the mitigations a grower/applicator employs at the field and farm level could provide several benefits to the grower/applicator. Tracking of the employed mitigation measures could help a grower/applicator ensure that they are achieving the number of points to satisfy any labeling requirements that include mitigations to address population-level impacts. Additionally, tracking the mitigations employed could assist with future planning of farm needs, and is generally aligned with the concepts of agricultural best management practices (commonly known as BMPs). Where a grower/applicator has a well thought out plan for the growing season which includes the tracking of mitigation measures employed, EPA would have increased confidence that measures have been

implemented and properly accounted for. Therefore, EPA is assigning **one point** for any grower/applicator who tracks their mitigations on paper or in electronic format in addition to any points for working with a specialist or participating in a conservation program. Working with a runoff/erosion specialist or participation in a program is not required to be eligible for this point, and therefore this point is available for any grower/applicator that tracks their mitigation measures.

3.3 Step 3. Identify Geographic Extent of Mitigation

For the Herbicide Strategy, EPA intends to apply mitigations, when appropriate, broadly across the full spatial extent of a use pattern (*e.g.,* specific crops) within the contiguous U.S., specifying the mitigations on the general pesticide product label. Through FIFRA actions, where EPA identifies mitigations that would apply in geographically specific areas only (referred to as Pesticide Use Limitation Areas or PULAs). Depending on the herbicide, EPA may use both or one or the other option or a combination of both. As discussed below, where mitigations are identified for listed generalists, these measures would be included on the general label, and labeling statement directing a user to BLT when additional mitigations are identified for listed plants.

EPA expects that applicants/registrants include mitigations on their proposed general pesticide product label where mitigations broadly apply (*e.g.,* cover large geographic areas, for generalists) instead of to certain geographic areas (*e.g.,* PULAs).

Where EPA identifies mitigations specific to certain geographic areas, it generally uses Geographic Information System (GIS) mapping information to identify where a pesticide limitation applies to a listed species or group of species. Such areas, along with a description of the use directions applicable to that area for a pesticide, are called PULAs. PULAs focus on areas where pesticide exposures are likely to impact the continued existence of a listed species, which may include a reduction in survival or recovery of the species. Thus, the purpose of a PULA is to identify geographic areas where pesticide mitigations apply to conserve a

Key Definitions for Step 3 of the Herbicide Strategy Framework

Bulletins Live! Two (BLT): BLT is the web-based application to access Endangered Species Protection Bulletins (Bulletins). EPA uses BLT to communicate where additional pesticide use directions may be needed to protect listed species in geographically specific areas.

Pesticide Use Limitation Areas (PULAs): A PULA is the specific geographic area associated with particular pesticide mitigations for a listed species, groups of listed species, or designated critical habitat. PULAs are used in BLT to provide pesticide applicators with specific locations where use restrictions may apply to their intended pesticide application to protect listed species or their designated critical habitat.

Endangered Species Protection Bulletins: A bulletin is the printed copy from the BLT application that provides the geographically specific mitigations for the pesticide application. The general pesticide product labeling directs applicators to the BLT system. Bulletins typically include both the PULA and the mitigations that apply within that PULA. Once PULAs are developed, each PULA # that applies for a pesticide product would be on the general pesticide product label and the BLT system will be used to help the applicator identify which PULA # applies to their location. When directed by the label to Bulletins these become enforceable pesticide use limitations to protect listed species or designated critical habitat.