North Dakota Pest Management
Mitigation Effectiveness Guide

Pest Management (595) requires:

- An environmental risk evaluation
    - Erosion (RUSLE2 & WEQ)
    - Pesticide application (WIN-PST)
- Identification of sensitive areas
- And appropriate mitigation for all identified environmental risk or sensitive areas.

Erosion environmental risk(s) that are greater than "T" for the design soil require conservation practices that result in predicted erosion rates no greater than "T".

Pesticide environmental risk(s) consist of the "hazard rating" that is identified in the soil/pesticide interaction report from WIN/PST and sensitive area(s) that are identified by the conservation planner.

- *If the hazard rating is V or L (very low or low) for leaching or solution runoff*, no treatment is required, but the management techniques from the following table are recommended.

- *If the hazard rating is I (intermediate) for leaching or solution runoff*, required treatments are the management techniques from the following table.

- *If the hazard rating is H (high) for leaching*, required treatments are the management techniques from the following table and one or two appropriate conservation practice(s) listed under leaching.
- *If the hazard rating is H (high) for solution runoff*, required treatments are the management techniques from the following table and one or two appropriate conservation practice(s) listed under solution runoff.
- *If the area is identified as sensitive,* required treatments are the management techniques from the following table and one or two appropriate conservation practice(s) to address the appropriate risk.

- *If the hazard rating is X (extra high) for leaching or solution runoff*, recommended treatment is substituting a pesticide with a less hazardous environmental risk rating and the appropriate required treatment for the substituted pesticide or at least three appropriate conservation practice(s) listed under leaching or solution runoff.

The following table identifies management techniques and conservation practices that have the potential to mitigate pesticide impacts on water quality. Not all techniques will be applicable to a given situation. Relative effectiveness ratings by pesticide loss pathway are "no effect" (blank), "slight effect" (+/-), "moderate effect" (++/--), and "significant effect" (+++/---). The table also identifies how the techniques function. Effectiveness of any mitigation technique can be highly variable based on site conditions and how it is designed. Therefore, with guidance provided by the table, site-specific selection and design of mitigation techniques that are appropriate for identified resource concerns is left to the professional judgment of the certified conservation planner.

Reducing Pesticide Impacts on Water Quality is based on available research specific to the technique, related research, and the NWCC Pest Management Team's best professional judgment. The ratings are relative index values as opposed to absolute values, much like the Conservation Practice Physical Effects (CPPE) matrix. They are intended to help planners choose the best combination of techniques for their identified resource concerns. The ratings are based on the relative *potential* for a technique to provide mitigation. The technique has to be specifically designed, implemented and maintained for the mitigation potential to be realized. Varying site conditions can result in a great deal of variation in actual mitigation effectiveness, but our relative index values indicate which techniques will generally provide more or less mitigation under a given set of conditions. Our general rule of thumb is that +'s generally have the potential to reduces losses by 10 -15%., ++'s have the potential to reduces losses by about 25%, and +++'s have the potential to reduce losses by about 50%.

Management Mitigation Techniques	Pesticide Loss Pathways			Function
	Leaching	Solution Runoff	Adsorbed Runoff	
Management Technique[1/]				
Application Timing	+	+	+	Reduces exposure potential - delaying application when significant rainfall events are forecast can reduce pesticide transport to ground and surface water, application when conditions are optimal can reduce the amount of pesticide applied, also delaying application when wind speed is not in accordance with label requirements can reduce pesticide drift to surface water
Formulations/Adjuvants	+	+	+	Reduces exposure potential – formulations and/or adjuvants that increase efficacy allow lower application rates
Lower Application Rates	+	+	+	Reduces exposure potential - use lowest effective rate
Partial Treatment	+	+	+	Reduces exposure potential - spot treatment, banding and directed spraying reduce amount of pesticide applied
Pesticide Label Environmental Hazard Warnings and BMPs www.cdms.net/	Required [2/]	Required [2/]	Required [2/]	Reduces exposure potential - label guidance must be carefully followed for pesticide applications near water bodies and on soils that are intrinsically vulnerable to erosion, runoff, or leaching
Scouting and Integrated Pest Management (IPM)Thresholds	++	++	++	Reduces exposure potential - reduces the amount of pesticide applied
Set-backs	+	++	+	Reduces exposure potential - reduced application area reduces amount of pesticide applied, can also reduce inadvertent pesticide application and drift to surface water
Soil Incorporation – mechanical or irrigation	---	+	+	Reduces exposure potential for surface losses, but increases exposure potential for leaching losses
Substitution – ▪ Alternative pesticides ▪ Cultural controls ▪ Biological controls	+++	+++	+++	Reduces hazard potential - use alternative pesticides with low environmental risk, substituting cultural (including burning and mechanical controls) and biological controls can reduce the need for pesticides

Conservation Practice Mitigation Techniques	Pesticide Loss Pathways			Function
	Leaching	Solution Runoff	Adsorbed Runoff	
Conservation Practice				
Brush Management (314)	+++	+++	+++	Using non-chemical brush control often reduces the need for pesticides, pesticide use requires environmental risk analysis and appropriate mitigation - see Pest Management (595)
Conservation Cover (327)	+++	+++	+++	Retiring land from annual crop production often reduces the need for pesticides, builds soil organic matter
Conservation Crop Rotation (328)	++	++	++	Reduces the need for pesticides by breaking pest lifecycles
Cover Crop (340)	+	+	++	Increases infiltration, reduces soil erosion, builds soil organic matter
Cross Wind Ridges (589A)			(+)[4/]	Reduces wind erosion and adsorbed pesticide deposition in surface water
Cross Wind Stripcropping (589B)			(++)[4/]	Reduces wind erosion and adsorbed pesticide deposition in surface water, traps adsorbed pesticides
Cross Wind Trap Strips (589C)			(++)[4/]	Reduces wind erosion and adsorbed pesticide deposition in surface water, traps adsorbed pesticides
Field Border (386)		+	++	Increases infiltration and traps adsorbed pesticides, often reduces application area resulting in less pesticide applied, can provide habitat for beneficial insects which reduces the need for pesticides, can provide habitat to congregate pests which can result in reduced pesticide application, also can reduce inadvertent pesticide application and drift to surface water
Filter Strip (393)		++	+++	Increases infiltration and traps adsorbed pesticides, often reduces application area resulting in less pesticide applied, can provide habitat for beneficial insects which reduces the need for pesticides, can provide habitat to congregate pests which can result in reduced pesticide application, also can reduce inadvertent pesticide application and drift to surface water
Forage Harvest Management (511)	++	++	++	Reduces exposure potential - timely harvesting reduces the need for pesticides
Grade Stabilization Structure (410)			++	Traps adsorbed pesticides
Grassed Waterway (412)		+	+	Increases infiltration and traps adsorbed pesticides (should be applied with Filter Strips at the outlet and on each side of the waterway)
Herbaceous Wind Barriers (603)			(+)[4/]	Reduces wind erosion, traps adsorbed pesticides, can provide habitat for beneficial insects which reduces the need for pesticides, can provide habitat to congregate pests which can result in reduced pesticide application, also can reduce pesticide drift to surface water
Irrigation Water Management (449)	+++	+++	++	Reduces exposure potential - water is applied at rates that minimize pesticide transport to ground

Conservation Practice Mitigation Techniques	Pesticide Loss Pathways			Function
	Leaching	Solution Runoff	Adsorbed Runoff	
				and surface water, promotes healthy plants which can better tolerate pests
Mulching (484)	+	+/-	+/-	Often reduces the need for pesticides, natural mulches increase infiltration and reduce soil erosion (+ solution and adsorbed runoff), artificial mulches may increase runoff and erosion (- solution and adsorbed runoff)
Nutrient Management (590)	++	++	++	Promotes healthy plants which can better tolerate pests
Prescribed Grazing (528A)	++	++	++	Improves plant health and reduces the need for pesticides
Residue Management, No-till and Strip-Till (329A)	+	++	+++	Increases infiltration, reduces soil erosion, builds soil organic matter
Residue Management, Mulch-Till (329B)	+	++	+++	Increases infiltration, reduces soil erosion, builds soil organic matter
Residue Management, Ridge Till (329C)	+	++	+++	Increases infiltration, reduces soil erosion, builds soil organic matter
Residue Management, Seasonal (344)	+	+	+	Reduces soil erosion
Riparian Forest Buffer (391)	+	+++	+++	Increases infiltration and uptake of subsurface water, traps sediment, builds soil organic matter
Riparian Herbaceous Cover (390)	+	++	++	Increases infiltration, traps sediment, builds soil organic matter
Sediment Basin (350)			++	Captures pesticide residues and facilitates their degradation
Stripcropping, Field (586)		+	+	Increases infiltration, reduces soil erosion
Windbreak/Shelterbelt Establishment (380) and Windbreak/Shelterbelt Renovation (650)			(++) [4/]	Reduces wind erosion, reduces adsorbed pesticide deposition in surface water, traps adsorbed pesticides, also can reduce pesticide drift

[1/] Additional information on pest management mitigation techniques can be obtained from Extension pest management publications, pest management consultants, and pesticide labels.

[2/] The pesticide label is the law - all pesticide label specifications must be carefully followed, including required mitigation. Additional mitigation may be needed to meet NRCS pest management requirements for identified resource concerns.

[3/] Details regarding the effects of Conservation Practices on ground and surface water contamination by pesticides are contained in the Conservation Practice Physical Effects matrix found in the National Handbook of Conservation Practices.

[4/] Mitigation applies to adsorbed pesticide losses being carried to surface water by wind.