

INTEGRATED PEST MANAGEMENT (IPM)

(Acre)
Code 595

Natural Resources Conservation Service
Conservation Practice Standard

I. Definition

A site-specific combination of pest prevention, pest avoidance, pest monitoring, and pest suppression strategies.

II. Purposes

This practice is applied as a component of a *Conservation Management System (CMS)* or *Resource Management System (RMS)* to support the following purposes:

- Prevent or mitigate off-site pesticide risks to water quality from leaching, solution runoff and adsorbed runoff losses.
- Prevent or mitigate off-site pesticide risks to soil, water, air, plants, animals and humans from drift and volatilization losses.
- Prevent or mitigate on-site pesticide risks to pollinators and other beneficial species through direct contact.
- Prevent or mitigate cultural, mechanical and biological pest suppression risks to soil, water, air, plants, animals and humans.

III. Conditions Where Practice Applies

Wherever pests will be managed on farmsteads, cropland, pastureland, forestland, wildlife land, or recreational land.

IV. Federal, Tribal, State and Local Laws

Users of this standard should be aware of potentially applicable federal, tribal, state and local laws, rules, regulations or permit requirements governing pest management. This standard does not contain the text of federal, tribal, state or local laws.

V. Criteria

A. General Criteria Applicable to All Purposes

1. *Integrated Pest Management (IPM)* strategies (*Prevention, Avoidance, Monitoring and Suppression* or “*PAMS*”) shall be employed to prevent or mitigate pest management risks for identified natural resource concerns. All methods of pest management must be integrated with the farm enterprise and other components of the conservation plan.
2. A comprehensive Integrated Pest Management plan utilizing PAM’s strategies will be developed in accordance with this standard to document how specific pest management risks will be prevented or mitigated. The IPM plan must be crop and/or land use specific and adhere to applicable elements and guidelines the University of Wisconsin and/or University of Wisconsin Extension Service, where guidelines exist. When guidelines are unavailable from a local land grant university, utilize guidelines and or available resources from other research or land grant universities in the region.

When a comprehensive IPM system is not feasible, utilize appropriate individual IPM techniques to adequately prevent or mitigate pest management risks for identified natural resource concerns. At a minimum, the IPM plan will utilize monitoring strategies to estimate pest density, stage of pest life cycle, and utilize established *economic treatment thresholds* to determine the need for pesticide use.

3. The conservation planning resource assessment shall identify the presence of any known threatened or endangered plant or animal species. The anticipated impacts of

pest management alternatives on threatened and endangered species shall be documented and alternative strategies shall be developed to protect the identified threatened and endangered species.

4. All methods of pest management must comply with federal and state regulations, including management plans for invasive pest species, noxious weeds, and disease vectors. Compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) is required.
5. All methods of pesticide use must comply with the current product label and Wisconsin Administrative Code Chapters ATCP 29, Pesticide Use and Control; ATCP 30, Pesticide Product Restrictions; and ATCP 31, Groundwater Protection Program, administered by the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP).

Locate all pesticide mixing, loading, storage, and supply areas (tanks) at least 100 feet away from any well or surface water body, and down slope of wells, unless mixing and loading is conducted over a spill containment surface. Wisconsin Administrative Code Chapter ATCP 29 requires a spill containment surface if greater than 1500 pounds of active ingredient are mixed and loaded at the same site during a calendar year.

Pesticide applications to the waters of the state shall be made according to Wisconsin Administrative Code Chapter NR-107, Aquatic Plant Management, administered by the Wisconsin Department of Natural Resources (DNR).

All incidents of accidental release of pesticides that may cause adverse environmental effects shall be reported to the Wisconsin DNR Spill Hotline at 800-943-0003.

6. IPM plans developed for *organic production systems* utilizing this standard shall comply with the *USDA National Organic Program* standards.
7. Implement specific management practices for *Genetically Modified Organism* (GMO) crops as required to minimize development

of pest resistance to the beneficial characteristic of the GMO crop.

8. Follow current pesticide use precautions which consider methods of avoiding development of pesticide resistance and shifts in pest species.
9. Follow product label for pre-harvest interval for fruit, vegetable, and field crops intended for human consumption.
10. The product label's pre-harvest interval for grazing or forage harvesting shall be followed.
11. Pesticides shall not be stored in areas where animal feeds are present. Planters or application equipment shall not be parked where animals can readily access them.
12. All recommendations for specific pest control strategies will be in accordance with current agronomic principles determined by a *professional agronomist*.
13. Restricted use pesticides shall be applied by a *certified pesticide applicator* certified in the appropriate pesticide applicator certification category.
14. Avoid unnecessary exposure to pesticides during mixing/handling and application by wearing protective clothing and equipment specified on the label. Read and follow all label instructions, as well as state and federal regulations regarding the use of personal protective equipment, posting of treated areas, and field re-entry restrictions.

B. Additional Criteria to Prevent or Mitigate Off-Site Pesticide Risks to Water Quality from Leaching, Solution Runoff and Adsorbed Runoff Losses

1. Apply pesticides appropriately according to climatic conditions, crop vegetative growth stage, soil moisture, pH, and organic matter content in the soil.
2. Follow pesticide label restrictions regarding soil organic matter, soil pH, soil texture, depth to water table and application setback distances from intermittent or perennial streams or other nearby surface water bodies, wetlands, and sinkholes.

- For identified water quality concerns related to pesticide leaching, solution runoff and adsorbed runoff, the current version of the USDA, NRCS *Windows Pesticide Screening Tool (WIN-PST)* program will be used to evaluate potential risks to humans and/or aquatic organisms, as appropriate, for each pesticide to be used.

The minimum level of mitigation required for leaching, solution runoff and adsorbed runoff is based on the final risk ratings in the “WIN-PST Soil/Pesticide Interaction Hazard Ratings” table below.

WIN-PST Identified Hazard Rating	Minimum Mitigation Index Score Level Needed
Low or Very Low	None Needed
Intermediate	20
High	40
Extra High	60

Use Wisconsin Agronomy Technical Note 2, Tables 1 and 2, to determine the Mitigation Index Score assigned to the most commonly used pesticide loss mitigation practices and *mitigation techniques*.

C. Additional Criteria to Prevent or Mitigate Off-Site Pesticide Risks to Soil, Water, Air, Plants, Animals, and Humans from Drift and Volatilization Losses

- The IPM plan shall comply with pesticide label instructions for minimizing volatilization.
- Follow pesticide labels regarding application during thermal inversion periods and weather conditions where turbulence from the wind and rising air currents may cause undesirable spray drift.
- The IPM plan shall identify circumstances where spray drift could violate the product label or cause off-site harm and shall identify strategies to prevent or minimize drift.
- For identified natural resource concerns related to pesticide drift and volatilization, use Wisconsin Agronomy Technical Note 2, Tables 1, 2 and 3, to select conservation practices and mitigation techniques to

address drift and volatilization concerns. The minimum level of mitigation required for drift reduction is an index score of 20. For Volatile Organic Compound (VOC) emission concerns, apply at least one IPM mitigation technique from the Pesticide Volatilization section of Wisconsin Agronomy Technical Note 2, Table 3.

D. Additional Criteria to Prevent or Mitigate On-Site Pesticide Risks to Pollinators and Other Beneficial Species Through Direct Contact

- Producers shall comply with pesticide label instructions intended to minimize the negative impacts of the product to pollinators and other beneficial species.
- When there is an identified direct contact pesticide risk to pollinators and other beneficial species in the application area, apply at least two IPM mitigation techniques from the Pesticide Direct Contact section of Wisconsin Agronomy Technical Note 2, Table 3, that are likely to address the identified resource concern.

E. Additional Criteria to Prevent or Mitigate Cultural, Mechanical and Biological Pest Suppression Risks to Soil, Water, Air, Plants and Animals

- For identified natural resource concerns related to *cultural, mechanical and biological pest suppression* (e.g., air quality concerns with burning for weed control or soil erosion concerns with tillage for weed control), natural resource concerns shall be addressed to FOTG quality criteria levels.
- Soil erosion rates shall be maintained at or below the Tolerable Soil Loss Rate (T). Soil erosion rates shall be determined using the current version of the appropriate erosion prediction tools Revised Universal Soil Loss Equation 2 and Wind Erosion Prediction System. Soil erosion and *soil quality* will be managed using a combination of crop rotations and residue management practices.
- Maintain rotational intervals to avoid herbicide carryover injury to subsequent crops in the rotation.
- Plant cover crops that have *allelopathic* effect on weeds and/or provide competition

for weeds outside of the primary cropping season. Use of cover crops can improve soil quality by reducing tillage operations and adding organic matter to the soil.

5. Use drip irrigation to direct water to crop rather than to weeds.
6. Implement mulching techniques utilizing straw and plastic to suppress weeds.
7. Increase crop density to suppress weeds by early shading of crops.
8. Use the *stale seedbed* approach to flush weeds from the soil before planting. Weeds that emerge during the pre-plant period are controlled by tillage, exposure to heat (flame weeding), or other mechanical methods.

VI. Considerations

- A. Consider the pest management benefits of improving management of soil pH, plant nutrients, soil moisture, and soil conditions to reduce plant stress, improve plant vigor, and increase the plants overall ability to tolerate pests.
- B. Consider the benefits of using farmscaping principles to create borders of beneficial specie habitat to increase natural predation on pests within the crop production area.
- C. Consider the benefits of using the minimum level of pest control necessary to meet commodity quantity and quality objectives in order to minimize the potential for environmental risk and pesticide residues.
- D. Consider the benefits of irrigation water management to reduce crop stress, avoid conditions conducive to disease development and minimize the potential for offsite contaminant movement.
- E. Consider precision pesticide application techniques in an IPM system to minimize the risk of pesticide movement offsite.
- F. Consider using this standard and applying the “PAMS” strategies when implementing WI FOTG Standards 314, Brush Management; and 315, Herbaceous Weed Control.

VII. Plans and Specifications

- A. The pest management component of an approved conservation plan shall be prepared in accordance with the criteria of this standard. The IPM plan shall contain an initial detailed strategy based on prior years’ crops and pest conditions. An end-of-year update to the initial IPM plan shall document actual product applications, scouting reports, treatment threshold assessments, actual crop yields and observations of crop yield, vigor and condition.

As a minimum, the pest management component of a conservation plan shall include:

- Plan map and soil map of the managed site with current crop field boundaries.
 - Location of identified sensitive species, groundwater and surface water risk areas, and setbacks if applicable.
 - Environmental risk analysis using approved tools and procedures for anticipated pest management recommendations by crop and pest.
 - Interpretation of the environmental risk analysis and identification of appropriate mitigation techniques.
 - A list of pest prevention and avoidance strategies that will be implemented, if applicable.
 - A scouting plan and treatment threshold levels for each pest, if applicable.
 - Other monitoring plans, if applicable (temperature, humidity, leaf surface moisture), to predict when a specific pest or disease risk will emerge and indicate when a pesticide application is warranted.
 - A list of accepted pest treatment thresholds or methods utilized to document the basis for treatment of crops with pesticides.
- B. The following records, where applicable, shall be maintained by the producer.
 - Monitoring or scouting results including the date, pest population/degree of infestation, and the crop or plant community condition.
 - When and where each pest suppression technique was implemented.
 - When and where special IPM techniques were implemented to mitigate site-specific risks (e.g., soil incorporation of a pesticide to reduce its surface runoff to a nearby stream).

VIII. 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.

- A. IPM 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 reviews should be conducted when a change occurs in crop rotation or when new pesticides are labeled for use.
- B. Maintain mitigation techniques identified in the plan in order to ensure continued effectiveness.
- C. Develop a safety plan that includes telephone numbers and address for the nearest treatment center for individuals exposed to pesticides and a telephone number for the nearest poison control center. Check the product label for instructions. In the event a pesticide is swallowed, call the Poison Center of Wisconsin at 1-800-222-1222. The National Pesticide Information Center (<http://npic.orst.edu/>) which is a collaboration between Oregon State University and the US Environmental Protection Agency may also be contacted for non-emergency information at 1-800-858-7378, or by email at npic@ace.orst.edu, Monday through Friday 9:30 a.m. to 5:30 p.m. central time.
- D. Prevent the contamination of water supplies during pesticide mixing by maintaining an air gap of twice the diameter of the hose or pipe being used, keeping the filler hose or pipe out of the spray tank at all times or by installing an anti-siphon device to prevent backflow. Only reduced pressure principle backflow preventers (RP valves) are allowable as an anti-siphon device for pesticide-related use. Never leave a spray tank unattended during filling.
- E. 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. No chemigation system may draw water directly from a potable water supply. See Wisconsin Administrative Code Chapter ATCP 29.54, Chemigation, and the pesticide label for other chemigation system requirements. A chemigation operation plan shall be documented when pesticides are used.
- F. When soil fumigants are used, follow the provisions identified in Wisconsin Administrative Code, Chapter ATCP 30.22, including the required documentation outlined in ATCP 30.
- G. Store pesticides according to label directions and as specified by state and federal regulations.
- H. Post warning signs where required by label directions and state or federal law around fields which have been treated and observe restricted entry intervals.
- I. Commercial pesticide applicators shall maintain appropriate pesticide labels and Material Safety Data Sheets (MSDS) for each pesticide used in the current year. Private applicators as a minimum shall have copies of the current pesticide label and have access to the MSDS through their pesticide supplier.
- J. Applicator's equipment shall be calibrated by the owner before mixing and loading pesticides. Calibrate equipment at the beginning of each season, periodically during the season, and with each major pesticide change. Calibration should be checked regularly during the spray season because nozzle wear increases the application rate and can alter spray patterns.
- K. Replace worn nozzle tips, cracked hoses, and faulty gauges.
- L. Dispose of pesticide wastes and pesticide containers in accordance with label directions and state or federal regulations. Clean application equipment after each use and apply rinsate to an approved site according to label directions. Triple rinse pesticide containers as soon as they are empty and add rinsate to spray solution. The Wisconsin Fertilizer and Chemical Association (WFCA) sponsors annual collections for empty, triple rinsed containers. WFCA can be contacted at 608-249-4070. Never reuse pesticide containers for any purpose.
- M. Dispose of unwanted pesticides along with their containers in accordance with label directions and state or federal regulations. Unwanted pesticides are collected at Agricultural Clean Sweeps sponsored by DATCP. For information on Ag Clean Sweep operation and funding, see Wisconsin Administrative Code Chapter ATCP 34 or the DATCP Agricultural Clean Sweep web site.

- N. Maintain application records of pesticides used for at least two years and at least three years for atrazine products. Pesticide application records shall be in accordance with USDA Agricultural Marketing Service's Pesticide Recording keeping program and site-specific requirements. Records of applications made as a commercial applicator for-hire must also be maintained for at least two years. Pesticide application records shall be in accordance with Wisconsin Administrative Code Chapter ATCP 29 and 30.

IX. References

Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP), Atrazine Prohibition Areas:

http://datcp.wi.gov/Environment/Water_Quality/Atrazine/Atrazine_Prohibition_Areas/index.aspx.

Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP), Agricultural Clean Sweep Program:

http://datcp.wi.gov/Environment/Clean_Sweep/Farmers/index.aspx.

Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP), Endangered Species Program:

http://datcp.wi.gov/Farms/Endangered_Species/index.aspx.

Wisconsin Department of Natural Resources (DNR) Endangered Resources web site:

<http://dnr.wi.gov/topic/EndangeredResources/ETList.html>.

Wisconsin Administrative Code, Chapter ATCP 29, Pesticide Use and Control.

Wisconsin Administrative Code, Chapter ATCP 30, Pesticide Product Restrictions.

Wisconsin Administrative Code, Chapter ATCP 31, Groundwater Protection Program.

Wisconsin Administrative Code, Chapter ATCP 34, Agricultural Clean Sweep.

Wisconsin Administrative Code, Chapter NR-102.10 Outstanding Resource Waters.

Wisconsin Administrative Code, Chapter NR-102.11 Exceptional Resource Waters.

Wisconsin Administrative Code, Chapter NR-107, Aquatic Plant Management.

University of Nebraska – Lincoln, Weed Management Decision Support System (WeedSOFT 2003) Version 8.0. <http://weedsoft.unl.edu>.

University of Wisconsin-Extension Bulletin A3276, Cranberry Pest Management in Wisconsin.

University of Wisconsin-Extension Bulletin A3646, Pest Management in Wisconsin Field Crops.

University of Wisconsin-Extension Bulletin A3422, Commercial Vegetable Production in Wisconsin.

University of Wisconsin-Extension Bulletin A3690, Protecting Wisconsin's Resources Through Integrated Weed Management: <http://corn.agronomy.wisc.edu/Management/pdfs/A3690.pdf>.

University of Wisconsin-Extension, Pesticide Applicator Training (PAT) Program: <http://ipcm.wisc.edu/pat/>.

USDA, Agricultural Marketing Service, National Organic Program: <http://www.ams.usda.gov/nop/>.

USDA, NRCS National Planning Procedures Handbook.

USDA, NRCS, Windows Pesticide Screening Tool (WIN-PST).

USDA, NRCS Wisconsin Field Office Technical Guide (FOTG), Section I, Revised Universal Soil Loss Equation Version 2 (RUSLE2), Wind Erosion Prediction System. <http://www.wi.nrcs.usda.gov/technical/consplan/rusle.html>.

USDA, NRCS Wisconsin Field Office Technical Guide (FOTG), Section III, Conservation Management Systems.

USDA, NRCS Wisconsin Field Office Technical Guide (FOTG), Section IV, Practice Standards and Specifications.

USDA, NRCS Wisconsin Agronomy Technical Note 2, Companion Document to Wisconsin NRCS FOTG Standard 595, Integrated Pest Management

X. Definitions

Allelopathic (V.E.4.) – any harmful effect of one plant or microorganism on other organisms through the production and release of chemical compounds into the environment.

Biological pest suppression (V.E.1) – the process of conserving, augmenting, or introducing beneficial living organisms (insects, nematodes, mites, fungi, bacteria, viruses, plants, vertebrates) to reduce pest population or its impacts.

Certified Pesticide Applicator (V.A.13.) – All pesticide users planning to become Wisconsin certified pesticide applicators must purchase Pesticide Applicators Training (PAT) materials and may attend optional PAT training sessions offered by the UWEX PAT Program, (608) 262-7588. See UWEX PAT web site <http://ipcm.wisc.edu/pat> for details. Persons planning to purchase pesticides classified as “restricted use” are required to be certified by DATCP Certification and Licensing Program, (608) 224-4548, as a private or commercial applicator. Contact this DATCP web site for details: <http://www.datcp.state.wi.us/arm/agriculture/pest-fert/pesticides/licenses/>.

Chemigation (VIII.E.) – the application of chemicals such as fertilizers and pesticides through irrigation water.

Conservation Management System (CMS) (II) – A conservation practice or combination of practices designed to address one or more resource concerns for a field or group of fields by land use.

Cultural pest suppression (V.E.1) – the use of practices other than chemical and biological controls (tillage, row spacing, irrigation, fertility, timely harvest) to reduce a pest population or its impacts.

Economic Treatment Threshold (V.A.2.) – a calculation used to determine when the predicted benefit from the application of a pest control treatment will exceed the cost of the treatment. WeedSOFT, University of Wisconsin - Extension Publications A3646, A4322, or other NRCS approved economic prediction tools may be used to complete this analysis.

Genetically Modified Organism (V.A.7.) – an organism whose genetic structure has been artificially modified by humans to add or enhance a beneficial characteristic. Benefits of genetic modification include increased disease resistance, resistance to specific families of herbicide products, or production by plants of substances toxic to insect pests.

Integrated Pest Management (IPM) (V.A.1.) – 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 utilize biological, mechanical, and cultural controls and the judicious use of chemical controls. IPM programs should strive to balance economics, efficacy, and environmental risk.

Mechanical pest suppression (V.E.1) – a component of cultural pest control that uses physical methods (cultivation, hoeing, hand weeding, mowing, pruning, or vacuuming) to reduce a pest population or its impacts.

Mitigation Techniques (V.B.3.) – Conservation practices or management actions implemented to reduce the impact of pest management activities on non-target organisms and natural resource concerns identified during the conservation planning resource assessment. Mitigation techniques may include installation of additional conservation practices and/or management techniques with a documented ability to reduce the impact of pesticide on the identified resource concern. Example conservation practices contained in NRCS e-FOTG Section IV, Standards and Specifications, include 393, Filter Strip; or 328, Conservation Crop Rotation. Management techniques may include selection of an alternative pesticide product, revision of the pesticide application method, rate, or timing, or use of a non-chemical control technique.

Organic Production System (V.A.6.) – A production system that is managed in accordance with the Organic Foods Production Act and regulations to respond to site-specific pest threats by integrating cultural, biological, and mechanical practices that foster the cycling of resources, promote ecological balance, and conserve biodiversity. As a general rule, the use of natural (non-synthetic) substances are allowed in organic crop production and the use of synthetic substances are prohibited. The National Organic Program regulations define the use of natural and synthetic products in organic production. The regulations also address the use of other technology such as genetically engineered products and irradiation of products.

Prevention, Avoidance, Mitigation Strategies (PAMS) (V.A.1.) – IPM Prevention, Avoidance, Monitoring, and Suppression (PAMS) techniques include:

- Prevention – Activities such as cleaning equipment and gear when leaving an infested area, using pest-free seeds and transplants, and irrigation scheduling to limit situations that are conducive to disease development.

- Avoidance – Activities such as maintaining healthy and diverse plant communities, using pest resistant varieties, crop rotation, and refuge management.
- Monitoring – Activities such as pest scouting, degree-day modeling, and weather forecasting to help target suppression strategies and avoid routine preventative treatments.
- Suppression – Activities such as the judicious use of cultural, mechanical, biological and chemical control methods that reduce or eliminate a pest population or its impacts while minimizing risks to non-target organisms.

Professional Agronomist (V.A.12.) – an individual who is certified by a sponsoring professional organization, such as the American Society of Agronomy, based on demonstrated knowledge of the principles of crop production and management. Certification under the NRCS TechReg web site (<http://techreg.usda.gov/>) for Pest Management Planner may be used to meet this requirement.

Resource Management System (RMS) (II.) – a holistic conservation system that includes a comprehensive resource inventory, utilizing a combination of conservation practices and management activities, when planned, at a minimum meet established quality levels and when implemented will provide conservation, sustainability, protection, and or improvement of the resource base for soil, water, air, plants, and animals.

Stale Seedbed (V.E.8.) – The practice of preparing a seedbed allowing weeds to germinate and killing the weeds prior to planting the crop.

Soil Quality (V.E.2.) – The fitness of a specific kind of soil to function within its surroundings, support plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation.

USDA National Organic Program (V.A.6.) – The program authorized by the Organic Foods Production Act (7 U.S.C. 6501 et. seq.) for the purposes of implementing its provisions.

Volatile Organic Compounds (V.C.4.) – some carbon containing chemicals that readily evaporate and undergo a photochemical reaction with potentially harmful health effects.

Windows Pesticide Screening Tool (WIN-PST) (V.B.3.) – A conservation planning tool used to evaluate potential pesticide risks to ground water (leaching potential) and surface water (runoff solution), as a result of the soil and pesticide interaction.