

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD & SPECIFICATION**

PEST MANAGEMENT

(Acre)
Code 595

DEFINITION

Utilizing environmentally sensitive prevention, avoidance, monitoring and suppression strategies to manage weeds, insects, diseases, animals and other organisms (including invasive and non-invasive species) that directly or indirectly cause damage or annoyance.

All methods of pesticide use must comply with the Missouri Pesticide Use Act as administered by the Missouri Department of Agriculture.

Special emphasis will be placed on the effect of pest controls to threatened and endangered plant and animal species. See FOTG Section I-(vii) for a list of sensitive species in Missouri.

PURPOSES

This practice is applied as part of a Resource Management System (RMS) to support one or more of the following purposes:

- Enhance quantity and quality of commodities.
- Minimize negative impacts of pest control on soil resources, water resources, air resources, plant resources, animal resources and/or humans.

Integrated Pest Management (IPM) that strives to balance economics, efficacy and environmental risk, where available, shall be incorporated into planning alternatives. IPM is a sustainable approach to pest control that combines the use of prevention, avoidance, monitoring, and suppression strategies, to maintain pest populations below economically damaging levels, to minimize pest resistance, and to minimize harmful effects of pest control on human health and environmental resources. IPM suppression systems include biological controls, cultural controls and the judicious use of chemical controls.

CONDITIONS WHERE PRACTICE APPLIES

Wherever pests will be managed.

Use field scouting, nematode assay, pest density, pest life cycles and economic thresholds (where available) to determine if and when pesticides should be used in an IPM program. Treatment thresholds for specific pest and crops are available from University Outreach and Extension. Avoid unnecessary and poorly timed pesticide applications.

CRITERIA

General Criteria Applicable to All Purposes

A pest management component of a conservation plan shall be developed.

All recommendations for specific pest control strategies will be in accordance with current agronomic principles and the University of Missouri publications.

All methods of pest management must comply with Federal, State, and local regulations, including management plans for invasive pest species, noxious weeds and disease vectors. Compliance with the Food Quality Protection Act (FQPA); Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); and Worker Protection Standard (WPS) is required.

An appropriate set of mitigation techniques must be planned and implemented to reduce the environmental risks of pest management activities in accordance with meeting the quality

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

**NRCS MOFOTG
March 2003**

criteria in the Field Office Technical Guide (FOTG) Section III. Mitigation techniques include practices such as Filter Strip (393) or Conservation Crop Rotation (328) and management techniques such as application method or timing. All methods of pest management must be integrated with other components of the conservation plan.

Applications of pesticides should be applied in a manner to avoid or reduce chemical drift, airborne particulate and odors.

On irrigated land, irrigation water management should be designed to minimize environmental risk from pest management.

Producers shall be instructed to pay special attention to all environmental hazards and site-specific application criteria listed on pesticide labels and contained in Extension recommendations.

Additional Criteria to Protect Quantity and Quality of Commodities

As an essential component of both commodity-specific IPM and IPM general principles, clients shall use the minimum level of pest control necessary to meet their objectives for commodity quantity and quality. IPM principles include the combination of prevention, avoidance, monitoring, and suppression strategies to maintain pests below economically damaging levels to minimize the harmful effects of pest control on human health and environmental resources. IPM suppression systems include biological controls, cultural controls, and judicious use of chemical controls.

Additional Criteria to Protect Soil Resources

In conjunction with other conservation practices, the number, sequence and timing of tillage operations shall be managed to maintain soil quality and maintain soil loss at or below the soil loss tolerance (T). The current version of approved erosion prediction tools such as the Revised Universal Soil Loss Equation (RUSLE) and the Wind Erosion Equation (WEQ) or Wind Erosion Prediction System (WEPS), and soil quality rating procedures such as the Soil Conditioning Index (SCI) are required to comply with this standard.

Producers shall be encouraged to pay special attention to pesticide label instructions for limiting pesticide residues in soil that may negatively impact non-target plants, water, animals and humans.

Additional Criteria to Protect Water Resources

Pest management environmental risks, including the impacts of pesticides on surface and ground water resources shall be evaluated for all identified water resource concerns. NRCS' Windows Pesticide Screening Tool (WIN-PST) shall be used to evaluate soil/pesticide interactions in Missouri.

When a chosen pesticide has a significant potential to negatively impact important water Resources (e.g. drainage area of a drinking water supply), an appropriate set of mitigating practices and/or management techniques must be put into place to address risk to human and non-target aquatic and terrestrial plants and wildlife. Pesticide alternatives with a WIN-PST soil/pesticide Hazard risk rating of 'Extra High', 'High' or 'Intermediate' shall be accompanied by one or more mitigating practices.

NRCS' goal is to reduce the hazard rating of "Extra High", "High" or "Intermediate" to the equivalent of a "low" or "very low" risk rating.

Selection of mitigating techniques shall be based on site-specific resource concerns and pesticide loss pathways. Refer to Section V of the FOTG (Conservation Practice Physical Effects) and Section III of the FOTG (Guidance Documents and Quality Criteria) for additional assistance in developing conservation alternatives. See Table 1 - Mitigation Effectiveness Guide - Reducing Pesticides Impacts on Water Quality. Follow pesticide label restrictions regarding soil organic matter, soil pH, soil texture, depth to water table, mixing/loading, and application setback distances from intermittent or perennial streams or losses to nearby surface water bodies (including wetlands and sinkholes).

Producers shall be encouraged to pay special attention to pesticide label instructions for limiting pesticide residues in leachate and runoff that may

negatively impact non-target plants, animals, water, fish and humans.

The number, sequence and timing of tillage operations shall be managed in conjunction with other sediment control tactics and practices, in order to minimize sediment losses to nearby surface water bodies.

Additional Criteria to Protect Air Resources

Producers shall pay special attention to pesticide label instructions for minimizing volatilization and /or drift that may negatively impact non-target plants, animals, humans, and bodies of surface water.

Avoid spray drift by not applying pesticides when wind and rising currents are favorable for drift. Adjust nozzle direction, flow rate, and vehicle speed to apply the rate of pesticide recommended by the pesticide label. Follow pesticide labels regarding application during thermal inversion periods and when the turbulence from wind and rising currents may cause undesirable spray drift. Adhere to local, state or federal regulations regarding pesticide application.

Additional Criteria to Protect Plant Resources

Producers shall pay special attention to pesticide label instructions including those directed at:

- Preventing misdirected pest management control measures that negatively impact plants (e.g., removing pesticide residues from sprayers before moving to the next crop and properly adjusting cultivator teeth).
- Appropriate climatic conditions, crop stage, soil moisture, pH, and organic matter in order to protect plant health.
- Limiting pesticide residues in soil that can carry over and harm subsequent crops.
- Follow label rotational intervals to avoid injury to subsequent crops in the rotation.

Additional Criteria to Protect Animal Resources

Producers shall be encouraged to pay special attention to pesticide label instructions that minimize negative impacts to domestic animals, wildlife, and aquatic organisms.

Additional Criteria to Protect Humans

Read and follow all label instructions, as well as local, state and federal regulations regarding posting and field re-entry restrictions on treated areas. In all situations, restrictions which are the most protective to humans will be followed.

Handle and apply pesticides properly to protect the user and the environment from adverse effects. Assure that the pesticide applicator knows the exact location of the area to be treated and the potential hazard of spray drift or subsequent pesticide movement to surrounding areas.

All pesticide users should be encouraged to take the Private Pesticide Applicators Training offered by several Universities. Persons planning to purchase pesticides classified as "restricted use" are required to be certified by the Missouri Department of Agriculture (MDA) as a private or commercial applicator. Contacts are Pesticide Applicator Training Coordinator, (573) 884-6361 and MDA Bureau of Pesticide Control, (573) 751-5509.

Report all incidents of accidental release of pesticides that may cause adverse environmental effects to Missouri Department of Natural Resources, Environmental Emergency Response Office, (573) 634-2436.

Store pesticides according to label directions and as specified by local, state, and federal regulations.

Avoid unnecessary exposure to pesticides during mixing/handling and application by wearing protective clothing and equipment specified on the label. Follow label instructions in case of accidental exposure.

CONSIDERATIONS

When commodity-specific IPM is unavailable the following IPM principles should be considered:

- Encourage the use of IPM systems that utilize the most appropriate means of pest management including cultural, biological, and chemical methods.
- Base pesticide application on characteristics such as water solubility, toxicity to non-target organisms, degradation, adsorption, efficiency, and economics.
- Consider site characteristics such as slopes, soil, geology, water filtration, depth to water table, proximity to surface water, topography and climate conditions.
- Select pesticides which adequately protect crops and offer the least potential for surface and ground water contamination.
- Plan erosion control practices to minimize soil loss and runoff that can transport absorbed or dissolved pesticides to surface waters.
- Follow currently recommended pesticides' use precautions which consider methods of avoiding pesticide resistance and shifts in pest species.
- Soil reaction (pH), plant nutrients, soil moisture, and soil conditions should be managed to reduce plant stress, improve plant vigor, and increase the plants' overall ability to tolerate pests.

Irrigation water should be managed to avoid conditions conducive to disease development and to minimize pest management environmental risk.

PLANS AND SPECIFICATIONS

The pest management component of a conservation plan shall be prepared in accordance with the criteria of this standard and recorded in narrative statements in the conservation plan.

See the National Planning Procedures Handbook for further guidance.

Operation and Maintenance

The owner/client is responsible for the proper implementation of this practice including operation and maintenance of all equipment. Operation and maintenance shall address the following.

- Plans shall be reviewed periodically to incorporate new IPM technology, respond to cropping system and pest complex changes, and avoid the development of pest resistance. Periodic review should be when a change occurs in crop rotation or when new pesticides are labeled for use.
- Maintain mitigation techniques identified in the plan in order to ensure continued effectiveness.
- Develop a safety plan that includes telephone numbers and address for the nearest treatment center for individuals exposed to chemicals and a telephone number for the nearest poison control center. Check the product label and/or Material Safety Data Sheet (MSDS) for instructions. In the event a pesticide is swallowed, call the poison control center. **The poison control center for Missouri is: Cardinal Glennon Children's Hospital Regional Poison Center St. Louis MO 63104. The phone number is 1-800-222-1222.** The National Pesticide Information Center (NPIC) telephone number in Corvallis, Oregon may also be given for non-emergency information:
1-800-858-7384

Monday - Friday

8:30 a.m. to 6:30 p.m. Central Time

For advice and assistance with emergency spills contact Missouri Department of Natural Resources, Environmental Emergency Response Office, (573) 634-2436.

- Locate all pesticide-mixing areas, storage, and supply areas (tanks) at least 150 feet away from any well or surface water body and down slope of wells.
- Prevent the contamination of water supplies by keeping the fillerhose or pipe out of the spray tank at all times. Install an anti-siphon device to prevent backflow. Never leave a spray tank unattended during filling.

- Pesticides used in chemigation shall be labeled for this method of application and all chemigation systems must be fitted with an anti-siphon device to prevent back flow.
- Store pesticides according to label directions and as specified by local, state, and federal regulations.
- Post warning signs according to label directions and/or local, state, and federal law around fields which have been treated and observe restricted entry intervals.
- Maintain appropriate Material Safety Data Sheets (MSDS) for each pesticide used.
- Calibrate equipment before mixing and loading pesticides. Calibrate equipment at the beginning of each season, periodically during the season, and with each major pesticide change. Since nozzle wear increases application rate and can alter spray patterns, calibration should be checked regularly during the spray season.
- Replace worn nozzle tips, cracked hoses, and faulty gauges.
- Dispose of pesticide wastes and pesticide containers in accordance with label directions and local, state, and federal regulations. Triple rinse pesticide containers and add rinsate to spray solution. Clean application equipment after each use and apply rinsate to an approved site according to label directions. Never reuse pesticide containers for any purpose.
- Maintain records of restricted use pesticides for at least two years. Pesticide application records shall be in accordance with USDA Agricultural Marketing Service's Pesticide Record Keeping Program. For additional information on record keeping contact the U.S. Department of Agriculture
Pesticide Records Branch
8700 Centreville Road, Suite 202
Manassas, VA 20110
Phone (703) 330-7826
FAX (703) 330-6110

REFERENCES

University of Missouri Publication MP 575
"Weed Control Guide for Missouri Field Crops".

University of Missouri Publication MP 581 "Weed and Brush Control Guide for Forages, Pastures, and Non-Cropland in Missouri".

University of Missouri Agricultural Guides:

- a. "1915 "Pesticide Poisoning Symptoms and First Aid"
- b. "1916 - "Pesticide Application Safety"
- c. "1918 - "Homeowner Chemical Safety"

TABLE I – Mitigation Effectiveness Guide - Reducing Pesticide Impacts on Water Quality

Note: Pest Management (595) requires environmental risk evaluation and appropriate mitigation for all identified resource concerns. This 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 judgement of the conservation planner.

Pest Management Mitigation Techniques	Pesticide Loss Pathways			Function
	Leaching	Solution Runoff	Adsorbed Runoff	
Management Techniques ^{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	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 – <ul style="list-style-type: none"> ▪ 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 Practices ^{3/}				
Alley Cropping (311)	+	+	++	Increases infiltration and uptake of subsurface water, reduces soil erosion, can provide habitat for beneficial insects which can reduce the need for pesticides, also can reduce pesticide drift to surface water

TABLE I - (continued)

Mitigation Technique	Pesticide Loss Pathways			Function
	Leaching	Solution Runoff	Adsorbed Runoff	
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
Contour Buffer Strips (332)		++	++	Increases infiltration, reduces soil erosion
Contour Farming (330)	-	+	+	Increases infiltration and deep percolation, reduces soil erosion
Contour Stripcropping (585)		++	++	Increases infiltration, reduces soil erosion
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
Dike (356)	++/--	++	++	Reduces exposure potential - excludes outside water (++) leaching) or captures pesticide residues and facilitates their degradation (-- leaching)
Diversion (362)	+	+	+	Reduces exposure potential - water is diverted
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
Forest Stand Improvement (666)	++	++	++	Reduces the potential for pest damage and the need for pesticides
Grade Stabilization Structure (410)			++	Traps adsorbed pesticides

TABLE I - (continued)

Mitigation Techniques	Pesticide Loss Pathways			Function
	Leaching	Solution Runoff	Absorbed Runoff	
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)
Hedgerow Planting (422)			(+) 4/	Reduces adsorbed pesticide deposition in surface water, also can reduce inadvertent pesticide application and drift to surface water
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 Land Leveling (464)	++	+	++	Reduces exposure potential - uniform surface reduces pesticide transport to ground and surface water
Irrigation System, Microirrigation (441)	++	+++	+++	Reduces exposure potential - efficient and uniform irrigation reduces pesticide transport to ground and surface water
Irrigation System, Sprinkler (442)	++	++	++	Reduces exposure potential - efficient and uniform irrigation reduces pesticide transport to ground and surface water
Irrigation System, Surface and Subsurface (443)	+	+	+	Reduces exposure potential - efficient and uniform irrigation reduces pesticide transport to ground and surface water
Irrigation System Tail Water Recovery (447)		+++	+++	Captures pesticide residues and facilitates their degradation
Irrigation Water Management (449)	+++	+++	+++	Reduces exposure potential - water is applied at rates that minimize pesticide transport to ground and surface water, promotes healthy plants which can better tolerate pests
Land Smoothing (466)	+	+	+	Reduces exposure potential - uniform surface reduces pesticide transport to ground and surface water
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
Pasture and Hay Planting (512)	++	++	++	Retiring land from annual crop production often reduces the need for pesticides, builds soil organic matter
Prescribed Burning (338)	++	++	++	Often reduces the need for pesticides
Prescribed Grazing (528A)	++	++	++	Improves plant health and reduces the need for pesticides
Recreation Area Improvement (562)	++	++	++	Increases infiltration and uptake of subsurface water, reduces soil erosion, builds soil organic matter
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

TABLE I - (continued)

Mitigation Technique	Pesticide Loss Pathways			Function
	Leaching	Solution Runoff	Absorbed Runoff	
Residue Management, Ridge Till (329C)	+	++	+++	Increases infiltration, reduces soil erosion, builds soil organic matter
Residue Management, Seasonal (344)	+	+	+	Increases infiltration, reduces soil erosion, builds soil organic matter
Riparian Forest Buffer (391)	+	+++	+++	Increases infiltration and uptake of subsurface water, traps sediment, builds soil organic matter
Sediment Basin (350)			++	Captures pesticide residues and facilitates their degradation
Stripcropping, Field (586)		+	+	Increases infiltration, reduces soil erosion
Structure For Water Control (587)	-	++	+++	Captures pesticide residues and facilitates their degradation, increases infiltration and deep percolation
Subsurface Drainage (606)	+	++	++	Increases infiltration and aerobic pesticide degradation in the rootzone *Note – avoid direct outlets to surface water
Surface Drainage, Field Ditch (607)	+	+	+	Increases infiltration and aerobic pesticide degradation in the rootzone
Surface Roughening (609)			(+) 4/	Reduces wind erosion and adsorbed pesticide position in surface water
Terrace (600)	--	++	+++	Increases infiltration and deep percolation, reduces soil erosion
Tree and Shrub Establishment (612)	+++	+++	+++	Retiring land from annual crop production often reduces the need for pesticides, increases infiltration and uptake of subsurface water, builds soil organic matter
Waste Storage Facility (313)	+	++	++	Captures pesticide residues
Waste Treatment Lagoon (359)		+++	+++	Captures pesticide residues and facilitates their degradation
Waste Utilization (633)	++	++	++	Increases soil organic matter
Water and Sediment Control Basin (638)	-	++	+++	Captures pesticide residues and facilitates their degradation, increases infiltration and deep percolation
Well Decommissioning (351)	+++			Eliminates point source contamination
Wetland Creation (658)	+	+	+	Captures pesticide residues and facilitates their degradation
Wetland Enhancement (659)	+	+	+	Captures pesticide residues and facilitates their degradation
Wetland Restoration (657)	+	+	+	Captures pesticide residues and facilitates their degradation
Windbreak/Shelterbelt Establishment (380)			(++) 4/	Reduces wind erosion, reduces adsorbed pesticide deposition in surface water, traps adsorbed pesticides, also can reduce pesticide drift
Windbreak/Shelterbelt Renovation (650)			(++) 4/	Reduces wind erosion, reduces adsorbed pesticide deposition in surface water, traps adsorbed pesticides, also can reduce pesticide drift

595-10

- ^{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.