

PEST MANAGEMENT PLANNING

Pest management planning will be consistent with NRCS Policy in the General Manual Title 180 Part 409 and Title 190 Part 404. Those policies list NRCS pest management roles as:

1. Evaluating environmental risks associated with probable pest management recommendations.
2. Developing appropriate mitigation alternatives to minimize environmental risks.
3. Assisting clients to adopt Integrated Pest Management (IPM) that helps protect natural resources.
4. Assisting clients to develop and implement an acceptable pest management component of their overall conservation plans.

National policy states that NRCS does not develop pesticide recommendations or change label instructions or recommend specifications for pesticide applications. In Minnesota this means NRCS does not recommend a specific pest control option for a specific field for purposes of field or vegetable crop, fruit, or forage production. Policy also states that persons who approve pest management components of conservation plans must be certified specialists in pest management. **NOTE: Field staff can recommend pest control options for successful installation and maintenance of conservation practices such as grassed waterways. However, if these options include chemical controls, the chemical controls will be evaluated for environmental risk and mitigation practices recommended if necessary.**

Two progressing levels of pest management planning are possible: awareness and advanced (which includes Integrated Pest Management (IPM) principles.)

AWARENESS PLANNING

Awareness planning focuses on the first few steps of the NRCS planning process. Completion of planned activities prepares the client for future annual field specific (advanced) pest management planning.

- Inventory the client's existing pest management program.
- Inventory sensitive areas where pest management presents risk for impacting non-target species and resources.
- Evaluate farmstead pesticide storage and handling procedures.
- Evaluate the client's current and proposed chemical control options for environmental impact.
- Recommend state BMPs for pesticides designated as common detect.
- Provide pesticide handling storage, mixing, and disposal guidance.
- Provide applicator calibration guidance.
- Provide recordkeeping guidance.

Awareness Planning Procedure

1. Conduct a preliminary inventory of the producer's existing pest management activities using the latest version of USDA-NRCS Form **MN-CPA- 024, Pest Management Inventory Worksheet** or analogous forms. The inventory will include target pests and pest controls, scouting frequency, and information related to transport, storage, mixing, and loading of pesticides.
2. Conduct a preliminary inventory of sensitive areas on the farm to include wells and well information such as aquifer depth, well logs and water tests; drinking water supply management areas (DWSMAs); Source Water Assessment Areas (SWAAs); water tables or surficial aquifers; surface waters; sinkholes; tile inlets; gullies; waterways; areas with sheet and rill soil losses greater than tolerable; shallow soils over fractured bedrock; and soils with *high* leaching and runoff potentials.
 - a. *Landowner well information may be available on-line at the following websites:*
<http://www.geo.umn.edu/mgs/cwi.html> or <http://www.health.state.mn.us/divs/eh/cwi/>
In other cases that information will have to be obtained from the client.

180-National Planning Procedures Handbook

- b. *Locations of DWSMAs and SWAAs can be found on the Minnesota Department of Health or Minnesota Department of Agriculture (MDA) websites. Those sites can be accessed from the NRCS Minnesota homepage at: <http://www.mn.nrcs.usda.gov/technical/ecs/nutrient/assessment/assessment.htm>. NRCS employees also have access to an NRCS GIS Project that identifies these areas.*
 - c. *Pollution sensitivity of the water table or surficial aquifer can sometimes be found in county geologic atlases or regional Hydrogeologic assessments. County atlases and regional assessments can be accessed from the NRCS Minnesota homepage at the above link. County environmental offices or SWCDs should also have copies. Local knowledge and information or other data sources will have to be consulted for counties not currently covered by county atlases or regional assessments.*
 - d. *Shallow soils over fractured bedrock can be identified using the NRCS in Minnesota database titled "Sensitive Soil Features for Nutrient Management".*
 - e. *High leaching or runoff potential soils are identified on the "Soil Sensitivity to Pesticide Loss Rating Reports" generated by NRCS' Windows Pesticide Screening Tool (WIN-PST).*
3. Analyze farmstead for sensitivity to chemical handling using **FARM*A*SYST Fact Sheet 2, Reducing the Risk of Groundwater Contamination by Improving Pesticide Storage and Handling** and **FARM*A*SYST Worksheet #2 Assessing the Risk of Groundwater Contamination from Pesticide Storage and Handling**. *The full set of FARM*A*SYST work sheets is available on-line from NRCS in New Jersey at <http://www.nj.nrcs.usda.gov/partnerships/farmasyst/> Return the analysis to the client. Do not keep in the case file.*
 4. Analyze all fields and probable chemical control options using NRCS' Windows Pesticide Screening Tool (WIN-PST). *WIN-PST and associated soils database can be accessed and downloaded through the NRCS Minnesota home page at: <http://www.mn.nrcs.usda.gov/technical/ecs/pest/pest.htm>.*
 5. Recommend MDA water quality pesticide BMP options if the client proposes to use a chemical listed as "common detect" *These BMPs are accessed on the NRCS Minnesota home page under Technical Resources; Pest management; Planning Aids. They can also be obtained directly from MDA at: <http://www.mda.state.mn.us/protecting/bmps/voluntarybmps.htm>.*
 6. Advise clients to pay special attention to all environmental hazards and site-specific application criteria listed on the pesticide label and contained in Extension and crop consultant recommendations (e.g., ground water advisory statements, application setbacks, application rate limitations on highly erodible land, soil type exclusions, etc.) *Sample label databases can be accessed on the NRCS Minnesota home page at: <http://www.mn.nrcs.usda.gov/technical/ecs/pest/pesticides/pesticides.htm>.*
 7. Advise clients that it is their responsibility to ensure that all pesticides included in the pest management component of their conservation plans are currently registered for use at their location by the MDA.
 8. Advise clients that record keeping is a critical part of pest management to include keeping records of restricted-use pesticide applications, in accordance with the U.S. Department of Agriculture, Agricultural Marketing Service and MDA guidelines.

An awareness plan consists of:

1. Current version of job sheet 595b 1st Year EQIP Pest Management containing a schedule for:
 - a. Inventorying pest management and sensitive areas.
 - b. Calibrating sprayer.
 - c. Beginning recordkeeping.

- d. Farmstead analysis.
- e. WIN-PST evaluations.
2. Fact sheets as appropriate addressing pesticide handling, storage, disposal and use. An MDA series of eight pest and pesticide management fact sheets released to NRCS Minnesota field offices in 1999 can be used. *These fact sheets have been converted into information pages on the MDA website: <http://www.mda.state.mn.us/protecting/bmps/voluntarybmps.htm> under learn more.*
3. MDA Water Quality Pesticide BMP fact sheets. *Accessed at the site above.*
4. Recordkeeping guidance. *Guidance can be found at: <http://www.extension.umn.edu/distribution/cropsystems/DC0915.html>*

ADVANCED PLANNING

Advanced pest management is annual field specific planning. This planning level uses all steps in the NRCS planning process. Advanced plans are developed based on Integrated Pest Management (IPM) principles of Prevention; Avoidance, Monitoring, and Suppression.

- **Prevention.** Promoting use of disease and weed free seed and disease and weed free tillage and harvest equipment.
- **Avoidance.** Promoting crop tolerance to pests.
 - Pest resistant varieties suitable for the applicable region of the state.
 - Timely planting.
 - Providing crops with proper nutrients, water, pH, and soil conditions that favor rapid establishment and vigorous growth.
 - Rotations.
- **Monitoring.** Scouting to properly identify pest and pest life stages and need for and timing of control. Economic Injury Levels (EILs) and Economic Treatment Thresholds used where available to help make control decisions. Preventive chemical applications eliminated or reduced.
- **Suppression.** Use control options with least environmental risk. Use multiple control techniques (cultural, biological, and chemical.)
 - Evaluate various management techniques to effectively control the target species. (University of Minnesota effectiveness tables are used to help select chemical controls.)
 - Identify low environmental risk options to include limited chemical applications within close proximity to sensitive areas.
 - Identify mitigation practices for chemicals with WIN-PST hazard ratings of medium or higher.

Advanced Planning Procedures

1. Identify target pests and select alternative control techniques (cultural, biological and chemical.) If chemical controls are an option:
Use University of Minnesota Bulletins that evaluate the effectiveness of various products and controls. *Bulletins such as “Cultural and Chemical Weed Control” can be accessed from University of Minnesota webpages, including <http://appliedweeds.cfans.umn.edu/pubs.html>.*
2. Analyze sensitive area information gathered during awareness planning to determine potential for pesticides to move towards water bodies once those pesticides leave the fields or move below the root zone.
 - a. Areas of fields within 300 feet of a non-cropped wetland, lake, river, stream, or conveyances to these waters have high potential to contribute contaminants to surface waters. A conveyance may be defined as a road ditch, ditch, tile inlet, intermittent stream, waterway, or un-vegetated channel. This includes gullies or waterways which discharge to ditches or road ditches that drain directly into surface waters.
 - b. Areas of fields located within boundaries of DWSMAs or SWAAs having potential to move materials to aquifers if those areas have been rated as having medium to high vulnerability.

180-National Planning Procedures Handbook

- c. Areas having high or very high pollution sensitivity of the water table or surficial aquifer as portrayed in county geologic atlas or regional Hydrogeologic assessment have potential for movement of applied chemicals to groundwater.
 - d. Areas within fields having a WIN-PST “Soil Sensitivity to Pesticide Loss Rating” of high (w) for Soil Leaching Potential (SLP) are sensitive to water table contamination.
3. **Mitigation.** Develop appropriate mitigation alternatives to minimize environmental risk. Mitigation includes controlling gully and sheet and rill erosion or filtering runoff. This should be done for all fields and is required within the boundaries of DWSMAs and SWAAs and for sensitive fields identified during awareness planning in Step 2, above. **See the attached Minnesota Mitigation Effectiveness Guide and Instructions for determining number of required mitigating practices.**
4. Advise producers to seek professional pest management scouting services.
 5. Present alternatives to client. All alternatives follow label restriction information.
 6. Develop the pest management plan according to client preference.
 7. Make plan modifications throughout the year as necessary.
 8. Help the producer evaluate success of the control techniques by reviewing information gathered by the producer or advisor.

An advanced pest management plan consists of:

1. An aerial photo identifying fields receiving recommendations and areas where setbacks are needed (grassed waterways, surface waters, well, tile inlets, sinkholes etc.)
2. Field specific pest management controls selected by client.
3. Management or Conservation mitigation practices selected by client not shown in 2, above.
4. WIN-PST reports (at a minimum the Soil Sensitivity to Pesticide Loss Rating Report and the WIN-PST Soil/Pesticide Interaction Loss Potential and Hazard Rating Report.)
5. Specific recommendations on crop varieties, and agronomic practices needed to keep crops thriving and vigorous (e.g. a nutrient management plan.)

DOCUMENTATION

The following items are required when documenting pest management applied:

- Location of the treatment (farm, tract, field number and acreage applied to.) (USDA aerial photos identifying the site are acceptable.)
- Crop or crop rotation.
- Target pests and recommended pest management techniques and date applied. (For pesticides, trade name/formulation and rate of application. For restricted use pesticides, include the product's EPA registration number and the applicator's certification number.)
- Control success.
- Results of farmstead assessments. **(Return to producer after review. Do not keep in case file.)**
- Results of environmental risk assessments when chemical controls are used.
- Sensitive resources and setbacks, if applicable. (Can be put on aerial photos.)
- Practices to mitigate risk of pest management techniques having medium to very high potential to impact non-target species.
- Operation and maintenance procedures.
- Records.

Other information which may prove useful when evaluating effectiveness of the applied treatment or useful in developing the next year's pest management plan (e.g. yields, conditions other than pests which may have impacted yields, wind directions or speed during application, and applicator skips.)

180-National Planning Procedures Handbook
Minnesota Mitigation Effectiveness Guide – Selecting Practices to Reduce Pesticide Impacts on Water Quality

NRCS Pest Management Policy requires environmental risk evaluation and appropriate mitigation for all identified resource concerns. NRCS' Windows Pesticide Screening Tool (WIN-PST) is used to evaluate environmental risk to the water resource. The following NRCS in Minnesota guidance identifies the number of mitigating practices needed for identified water resource concerns (Narrative and Summary Tables 1 and 2) and then lists the mitigation practices and their effectiveness (Table 3). The larger the Table 3 number, the greater the positive or negative impact on water quality with no impact shown as a 0.

REQUIRED NUMBER OF MITIGATING PRACTICES

The number of mitigating practices recommended for a given pest management alternative will vary dependent on the control, WIN-PST hazard ratings, and site conditions. The following instructions provide the minimum level of mitigation practices needed. Planners may require additional mitigation dependent on site specific knowledge of site potential to move products to surface waters or sources of drinking water.

1. ***Mitigation requiring management or conservation practices totaling a positive 5 from the mitigation charts and addressing the appropriate loss pathways.*** Chemical control alternatives with *High or Extra High* Human Hazard ratings on land within Drinking Water Supply Management Areas (DWSMAs) ***with moderate vulnerability to contamination*** or land within ***vulnerable Source Water Assessment Areas (SWAAs)*** or in other areas identified in pest management sensitive area assessments as having high pollution sensitivity.
2. ***Mitigation requiring management or conservation practices totaling a positive 4 from the mitigation chart and addressing the appropriate loss pathways.*** Chemical control alternatives with *High* Human Hazard ratings or *Extra High* Fish Hazard ratings.
3. ***Mitigation requiring management or conservation practices totaling a positive 2 from the mitigation chart and addressing the appropriate loss pathways.*** Chemical control alternatives with *Intermediate* Human Hazard ratings or *High* Fish Hazard ratings.
4. ***No Required Mitigation.*** Pest controls with *low or very low* WIN-PST Human Hazard or Fish Hazard ratings require no mitigation measures for the respective pathway, except as noted in 7 below.
5. ***Mitigation recommending at least one management or conservation practice with a positive number.*** Mitigation is recommended but not required for chemical control alternatives with an *Intermediate* Fish Hazard rating.

Additional mitigation guidance

6. ***Use of chemicals with High or Extra High WIN-PST Human Hazard ratings for the appropriate loss pathway is not allowed on land within the boundaries of DWSMAs with high or very high vulnerability to contamination..***
7. ***Use of “Common detect chemicals” (currently acetochlor; atrazine; metolachlor and metribuzin) will require at least one mitigation management or conservation practice with a positive number when WIN-PST human hazard ratings are low or very low for the respective loss pathway.***

Table 1 Summary of Required Number of Mitigation Practices for Human Hazard

WIN-PST Human Hazard Rating for leaching (ILP) and Solution Runoff (ISRP)	Mitigation Measures including Pest Management Practices and Conservation Practices
Low or very low	None
Intermediate	Practices totaling a positive 2
High	Practices totaling a positive 4
Extra High	Practices totaling a positive 5
<i>Additional requirements for common detect chemicals (currently acetochlor; atrazine; metolachlor and metribuzin)</i>	
Low or very low	Practices totaling a positive 1.
<i>Additional requirements for Land Within DWSMAs with medium or higher vulnerability to contamination; vulnerable SWAAs; or land outside of these areas identified as susceptible to water contamination</i>	
High or Extra High.	Practices totaling a positive 5 if in a DWSMA with moderate vulnerability to contamination or a vulnerable SWAA or areas outside of DWSMAs or SWAAs identified as susceptible to contamination
	Chemicals with High or Extra High Human Hazard Ratings not allowed in DWSMAs with high or very high vulnerability to contamination.

Table 2. Summary of Required Number of Mitigation Practices for Fish Hazard

WIN-PST Fish Hazard Rating for Leaching (ILP); or Solution Runoff (ISRP) and/or Adsorbed Runoff (IARP)	Mitigation Measures including Pest Management Practices and Conservation Practices ^{2/}
Low or Very Low	None required
Intermediate	None required but practices totaling a positive 1 recommended
High	Practices totaling a positive 2
Extra High	Practices totaling a positive 4

NOTE: Mitigation practices already accounted for in the respective WIN-PST rating cannot be counted again when developing mitigation alternatives. And mitigation practices for common detect chemicals should include at least one state water quality pest management BMP for the respective chemical.

Conservation and pesticide management practices must be appropriate for each pesticide loss pathway(s) applicable on the site.

Conservation practices must be included in the conservation plan for the field(s)/site(s).

Table 3 Mitigating Practices and Their Effectiveness

Mitigation Practices for Water Quality	Relative Effectiveness Rating by Pesticide Loss Pathways			Description of Mitigation Techniques and Conservation Practices Function
	Leaching	Solution Runoff	Adsorbed Runoff	
Pesticide Management Practices				
Application Timing	Use WIN-PST 3.0 to account for timing relative to rainfall events			Delaying application when significant rainfall events are forecast
Banding	Use WIN-PST to account for banding			Pesticide is banded resulting in 50% or less of the field receiving treatment.
Lower Application Rates	Use WIN-PST to account for rates that supply low amounts of product active ingredients.			Use lowest effective rate. NOTE: WIN-PST definitions of standard, low and ultra-low rates of active ingredients may vary from what is considered a low label rate.
Scouting and use of Land Grant Economic Thresholds	3	3	3	Pesticides used only when needed. "Preventative prescriptions" reduced. Pest correctly identified and controls applied at correct life stage.
Scouting without thresholds	2	2	2	
Set-backs	1	1	1	Reduces amount of pesticide applied, inadvertent pesticide application and drift.
Spot treatment	3	3	3	At least one application of a pesticide with a WIN-PST human hazard rating of intermediate or higher is reduced by applying the same or a different product to 20% or less of the field.
Soil Incorporation – mechanical or irrigation	Use WIN-PST to account for soil incorporation.			Reduces exposure potential for surface losses, but increases exposure potential for leaching losses
Substituting non-pesticide controls (complete substitution)	5	5	5	Pesticide use replaced by non-pesticide controls.
Substituting non-pesticide controls (partial substitution)	3	3	3	At least one application of a pesticide with a WIN-PST human hazard rating of intermediate or higher is replaced by a non-pesticide control such as cultivation or shredding.
Substituting lower risk pesticides (complete substitution)	Use WIN-PST to account for complete substitution			Reduces hazard potential by using alternative pesticides with lower environmental risk in the designated pathway.
Substituting lower risk pesticides (partial substitution)	2	2	2	Annual applications of pesticides with WIN-PST human hazard ratings of high or extra high eliminated by rotating to pesticides with intermediate or lower hazard ratings every other year. Or annual applications of pesticides with intermediate WIN-PST human hazard ratings eliminated by rotating to pesticides with low or very low hazard ratings every other year.
Substituting lower risk pesticides (partial substitution)	Use WIN-PST to account for partial substitution or take 1 point if the WIN-PST rating doesn't change			Reduced rate of pesticides with WIN-PST human hazard ratings of intermediate or higher by partial substitution of a pesticide with low risk in a tank mix or as part of split application.
Conservation Practices				
Conservation Crop Rotation (328) with more than one crop type.	2	2	2	Crop rotations with small grains, legumes, or grasses can decrease erosion. The rotation must break the life cycle of the targeted pest.
	1	1	1	Rotations comprised of different row crops
Contour Buffer Strips (332)	0	2	2	Increases infiltration and reduces soil erosion.
Contour Farming (330)	-1	1	2	Increases infiltration and deep percolation and reduces soil erosion
Cover Crop (340)	1	1	2	Increases infiltration, reduces soil erosion, builds soil organic matter; provides some weed control
Diversion (362)	1	1	1	Water is diverted from flowing across fields.

180-National Planning Procedures Handbook

Pest Management Mitigation Techniques for water Quality	Relative Effectiveness Rating by Pesticide Loss Pathways			Description of Mitigation Techniques and Conservation Practices Function
	Leaching	Solution Runoff	Adsorbed Runoff	
Field Border (386)	0	1	1	Increases infiltration and traps adsorbed pesticides. Can reduce application area and drift to surface water.
Filter Strip (393)	0	1	3	Similar to Field Border (see above).
Forage Harvest Management (511)	2	2	2	Reduces exposure potential - timely harvesting reduces the need for pesticides
Grassed Waterway (412)	0	1	2	Increases infiltration and traps adsorbed pesticides (should be applied with Filter Strips at the outlet and on each side of the waterway)
Irrigation Water Management (449)	3	2	2	Water is applied at rates that minimize pesticide transport to ground and surface water.
Nutrient Management (590)	1	1	1	Promotes healthy plants to better tolerate pests
Prescribed Burning (338)	2	2	2	Often reduces the need for pesticides
Prescribed Grazing (528A)	2	2	2	Improves plant health; reduces need for pesticide
Residue Management, No-till or Strip-Till (329); Mulch Till (345) or Ridge Till (346)	-1	2	3	Increases infiltration, reduces soil erosion, builds soil organic matter
Residue Management, Seasonal (344)	-1	1	1	Similar to No-till and Strip-till
Riparian Forest Buffer (391)	1	2	3	Increases infiltration and uptake of subsurface water, traps sediment, builds soil organic matter
Sediment Basin (350)	0	1	2	Captures pesticide residues and facilitates their degradation
Sinkhole and Sinkhole Area Treatment (725)	3	0	0	
Stripcropping, <i>Contour</i> (585)	0	2	2	Increases infiltration, reduces soil erosion
Stripcropping, <i>Field</i> (586)	0	1	1	
Terrace (600) <i>Gradient PTO Level</i>	0	1	3	Increases infiltration and deep percolation, reduces soil erosion
	-1	-1	4	
	-1	3	4	
Vegetative Barriers (601)	0	0	2	Reduces soil erosion, traps sediment, increases infiltration
Water and Sediment Control Basin (638)	-1	0	3	Captures pesticide residues and facilitates their degradation. Traps sediment. May increase infiltration and deep percolation
Well Decommissioning (351)	3	0	0	Eliminates point source contamination

This Minnesota mitigation effectiveness guide was adapted from the national NRCS “Mitigation Effectiveness Guide” developed by the NRCS National Water and Climate Center’s Pest Management Team. The national effectiveness guide is an expanded version of an original matrix developed by the EPA-sanctioned Aquatic Dialogue Group and published by SETAC. The original reference is Aquatic Dialogue Group: Pesticide Risk Assessment and Mitigation, Baker JL, Barefoot AC, Feasley LE, Burns LA, Caulklins PP, Clark JE, Feulner RL, Giesy JP, Graney RI, Griggs RH, Jacob HM, Laskowski DA, Maciorowski AF, Mihaich EM, Nelson Jr HP, Parrish PR, Siefert RE, Solomon KR, van der Schalie WH, editors. 1994. Society of Environmental Toxicology and Chemistry, Pensacola FL., pages 99-111 and Table 4-2.

NOTE: Mitigation effectiveness ratings are relative index values as opposed to absolute values. Varying site conditions as well as how a particular mitigation practice is designed and applied can result in site specific variation in actual mitigation effectiveness.

NOTE: Mitigation practices for common detect chemicals should include at least one state water quality pest management BMP for the respective chemical.