DEPARTMENT OF AGRICULTURE

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Water Quality Best Management Practices for CHLORPYRIFOS

The Minnesota Department of Agriculture (MDA), in cooperation with the University of Minnesota Extension Service and other interested parties, has developed voluntary Best Management Practices (BMPs) to address the presence of chlorpyrifos in Minnesota's surface water from normal agricultural use (see reverse side of page). If the voluntary BMPs are proven ineffective, mandatory restrictions on chlorpyrifos use and practices may be required. The BMPs may refer to mandatory label use requirements. Always read and follow product labels. For information on monitoring results for chlorpyrifos and other pesticides in Minnesota's water resources, refer to the MDA's Monitoring and Assessment webpage www.mda.state.mn.us/chemicals/pesticides/maace.aspx.

Example trade names for products and package mixtures containing chlorpyrifos. List is not all-inclusive and can change with the introduction of new products; always check the label, or consult MDA's product registration database at http://npirspublic.ceris.purdue.edu/state/, select Minnesota, and search for Active Ingredient.*

CHLORPYRIFOS IS AN ACTIVE INGREDIENT IN		
Chlorpyrifos	Govern	Pilot
Cobalt	Hatchet	Vulcan
Cobalt Advanced	Lorsban	Warhawk
Dursban	Lorsban Advanced	Whirlwind
Eraser	Nufos	Yuma

*** Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement is implied.**

The chlorpyrifos BMPs are companions to a set of core water quality BMPs for use with all agricultural insecticides (www.mda.state.mn.us/protecting/bmps.aspx). If using chlorpyrifos for crop production, consult these BMPs prior to application. 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.

Information about CHLORPYRIFOS

- Chlorpyrifos, a broad-spectrum insecticide, was first registered in 1965 and was widely used for agricultural and home pest control. Most indoor, pet, and homeowner uses were voluntarily withdrawn in 2001.
- Chlorpyrifos is used to control foliar and soil-borne insect pests on a variety of crops including soybeans, corn, alfalfa, sugar beet, and a number of fruit and vegetable crops. It is also used as a seed treatment.
- Chlorpyrifos is a "Restricted Use Pesticide" which indicates that it can only be bought and applied by a Certified Pesticide Applicator.
- Chlorpyrifos belongs to the organophosphate class of insecticides (Mode of Action Group 1B) and controls insects by disrupting normal nervous system function.
- Chlorpyrifos is highly toxic to bees and other beneficial insects exposed to direct treatment or residues on blooming crops or weeds. It is also toxic to fish, aquatic invertebrates, and birds. It is moderately toxic to mammals.

Pesticide applications near water bodies and in certain regions/watersheds are more likely to result in potential water quality impacts from runoff, drift, and volatilization. Other sensitive areas include those that provide runoff to surface water systems, areas near tile surface inlets, highly erodible soils, areas with seasonally high water tables, and highly permeable soils. Note: Many fields are adjacent to water bodies, and portions of every Minnesota county may contain sensitive soils, water tables, and geology.

Contact your Natural Resources Conservation Service or Soil & Water Conservation District for further information on specific soil and water resource conditions on and near your farm. Then work with Extension educators, crop consultants, and other agricultural advisors to select and adopt the Best Management Practices that are appropriate for your field and farm.

The BMPs are reminders of label requirements and a series of additional voluntary options. Producers and crop production advisors should select options most appropriate for a given farming operation, soil type, geography, tillage and cultural practices, and irrigation and runoff management. The MDA encourages development of Integrated Pest Management Plans for every Minnesota farm. **Always read and follow the product label. Label use requirements and application setbacks are legally enforceable.**

Water Quality Best Management Practices for CHLORPYRIFOS
To be used in conjunction with MDA's core "BMPs for All Agricultural Insecticides"

Chlorpyrifos-Specific Practice*	Description	Benefit
1. Adopt the core "Water Quality BMPs for All Agricultural Insecticides" when applying chlorpyrifos.	• Minnesota Department of Agriculture's "BMPs for All Agricultural Insecticides" are a baseline set of voluntary crop production practices to reduce losses of insecticides to water resources. Core Insecticide BMPs are available on the MDA web page. • Utilize practices which avoid insects or interfere with their lifecycle. • Use crop varieties that are pest tolerant/resistant.	Adoption of core BMPs and adherence to mandatory label requirements and application setbacks results in potential water quality benefits.
2. Limit chlorpyrifos application rates to those specified on the product label.	• Utilize lowest labeled application rate which will effectively control the pest, preserving higher rates for high pest pressure. Recommended application rate varies with the target pest species. • Observe label restrictions for maximum chlorpyrifos applied "per acre", "per application", "per season", or "per year".	Proper chlorpyrifos application rates results in cost effective insect control and minimizes risk to water resources.
3. Apply chlorpyrifos according to label directions.	• Adhere to mandatory droplet size, boom height, and wind speed restrictions. Boom width and nozzle orientation are specified for aerial application. • For applications made through the planter, in-furrow and T-band (incorporated) have lower risk of surface run-off than surface applications. • Include applications by all methods when determining maximum annual usage limits.	Protects vulnerable streams, rivers, lakes, and reservoirs from chlorpyrifos runoff, drift, or leaching.
4. Maintain application setbacks from permanent water bodies such as lakes, ponds, rivers, streams, and marshes.	Required treatment setbacks from aquatic areas for chlorpyrifos applications: **APPLICATION METHOD** — **SETBACK (FEET)** Ground boom — 25 Orchard airblast sprayer — 50 Aerial (plane/helicopter) — 150 • Crop varieties with resistance or tolerance for some insect pests might be used in select fields or setback/buffer zone areas. • Also follow required sensitive site setbacks which are based on application rate, spray droplet size, and application method to reduce bystander exposure.	Protects vulnerable streams, rivers, lakes, and reservoirs from chlorpyrifos runoff and drift.
5. Utilize Integrated Pest Management (IPM) for making pest control decisions.	• If available, use scouting procedures and Economic Thresholds (ET) to make insect management decisions (https://wiki.bugwood.org/NPIPM:Main_Page). • Consider cultural, biological, and chemical control options as part of an IPM strategy. Use crop rotation, insect resistant or tolerant varieties, and other non-chemical management practices. A combination of strategies can be used in the same field and year.	Decreases crop loss to pest damage, unnecessary insecticide applications, and insect resistance selection.
6. Rotate chlorpyrifos with other insecticides and management practices.	• Rotate chlorpyrifos use with insecticide from other mode-of-action (MOA) groups (www.irac-online.org/modes-of-action). • Tank mixes of chlorpyrifos with other organophosphate insecticides (MOA 1B) are not considered mode-of-action rotation.	Reduces selection pressure for insect resistance to chlorpyrifos. Reduces probability of sequential chlorpyrifos impacts on water resources.
7. Manage and dispose of unused chlorpyrifos properly.	• Return unused chlorpyrifos or apply it to other acres according to label directions. • Do NOT pour leftover pesticides down a drain or in a single spot in a field. • Maintain spill safeguards at insecticide storage and loading areas.	Reduces the potential for surface and groundwater contamination.

***For core practices and for practices related to the use of other specific insecticides, visit MDA's Best Management Practices webpage www.mda.state.mn.us/protecting/bmps/voluntarybmps.aspx.**

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