

TRANSIENT or BASED AERIAL APPLICATION OPERATION AGREEMENT

AIRPORT NAME: HAWLEY MUNICIPAL AIRPORT
(Hereafter referred to as PUBLIC AIRPORT)

Date: _____

Name: _____

Company: _____

Address: _____

Phone Number: _____

Aircraft N-Number: _____

Hired by: _____

Effective Dates of Operation: _____

All requesting pilots must submit all documentation necessary to legally conduct aerial applications from the public airport. The following items must be submitted with this agreement:

- Minnesota Department of Agriculture Commercial Pesticide License
- Minnesota Department of Transportation Commercial License
- Proof of liability insurance on all aircraft (The minimum insurance coverage for each aircraft shall be the following types and amounts: \$100,000 per person and \$300,000 per occurrence for bodily injury and \$100,000 for property damage. Airport named as additional insured.)
- Proof of liability insurance on all trucks and equipment
- Site-specific Chemical Storage Plan and Material Data Safety Sheet for all chemicals stored on the airport property for more than 24 hours
- Site-specific Incident Response Plan

Requesting pilots hereby certify possession of the following current documents:

- FAA Operating Certificate
- Commercial Pilot's License
- Current Pilot Medical Certificate
- Bi-Annual Log Entries
- Current Aircraft Registration and Air Worthiness Certificate with Annual Inspection

The operating agreement must be completed and submitted to the public airport manager at least 48 hours prior to operations. Transient permits shall not exceed 60 (sixty) days without authorization from the public airport manager.

PUBLIC AIRPORT RULES AND REGULATIONS

“Operator” is defined as anyone possessing a Minnesota Commercial Pesticide Applicator License and engaged in the activities of chemical storage, mixing, and/or aerial application. “Public Airport” is defined to mean the Owner of the airport, its staff, those working on behalf of the Owner of the airport (planner, engineer, surveyor, consultants, etc) and airport management staff.

1. No persons or vehicles are allowed on the runway(s) or taxiway(s). Operators will use storage, water sources, and operation areas as designated by Public Airport Manager.
2. Operators must obey all security regulations including using proper access points, closing gates and doors, and securing aircraft, equipment, and storage containers.
3. The arrival and departure building may not be used as the operator's place of business to conduct meetings with clients. Operator and employees may use the arrival and departure building (e.g., bathrooms, vending machines, phone) but must keep said building clean and orderly.
4. Operator is responsible for spills, chemical theft, damages, and any injury caused by chemicals and normal operation of aerial application while conducting business at Public Airport.
5. Operator shall notify Public Airport Manager immediately of any spills, injuries, vandalism, incidents, or accidents.
6. Operator shall not dump, rinse, or pour chemicals on the airport grounds.
7. Operator must abide by Public Airport's fueling rules and regulations.
8. Operator shall abide by all rules and regulations set by the Federal Aviation Administration (FAA), Environmental Protection Agency (EPA), Food and Drug Administration (FDA), Occupational Safety and Health Administration (OSHA), Minnesota Department of Agriculture (MDA), Minnesota Department of Transportation (MN/DOT), and all other pertinent regulations.
9. To the fullest extent permitted by Laws and Regulations, Operator shall indemnify and hold harmless the Public Airport (as defined in this section) from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of attorneys and other professionals and all court or other dispute resolution costs) arising out of or relating to any claim or action (legal or equitable), or any regulatory action or penalty, brought by any entity against the Public Airport to the extent such claim, actions or penalties are caused by or based upon Operator's actions.
10. Prior to departing the airport premises, Operator shall notify Public Airport Manager that operations are terminated.

PUBLIC AIRPORT

By:

Its:

STATE OF MINNESOTA)

COUNTY OF)

On this ____ day of _____, 20__, before me, a notary public within and for the said county and state, personally appeared _____, known to me to be _____ of the Public Airport, party of the first part, identified herein, and who executed the above and foregoing instrument, and who acknowledged to me that he/she had the authority to execute the same on behalf of the Public Airport in the capacity set forth herein.

Notary Public
County, Minnesota
My Commission Expires: _____

OPERATOR

By:

Its:

STATE OF MINNESOTA)

COUNTY OF)

On this ____ day of _____, 20__, before me, a notary public within and for the said county and state, personally appeared _____, known to me to be _____, party of the second part, identified herein in Operator, and who executed the above and foregoing instrument, and who acknowledged to me that he/she had the authority to execute the same on behalf of _____ in the capacity set forth herein.

Notary Public
County, Minnesota
My Commission Expires: _____

1505.3070 LOADING AREAS.

Subpart 1. **Containment for liquid bulk pesticide loading sites.** An area used for the loading of liquid bulk pesticide into fixed storage containers, mobile containers, or pesticide application equipment at a bulk pesticide storage facility must be provided with a means of containment that is elevated above the surrounding area, constructed of reinforced concrete or other commissioner-approved material, and designed and constructed for the intended purpose. The means of containment must not contain a drain and must comply with either item A or B.

A. A curbed loading area without a sediment trap must comply with subitems (1) and (2).

(1) The perimeter of the area must be curbed a minimum of three inches in height to prevent runoff and the curbed surface must form a liquid-tight containment area.

(2) The curbed surface and containment area must contain a minimum of 1,000 U.S. gallons.

B. A sloped surface that contains a sediment trap must comply with subitems (1) to (3).

(1) The perimeter of the area must be curbed three inches in height to prevent runoff and must form a liquid-tight containment area.

(2) The area must be sloped to a sediment trap used only for the temporary collection of spilled or released pesticides. The sediment trap may not be greater than two feet deep or hold more than 109 U.S. gallons.

(3) The area must contain a minimum of 1,000 U.S. gallons.

Subp. 2. **Containment for pesticide-impregnated fertilizer loading sites.** An area used for the loading of pesticide impregnated fertilizer into fixed storage containers, mobile containers, or pesticide application equipment at a bulk pesticide storage facility must be provided with the means of containment in items A to C.

A. The containment area for pesticide-impregnated fertilizer loading must be elevated above the surrounding area, be constructed of reinforced concrete or other commissioner-approved material, and be designed and constructed for the intended purpose. A scale with a liquid-tight containment area is acceptable.

B. The containment area must be of adequate size to fully hold the largest fixed storage container, mobile containers, or commercial pesticide application equipment that will be loaded on the area.

C. The containment area must be protected or managed in a manner that will prevent pesticide-contaminated runoff from leaving the area.

Subp. 3. Load area exceptions and underground plumbing.

A. If load areas for fixed storage containers, mobile containers, or pesticide application equipment are physically separated from one another, each separate load area must be of a design, size, and construction to contain a minimum of 500 U.S. gallons.

B. If no bulk pesticide storage container at the storage facility has a rated capacity of more than 500 U.S. gallons, the load area must be of a design, size, and construction to contain a minimum of 500 U.S. gallons.

If no bulk pesticide storage container at the storage facility has a rated capacity of more than 250 U.S. gallons, the load area must be of a design, size, and construction to contain a minimum of 250 U.S. gallons.

C. A load area is not required for areas used for loading anhydrous ammonia tanks with pesticides used to control the nitrification process, if:

(1) the bulk pesticide storage container, pump, and associated connections are located within a secondary containment area;

(2) all pesticide delivery hoses are placed in the secondary containment area between uses;

(3) no aluminum components are used; and

(4) all pesticide releases are immediately abated and recovered.

D. Any underground plumbing used for transferring rinsates or sediment from a sediment trap to rinsate tanks must be designed, constructed, installed, and maintained to prevent the release of pesticides to the environment and the backflow of pesticide rinsates to the sediment trap.

Statutory Authority: *MS s 18B.06; 18B.14*

History: *14 SR 161*

Posted: *July 24, 2008*

Guidance for Reporting

Agricultural Chemical Incidents

Guidance Document 1

24-HOUR REPORTING HOTLINE

(651) 649-5451 (METRO) OR (800) 422-0798 (NON-METRO)

What incidents need to be reported?

State law requires that agricultural chemical incidents must be immediately reported to the Minnesota Department of Agriculture (MDA). An "incident" means a flood, fire, tornado, transportation accident, storage container rupture, portable container rupture, leak, spill, emission, discharge, escape, disposal, or other event that releases or immediately threatens to release an agricultural chemical, accidentally or otherwise into the environment and may cause unreasonable adverse effects on the environment. An incident does not include a release resulting from the normal use of a product or practice in accordance with the law.

Violations of this reporting requirement may result in enforcement action by the MDA and in civil penalties, or ineligibility for reimbursement of cleanup costs. Reporting is necessary no matter how small the quantity involved, except for incidents which meet **ALL** of the following criteria:

- * the responsible party or owner of real property is a licensed or certified private or commercial pesticide applicator; AND
- * the amount of pesticide involved in the release and any other releases which have occurred at the site is less than what can be legally applied to one acre of agricultural cropland during the preceding year; AND,
- * the release was not into or near public water or ground water.

Following are some general guidelines on reporting agricultural chemical incidents. Additional reporting requirements may exist under other state or federal laws, local ordinances or permits. Understanding all reporting requirements is the responsibility of

anyone who transports, uses, stores, or handles agricultural chemicals.

When does an incident need to be reported and recovered?

Under most circumstances an agricultural chemical incident must be reported to MDA immediately. Implementation of steps to recover agricultural chemicals that may adversely affect the environment must also begin immediately, no matter how small the incident.

How to report an agricultural chemical incident:

MDA staff are available to receive reports 24 hours a day, 7 days a week. MDA uses the Department of Public Safety's duty officer system. When you call (651) 649-5451 (metro) or (800) 422-0798 (non-metro) day or night, the duty officer will relay your message to an MDA staff person on duty who will call you back promptly with further instructions.

Who must report an incident?

A responsible party¹ or an owner of real property² must **immediately** notify MDA of incidents of any agricultural chemical³ under its control.

1. A "*responsible party*" is a person who, at the time of an incident, has custody of, control of, or responsibility for a pesticide, fertilizer, pesticide or fertilizer container, or pesticide or fertilizer rinse.
2. An "*owner of real property*" is a person who is in possession of, has the right of control of, or controls the use of real property where an incident takes place, including but not limited to a fee owner, lessee, lessor, renter, tenant,

contract for deed vendee, licensor, licensee, or occupant.

3. An "*agricultural chemical*" is a pesticide as defined in Minn. Stat. Chapter 18B or a fertilizer, plant amendment or soil amendment as defined in Minn. Stat. Chapter 18C.

Other Notes

Persons who store or transport agricultural chemicals are construed as being "*in control of*" or having a "*responsibility for*" that substance, and therefore are required to report incidents, regardless of ownership.

Owners of property where an agricultural chemical has been spilled, leaked, or disposed of in the past are required to report to MDA contamination on their property upon discovery. Sometimes a fire or police department responding to an incident will report the event to MDA. A report from a fire or police department, or anyone else, **does not** relieve you of **your** obligation to report the incident to MDA.

Guidance for

Sudden Agricultural Chemical Incident Cleanup Guidance Document 2

When a person discovers a leak, an overflow, a spill, or other signs of an agricultural chemical incident, the following steps should be taken to clean up the release to comply with state laws regarding agricultural chemical incident cleanups and to ensure eligibility for ACRRRA reimbursement of cleanup costs.

REPORT THE INCIDENT IMMEDIATELY

(see "*Exception*" on reporting)

Under state law, anyone who has control of, custody of, or responsibility for an agricultural chemical is considered to be a responsible party and must notify the Minnesota Department of Agriculture (MDA) immediately when an incident involving that agricultural chemical occurs. Notify MDA of an incident as soon as possible by calling the 24-hour duty officer at (651) 649-5451 (metro) or 1-800-422-0798 (non-metro). The MDA staff person on call will promptly call you back to explain what steps to take to minimize the impact of the release. Generally, these will include the following actions:

1. Secure Site

- Secure a perimeter and keep all non-essential people out of the incident area;
- Do not allow smoking in area;
- Alert firefighters and/or other emergency personnel of precautions as advised by material safety data sheets;
- Arrange off-site evacuation if necessary (this should be done through working with the local officials); and,
- If the leak or spill is indoors, ventilate the area as thoroughly as possible.

2. Abatement

- If it can be done safely, stop further leakage from damaged containers;
- Contain above-ground runoff by placing absorbent pillows, clay, other heavy soil, etc., around liquid spills to limit further spread of spilled ag chemical; and,
- Plug or berm underground waterways (storm sewers, sanitary sewers, etc.).

3. Recovery

- Transfer the remaining contents of each leaking container into a clean empty container of the same type and remove the salvaged container from the contaminated area;
- Separate any containers that have not been affected by the spill; and,
- Arrange to remove, hold, or dispose of pooled contaminated water, soil, etc.

4. Remediation*

- Determine the extent and degree of contamination;
- Develop steps for the final clean-up of the incident;
- Reuse or dispose of the recovered chemicals and/or contaminated materials; and,
- Determine the effectiveness of the clean-up through the collection & analysis of samples

* Each step of the proposal must receive MDA approval before being implemented

Also, notify MDA of suspected incidents including the discovery of product-contaminated soils, contaminated wells or surface water, product inventory loss and failed tank or pipeline tests.

APPLY FOR REIMBURSEMENT

Upon completion of steps 1-4, a responsible person who has investigated and taken corrective actions in response to an agricultural chemical incident may apply to the ACRRRA Board (which administers the Agricultural Chemical Response and Reimbursement Account) for reimbursement of cleanup costs: For more information on the ACRRRA reimbursement program call (651) 201-6490.

"Exception" for Reporting

Reporting is necessary no matter how small the quantity involved, except for incidents which meet **ALL** of the following criteria:

1. *the responsible party or owner of real property is a licensed or certified private or commercial pesticide applicator; and*
2. *the amount of pesticide involved in the release and any other releases which have occurred at the site is less than what can be legally applied to one acre of agricultural cropland during the preceding year; and,*
3. *the release was not into or near public water or ground water.*

No matter how small the quantity involved the responsible party must **immediately** take all reasonable actions necessary to minimize and abate.

Water Quality **Best Management Practices**

for ALL AGRICULTURAL HERBICIDES

March 2010

In order to protect Minnesota's water resources, the Minnesota Department of Agriculture (MDA), along with University of Minnesota Extension and other interested parties, has developed a set of core voluntary Best Management Practices (BMPs). The core voluntary BMPs are provided on the opposite side of this page and should be adopted when applying all agricultural herbicides in Minnesota. The BMPs may also refer to mandatory label use requirements. Always read product labels. Additional information and references accompany the BMPs.



The MDA has also developed unique voluntary BMPs (on separate pages) for the use of specific herbicides due to their presence in Minnesota's groundwater or surface water from normal agricultural use. The herbicide-specific BMPs should be adopted when using herbicides that have been, or whose breakdown products have been, frequently detected in groundwater (acetochlor, alachlor, atrazine, metolachlor and metribuzin) or those detected at concentrations of concern in surface water (acetochlor and atrazine). If the BMPs are proven ineffective, mandatory restrictions on herbicide use and practices may be required. For information on monitoring results for herbicides in Minnesota's water resources, refer to the MDA's Monitoring and Assessment webpage: www.mda.state.mn.us/monitoring

Careful planning in the use of herbicides – as part of an Integrated Weed Management Plan – can help protect water resources from future contamination and help reduce the levels of herbicides currently in Minnesota's waters. Planning also promotes the efficient and economical use of herbicides and may result in reduced application rates that can save you money.

State and federal law can require that the use of a pesticide be limited or curtailed due to the potential for adverse impacts on humans or the environment. The Minnesota Pesticide Control Law (Minn. Stat. 18B) outlines state regulatory authority to prevent these impacts. The Minnesota Groundwater Protection Act (Minn. Stat. 103H) outlines a process that can lead to regulations on the use of herbicides frequently detected in groundwater. In addition, there are other state and federal laws that could lead to restrictions on the use of herbicides contributing to surface water impacts. Adopting these BMPs, and a cautious and respectful attitude regarding the proper use of herbicides, will help growers maintain access to a variety of herbicides that are important and diverse tools in the effort to control weeds and protect water resources.

Best Management Practices (BMPs) for herbicide use

- The purpose of voluntary BMPs is to prevent and minimize the degradation of Minnesota's water resources while considering economic factors, availability, technical feasibility, implementability, effectiveness, and environmental effects.
- From a practical standpoint, these BMPs are intended to reduce the loss of herbicides to the environment and to encourage the efficient use of herbicides, chemistry-rotation, and non-chemical approaches to weed control as part of an Integrated Weed Management program to save costs, reduce development of herbicide resistant weeds and increase profitability.

Integrated Weed Management

Reducing crop losses by combining *cultural*, *chemical* and *mechanical* techniques in ways that favor the crop and suppress weed populations and vigor.

See "Additional Information & References" for more details and practical examples.

The BMPs are provided as a series of options. Producers, crop consultants and educators should select options most appropriate for a given farming operation, soil types and geography, tillage and cultivation practices, and irrigation and runoff management. The MDA encourages development of Integrated Weed Management Plans for every Minnesota farm (see “Additional Information and References” for more information). **Always read the product label. Label use requirements and application setbacks are legally enforceable.**

Water Quality *Best Management Practices for All Agricultural Herbicides*

Core Practice*	Description	Benefit
1. Scout fields for weeds and match the management approach to the weed problem.	Scout for weeds, then map infestations throughout the year. Determine whether weed control will result in significant crop yield benefits. Carefully match weed control options – including non-chemical control – to weed pressures. Use herbicides only in situations where they are necessary and will be cost-effective. Use herbicides with long-lasting effect (“residual control”) only in fields that have high densities of target weeds or in fields where weed information is lacking (e.g., newly rented or purchased acres). Consider post-emergent weed control alternatives.	Responding accurately to specific weed pressures, using post-emergent control and using alternative chemical and non-chemical (e.g., cultivation) controls can lower costs and prevent water resource impacts.
2. Evaluate reduced or split herbicide application rates.	Evaluate a reduced-rate herbicide program. Banding – especially in ridge-till rotations – can significantly reduce herbicide costs. Use split applications to reduce the amount of herbicide loss in runoff during early spring rains. Consider using the lowest label rate in a “rate range.” Start on a small area to test what works best on your farm. Scout fields for weed escapes and be prepared for follow-up weed management including post-emergent herbicide application, rotary hoeing, or inter-row cultivation.	In many cases, banding and a carefully planned reduced-rate herbicide program can result in effective weed control, reduced costs, and a reduction in herbicide loss to the environment.
3. For Surface Water protection: Soil incorporate herbicides.	Evenly incorporate herbicides to the depth recommended on the product label. Improper incorporation, excessive crop residues, or poor soil tillage may result in erratic, streaked or otherwise unsatisfactory weed control. Combine soil incorporation of herbicides with another tillage operation to avoid additional field passes and loss of crop residue.	Incorporated herbicide is less vulnerable to being lost in runoff and reaching nearby streams, lakes and surface tile inlets.
4. For Surface Water protection: Evaluate surface drainage patterns in your field and install filter strips and establish buffer zones for streams, sinkholes and tile inlets.	Work with crop consultants and other ag professionals. Study Natural Resources Conservation Service (NRCS) listings for herbicides and soil properties that can lead to herbicide losses in runoff to surface waters (rivers, streams and lakes). Consider herbicides that NRCS lists as having low loss ratings for runoff from your soils, or consider non-chemical weed control methods in sensitive areas. Then, in addition to required label setbacks or buffers, install vegetative filter strips and establish buffers along vulnerable surface waters, karst features, tile inlets and sinkholes.	Filters and buffers reduce field runoff and setbacks eliminate applications where losses are most likely. Reducing use of herbicides known to move to surface water reduces the potential for surface water contamination.
5. For Groundwater protection: Determine the depth to groundwater in your fields and consider protective practices in vulnerable areas.	Work with crop consultants and other ag professionals. Study Department of Natural Resources groundwater pollution sensitivity maps and Natural Resources Conservation Service (NRCS) listings for herbicides and soil properties that contribute to herbicide losses by leaching. Consider herbicides that NRCS lists as having low loss ratings for leaching from your soils, or consider non-chemical weed control methods in sensitive areas. Follow label requirements or recommendations where water tables are shallow.	Reducing herbicide use in sensitive areas reduces the potential for groundwater contamination. Adhering to label groundwater advisories and exclusions reduces aquifer pollution.
6. Rotate herbicide sites of action (chemistry).	Avoid using herbicides with the same site of action over an extended period of time. Rotate or combine herbicides with different sites of action yet with equivalent effectiveness for target weeds. Evaluate this practice in the context of other effective weed control practices, such as field scouting, crop rotation (including rotation of herbicide-tolerant crops), and mechanical weed control.	In the long term, this practice can help reduce the total annual loss of particular herbicides to water resources and the environment. It may also slow the development of herbicide resistance in weeds or weed species shifts.
7. Use precision application methods.	Precision application of herbicides includes auto-steer, auto-boom shutoff, and variable application rate technology. Used by themselves or in combination, these practices can reduce needless herbicide use resulting from overspray, spray overlap, and higher than recommended application rates.	Precision applications can result in less total herbicide applied when compared to conventional application methods; this means less potential loss to the environment.
8. For Groundwater protection: Develop an Irrigation Water Management Plan.	If you irrigate, implement a water management scheduling plan that uses a soil probe, rain gauge, daily crop water use estimations and a soil water balance worksheet.	Effective irrigation management reduces leaching of chemicals to groundwater.

*For practices related to the use of specific herbicides refer to MDA’s herbicide-specific Best Management Practices. All BMPs are available at www.mda.state.mn.us/herbicidebmps See “Additional Information & References” for access to detailed guidance on all recommended practices.

ADDITIONAL INFORMATION & REFERENCES

This information accompanies the State of Minnesota's voluntary water quality best management practices (BMPs) for agricultural herbicides. The information and references are not additional BMPs; rather, they provide more detailed guidance to support a producer's management program for the proper use of all herbicides, and are provided in support of the voluntary BMPs.

Applied Weed Research

University of Minnesota Applied Weed Science Research program (weed and pesticide management information):

<http://appliedweeds.cfans.umn.edu>

"Herbicide Resistant Weeds" (information on rotating chemistries & herbicide sites of action) J. L. Gunsolus, 2008, U of M:

www.extension.umn.edu/distribution/cropsystems/DC6077.html

Herbicide Resistance Action Committee (international industry resource on managing weed resistance to herbicides):

www.hracglobal.com

International Survey of Herbicide Resistant Weeds (industry and academic collaboration to monitor herbicide resistance):

www.weedscience.org

Pesticide Use

Minnesota Department of Agriculture (MDA):

Best management practices for pesticide use, www.mda.state.mn.us/pesticides

Integrated pest management information, www.mda.state.mn.us/ipm

Pesticide sales and use information, www.mda.state.mn.us/pesticides

University of Minnesota Extension:

Assistance with Integrated Weed Management Plan development, www.extension.umn.edu/offices

Pesticide Safety and Environmental Protection, www.extension.umn.edu/pesticides

USDA - Natural Resources Conservation Service (NRCS):

"Protecting Wisconsin's Resources through Integrated Weed Management" (includes the "Minnesota Insert")

Find the same publication without the insert at <http://ipcm.wisc.edu/Publications/tabid/54/id/79/Default.aspx>

NRCS - Minnesota Pest Management website, with information on pest management planning and policy, technical standards, pesticide information, and the WIN-PST tool, www.mn.nrcs.usda.gov/technical/ecs/pest/pest.htm

Iowa State University Extension:

"Eight Ways to Reduce Pesticide Use", www.extension.iastate.edu/publications/IPM59.pdf

"Understanding and Reducing Pesticide Losses", www.extension.iastate.edu/publications/PM1495.pdf

University of Wisconsin Extension:

"Reduced Herbicide Rates in Corn" #A3563, <http://ipcm.wisc.edu/publications/tabid/54/default.aspx>

Soils & Water

Local Soil and Water Conservation District (SWCD) offices (assistance with water table information and soil, groundwater and surface water maps): www.bwsr.state.mn.us/directories

USDA - Natural Resources Conservation Service (NRCS) (assistance with water table information, identification of vulnerable soils and sensitive areas, soil maps, and pest and weed management planning): www.mn.nrcs.usda.gov and click on "Technical Resources". To locate offices for local assistance, click on "Find a Service Center".

USDA - NRCS soil survey information is available on-line at: <http://websoilsurvey.nrcs.usda.gov/app/>

Minnesota Department of Natural Resources (MDNR) (information for some areas of the state on water table depth groundwater pollution sensitivity, and karst features): www.dnr.state.mn.us/groundwater/index.html

University of Minnesota Extension (assistance with soil and water information and development of irrigation plans): www.extension.umn.edu/offices See also "Tillage BMPs for Water Quality Protection in Southeast Minnesota", www.extension.umn.edu/distribution/cropsystems/DC7694.html and "Irrigation Water Management Considerations for Sandy Soils in Minnesota", www.extension.umn.edu/distribution/cropsystems/DC3875.html

Minnesota Department of Agriculture (MDA) (information about monitoring and assessment of water resources for pesticide impacts): www.mda.state.mn.us/monitoring See also "Irrigation Management", www.mda.state.mn.us/protecting/conservation/practices/irrigation.aspx

ADDITIONAL INFORMATION & REFERENCES

Integrated Weed Management

Use one or more of the following strategies to help you cost effectively manage weeds while protecting the environment. Develop an Integrated Weed Management Plan in consultation with University of Minnesota Extension Educators, Natural Resources Conservation Service and Soil & Water Conservation District personnel, certified crop advisors and local crop consultants.

- ✓ **Develop an Integrated Weed Management Plan for your field(s)** – The MDA encourages the development of Integrated Weed Management plans for every Minnesota farm (*see opposite side of this page for additional information and references*). Start slow if you like . . . try the practices on a few fields and build from there!
- ✓ **Document recent chemical use.** This information is important when planning for rotating herbicide chemistries and establishing reduced rate programs.
- ✓ **Introduce a post-harvest cover crop, introduce a small grain or perennial forage,** and rotate among a wider variety of crops to disrupt weed life cycles and control weeds while using fewer chemicals.
- ✓ **Don't assume that more is better!** It may cost more to achieve 100% elimination of weeds than is gained through increased yield. Work with a crop consultant to determine the economic level of injury your field can sustain with reduced or no herbicide use.
- ✓ **Proper application timing.** Apply herbicides under optimal environmental conditions and at the appropriate time of year, crop growth stage, and weed growth stage specified on the label. Doing so can reduce the availability of herbicides for runoff or leaching.
- ✓ **Use a rotary hoe, harrow or cultivator** as part of integrated approaches to weed control. Mechanical weed control can reduce herbicide program costs and reduce herbicide environmental impacts.
- ✓ **Consider planned, periodic use of herbicide-resistant (HR) crops** into cropping sequences, but don't rely on this technology to solve all weed problems. HR crops should be considered as part of a planned rotation of herbicide chemistries (to avoid the buildup of herbicide resistant weeds or weed species shifts).
- ✓ **Apply herbicides as split applications** to reduce the amount of herbicide on the soil surface during periods of higher rainfall intensities.
- ✓ **Work with your local crop consultant and University Extension Educators** to determine where reduced rates or alternative weed control practices can be introduced.

*In accordance with the American Disabilities Act, an alternative form of communication is available upon request. TDD 1-800-627-3529.
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