OFFICE OF THE LEGISLATIVE AUDITOR
STATE OF MINNESOTA

EVALUATION REPORT

Pesticide Regulation

MARCH 2006

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OFFICE OF THE LEGISLATIVE AUDITOR

State of Minnesota • James Nobles, Legislative Auditor

March 2006

Members
Legislative Audit Commission

Although the sale and use of pesticides are governed largely by federal law and rules, states can add stricter controls, which Minnesota has done. States also have a significant enforcement role. In Minnesota, that role is performed by the Department of Agriculture, which also monitors the effect pesticides have on the environment.

The Legislative Audit Commission directed the Office of the Legislative Auditor to evaluate the department's pesticide-related activities. The commission acted when legislators and others questioned how well the department enforces pesticide regulations, investigates complaints, and monitors pesticide contamination in water.

We found that the department generally performs its duties in a reasonable and professional manner, but we also found opportunities for improvement. For example, we recommend that the department increase its efforts to measure and monitor urban pesticide use and strengthen its review of certain types of pesticide application records. We also recommend that the Legislature require land managers to provide advance notice to certain people affected by pesticide applications.

This report was researched and written by Jody Hauer and Jo Vos, project co-managers. The Department of Agriculture cooperated fully with our evaluation.

Sincerely,

James Nobles
Legislative Auditor

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Summary

Overall, the Minnesota Department of Agriculture does a good job regulating and monitoring pesticides, but improvements are needed.

Major Findings:

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- The Minnesota Department of Agriculture's licensing of pesticide applicators and dealers and regulation of pesticide storage facilities meet or exceed federal and state laws (p. 32).
- The department imposes numerous enforcement actions, including monetary penalties, for law violations, but it does not fully evaluate their consistency or effectiveness (p. 51-52).
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- The Department of Agriculture should evaluate the consistency and effectiveness of all of its enforcement actions (p. 54).
- The Legislature should require advance notice by land managers about pesticide applications toxic to bees and require the department to evaluate the merits of extending this requirement to other similarly risky situations (p. 59).
- For certain investigations, the department should examine pesticide application records in person (p. 65).
- The department should ensure that waste-pesticide disposal options exist statewide (p. 71).
- The department should develop and implement a consistent approach to monitor urban pesticide use biennially, as state law requires (p. 77).
- The department should increase its monitoring activities to include surface water sites in sensitive urban areas and, at the least, test the samples for nonagricultural pesticides (p. 88).

Report Summary

A complex array of state and federal laws provides the framework for how Minnesota regulates pesticides. The Department of Agriculture is the state's lead agency for enforcing pesticide requirements. In fiscal year 2005, the department spent $10.7 million to regulate pesticides—most of it coming from fees paid by the pesticide industry.

Minnesota Relies Heavily on the Federal Government to Impose Pesticide-Use Restrictions

Like nearly all states, Minnesota requires that pesticide products be registered in the state prior to their distribution or sale. The Department of Agriculture relies on the federal registration process to help ensure that pesticides will not have unreasonable adverse effects on the environment or human health in Minnesota.

The department should develop criteria for when it will review federally-approved pesticide products in greater detail.

Although the department can request any relevant information when registering pesticide products and can impose additional use restrictions, the department did so only three times in the last 15 years. The department should develop criteria to identify when it would be appropriate to review product information in greater detail before registering products.

The Department Meets or Exceeds Federal and State Requirements on Licensing Pesticide Applicators

The department tests and certifies pesticide applicators, licenses dealers, and enforces safeguards for storage facilities. Its state plan for certifying applicators sets stricter controls than federal law in several ways.

The Department Cannot Evaluate the Consistency or Effectiveness of All of Its Enforcement Actions

The department imposes numerous enforcement actions for pesticide violations, ranging from relatively mild written advisories to serious monetary penalties. Over the past five years, the rate of enforcement actions per investigation and the proportion with monetary penalties increased.

The department takes certain steps to make its enforcement actions, particularly monetary penalties, consistent, but it cannot evaluate whether its enforcement actions overall are fair and deter violators. It should determine the consistency and effectiveness of all of its enforcement actions, which will require improving its database. Department staff acknowledge the limitations of their existing information system and are in the process of replacing it.

Information on Certain Pesticide Applications Is Not Sufficiently Available

Information on pesticide applications comes from records maintained by pesticide applicators and, in limited circumstances, by advance notice of a pesticide application or the posting of warning signs at application sites. Federal and state laws regulate application records, and, in Minnesota, these records are generally not available to the public. Only the department, customers, physicians, and veterinarians have legal access.

Minnesota requires that residents near application sites receive advance notice about pesticide applications only prior to mosquito or gypsy moth treatments or when other applications are made to reduce public health risks. Unlike certain other similar states, Minnesota does not require advance notice to beekeepers for the application of pesticides toxic to bees. Some beekeepers have suffered losses due to pesticide applications.

The Legislature should require land managers to provide advance notice about pesticide applications toxic to bees when nearby beekeepers formally request notification. Further, it should

ask the department to evaluate the feasibility of extending the requirement to other applications that could threaten human health or pose serious economic harm.

Investigations Are Generally Reasonable But More Rigorous Verification of Application Records Is Sometimes Needed

For certain cases, department inspectors should review pesticide application records in person.

Minnesota statutes prohibit applying pesticides beyond the intended site or in a manner that endangers humans or wildlife. Since 2000, the department has investigated more than 90 cases alleging human or animal exposure to pesticides, and its process is generally reasonable. An important part of the department's investigations is interviewing pesticide applicators and reviewing application records. In some cases, however, inspectors asked for faxed copies of application records and did not seek the records in person. Due to the adversarial nature of some cases, this method could produce incomplete investigations.

The department should determine when its inspectors must make independent, in-person verifications of pesticide applications. This is particularly important for cases where the actual pesticide application or its date is in question.

Waste Pesticide Disposal Is Not Available Statewide as Required

While the department has good methods for measuring rural pesticide use, it needs some for pesticides in urban areas.

Statutes require that the department operate a program to collect waste pesticides generated in the state and designate a place at least every other year for residents of each county to dispose of unused pesticides. From 1989 through 2003, the department held one-day events at which farmers and agricultural businesses could drop off unwanted pesticides.

In fiscal year 2004, the department made changes and sought cooperative agreements with county household hazardous waste programs to collect agricultural waste pesticides along with waste pesticides that counties were already collecting from households. However, one-third of Minnesota's 87 counties, many of them highly agricultural, have declined to participate. In fiscal years 2004 and 2005, the allotments for waste pesticide disposal were not fully spent.

The department should ensure that disposal options exist statewide, as required by law. It could seek to expand contracts in counties that agree to accept agricultural waste pesticides from outside their boundaries or revise its funding formula to encourage nonparticipating counties to enroll.

The Department Does Not Adequately Monitor Urban Pesticide Use

Minnesota statutes require that the Department of Agriculture monitor rural and urban pesticide use on a biennial basis. The department monitors rural pesticide use—defined as both the amount of pesticides used and the management techniques employed—in various ways. Most importantly, in January 2005, the department released its first report on the amount and type of pesticides used on four major crops in Minnesota. In early 2006, it expects to issue its first report on the techniques that corn farmers statewide use to manage pests and pesticides.

In contrast, the department has not conducted similar statewide surveys that measure the amount of pesticides used in urban areas, nor does it have a process for doing so. With the exception of two statewide surveys of school districts in the early 2000s, most of the department's work regarding urban pesticide use has focused on isolated surveys of pest management practices in particular watersheds.

Monitoring urban pesticide use is not a simple task, and there are few if any models for the department to emulate. While a complete accounting of all urban pesticide use is impractical, the department could consider monitoring certain types of nonagricultural

pesticide applications, such as those made in buildings or to lawns and gardens by hired applicators. Alternatively, it could survey school districts about the amounts and types of pesticides they use. As another option, the department could collect product sales data during the registration process in such a manner that would allow staff to estimate the amount of nonagricultural pesticides distributed in the state.

The Department Recently Expanded Groundwater Monitoring Into Urban Areas

As it has for groundwater, the department should expand its activities for monitoring surface water into urban areas.

The Department of Agriculture established its central sand plains groundwater monitoring network in 1999. It currently consists of 86 sites with 193 specialized, dedicated monitoring wells in an area of heavy agricultural use and high soil sensitivity to pesticides. At about the same time, the department also set up a natural springs monitoring network in southeastern Minnesota that now consists of six springs.

In 2004, the department began expanding its groundwater network. By late 2005, the department had installed or constructed 40 additional groundwater monitoring wells in southwestern, south central, northwestern, and west central Minnesota. The department anticipates drilling more wells in north central, east central, and northwestern Minnesota in 2006. Also, in 2004 and 2005, it expanded its groundwater monitoring activities into urban areas by analyzing samples collected by the Minnesota Pollution Control Agency from the Twin Cities, Rochester, and St. Cloud areas.

Surface Water Monitoring Is Still Focused on Agricultural Areas

The department established an automated surface water monitoring network in 1990, focusing on watersheds most sensitive to agricultural pesticides. The number of sites has fluctuated over the years, largely in response to budget concerns and changing priorities. In 2005, the department maintained automated sampling stations on five rivers and streams, all located in agricultural areas in southeastern and south central Minnesota.

In 2002, the department began expanding its surface water program by manually collecting samples from other agricultural areas. By 2005, it was collecting additional samples at 51 largely agricultural sites throughout a large part of the state. Because it does not collect water samples from urban areas, the department does not analyze any of its surface water samples for pesticides commonly used in urban areas.

Given the department's limited resources, it was correct to initially focus water monitoring efforts in the most sensitive agricultural areas of the state. The department's recent decision to expand groundwater monitoring into urban areas will provide a more complete picture of groundwater and pesticides. Similar information about the condition of surface water, however, is lacking, and we recommend that the department likewise expand its surface water monitoring activities into highly sensitive urban areas and test samples from these areas for nonagricultural pesticides.

The Department Aggressively Developed Best Management Practices But Now Needs to Evaluate Them

The department considers developing voluntary best management practices when specific pesticides are frequently detected in groundwater or when their concentrations in surface water exceed 10 to 50 percent of the appropriate water standard. In 2004, the department adopted groundwater best management practices for five agricultural pesticides, surface water best management practices for two agricultural pesticides, and one set of general herbicide best management practices. The department now needs to evaluate their effectiveness.

Introduction

Pesticides control weeds, insects, and other pests in both agricultural and urban settings. In Minnesota, the Department of Agriculture is responsible for enforcing federal and state pesticide regulations. Concerns arose over the adequacy of the department's efforts to monitor pesticide contamination in water and rigorously enforce pesticide laws. In April 2005, the Legislative Audit Commission directed the Office of the Legislative Auditor to evaluate pesticide regulation in Minnesota. Our evaluation addresses the following questions:

- **How well does the Minnesota Department of Agriculture review pesticide products when registering them for use in Minnesota?**
- **How well does the department meet federal and state requirements for the licensing and permitting of pesticide applicators, dealers, and facilities?**
- **To what extent does the department enforce pesticide regulations?**
- **How adequately does the department ensure proper disposal of waste pesticides?**
- **Does the department have reasonable processes for monitoring the use and environmental effects of pesticides and for developing and monitoring "best management practices" for pesticide use?**

To answer these questions, we analyzed federal and state regulations and literature on pesticide regulation. We interviewed staff from the Minnesota Department of Agriculture, the U.S. Environmental Protection Agency, and other pertinent agencies and spoke with representatives of environmental organizations, the agricultural industry, and local governments. With data from the Minnesota Department of Agriculture, we analyzed pesticide regulation funding and enforcement. We reviewed case files of certain pesticide products recently registered in the state and conducted a case study of department investigations related to certain allegations of pesticide misuse. We also compared components of Minnesota's pesticide regulation with those in ten similar states.

The safety of pesticides remains a matter of debate, and this study did not evaluate whether pesticides are safe to use. Although the U.S. Environmental Protection Agency plays a key role in the regulation of pesticides, our study did not evaluate that agency's performance. We did not examine the appropriateness of the various health standards that relate to pesticides. Further, although the Minnesota Department of Agriculture is responsible for regulating fertilizers, among other duties, this study did not include them but instead focused exclusively on pesticides.

Chapter 1 of the report provides background information on pesticides and the federal and state agencies and laws that govern them. Chapter 2 analyzes the process for registering pesticide products and regulations on selling, using, and storing pesticides. In Chapter 3, we examine issues related to enforcing pesticide regulations. Finally, Chapter 4 focuses on efforts to monitor the use and environmental effects of pesticides.

1 Background

SUMMARY

A complex array of federal and state laws and rules regulates pesticides. The Minnesota Department of Agriculture is the state's lead agency for enforcing pesticide requirements. In fiscal year 2005, the department spent $10.7 million on pesticide-related work, 86 percent of which was spent by the Agronomy and Plant Protection Division. Two-thirds of the division's fiscal year 2005 funding came from the Agricultural Fund, which receives most of its money from fees and charges paid by the pesticide industry; only 12 percent of spending came from the state's General Fund.

Federal laws and rules govern the sale and use of pesticides. However, states have a significant enforcement role, and they can set stricter standards to control pesticide sales and use within their borders. States can also prescribe activities to monitor the overall effects of pesticides on the environment. This chapter provides a brief overview of the federal and state laws and agencies involved in regulating pesticides in Minnesota. Specifically, this chapter answers the following questions:

- **What are pesticides, and how are they used? What are their advantages and disadvantages?**
- **What state and federal laws govern pesticides, and what agencies are involved?**
- **How does the Minnesota Department of Agriculture regulate pesticides, and how much does it spend to do so?**

To answer these questions, we researched federal and state regulations and analyzed national literature on pesticide issues. We interviewed employees of the Minnesota Department of Agriculture and other agencies, as well as representatives of environmental groups and the state's agricultural industry. We also analyzed department data on expenditures, revenues, and personnel.

PESTICIDES

Pesticides are used in many settings and for diverse purposes.

As we discuss in the following section, pesticides are used in a variety of settings that are important to the state's economy and the quality of life that citizens enjoy. For example, pesticides are commonly used as disinfectants for potable and recreational water as well as waste water. Agriculture is one of the state's major industries. In fiscal year 2003, Minnesota had approximately 80,000 farms, and they produced over $2.6 billion dollars worth of exports.[1] Using

[1] Minnesota Agricultural Statistics Service, *Minnesota Agricultural Statistics 2004* (St. Paul, 2005), 4-5; http://www.nass.usda.gov/mn/agstat05/p004.pdf, accessed December 12, 2005; and http://www.nass.usda.gov/mn/agstat05/p005.pdf; accessed December 12, 2005.

pesticides wisely helps make this possible. In addition, pesticides are widely used in other settings, including school buildings and grounds, homes, retail and industrial establishments, right-of-way corridors, lawns, and golf courses.

Definitions

The word "pesticide" refers to a broad range of substances. According to state and federal laws:

- **A pesticide is any substance or mixture of substances meant to prevent, destroy, repel, or mitigate a pest, and any substance or mixture of substances meant to regulate, defoliate, or dry a plant.[2]**

The laws further define pests to include insects, rodents, certain worms, fungi, weeds, terrestrial or aquatic plants, animal life, viruses, and bacteria, but exclude viruses, bacteria, or other microorganisms on or in humans or other living animals.[3]

Restricted-use pesticides are more hazardous than general-use pesticides.

Pesticides are classified as restricted-use or are unclassified (commonly referred to as general-use). Because of their active ingredients, restricted-use pesticides are considered more hazardous to the environment (which includes humans, animals, and other natural resources) than general-use pesticides. Only licensed pesticide dealers can sell restricted-use pesticides, and only certified applicators can buy and use them. In contrast, general-use pesticides can be sold in a wide variety of stores, such as nurseries, supermarkets, and hardware stores, and anyone may purchase and use them.

In addition, pesticides are often classified by the type of pest they control or the site where they are applied. Classifications based on type of pest include: herbicides (plants), fungicides (fungi or mold), insecticides (insects), fumigants (pests in buildings or soil), disinfectants and sanitizers (microorganisms on inanimate objects), and rodenticides (mice and other rodents). Common site classifications include: agriculture; lawn and garden; home; structural; animal care; disinfectants and sanitizers; and wood preservatives, paints, and stains.

Number and Type of Products

Federal pesticide laws require that the U.S. Environmental Protection Agency register pesticides and pesticide products before they can be sold anywhere in the nation.[4] The laws also allow states to establish their own registration processes,

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[2] *Minnesota Statutes* 2004, 18B.01, subd. 18; and 7 *USC* 136(u)(1) and (2) (2000).

[3] *Minnesota Statutes* 2004, 18B.01, subd. 17; and 7 *USC* 136(t) (2000).

[4] 7 *USC* 136a(a) (2000). Throughout the report, the word "pesticide" refers to a substance's active ingredients, such as atrazine, that give the substance its ability to ward off pests. "Pesticide product" refers to a brand name product, such as Round-Up. Nationwide, there are far more pesticide products (about 21,000) than there are pesticides (about 850).

which Minnesota has done through the Department of Agriculture.[5] According to department data:

- **As of November 2005, 11,262 pesticide products were registered by the Department of Agriculture for use in Minnesota, almost all of which were classified as general-use products.**

Only about 4 percent of the products registered in 2005 were restricted-use products.[6] For example, products such as the corn herbicide Harness and ZP Rodent Bait are both restricted-use products. Examples of general-use products include Deep Six Flying Insect Killer and Lawn Science Pro Series Crab Grass Preventer.

Restricted-use pesticides are only 4 percent of all pesticide products registered in Minnesota.

Pesticide products registered in the state cover many different uses. As shown in Table 1.1, one-half of the products registered in Minnesota as of August 2005 were classified as either disinfectants and sanitizers (23 percent), agricultural crop products (14 percent), or lawn and garden products (13 percent).

Since 1994, the overall number of products registered in Minnesota increased 30 percent. According to department staff, the two product categories with the largest increases were (1) disinfectants and sanitizers and (2) lawn and garden products.

Advantages and Disadvantages

Pesticides are substances that are intentionally added to the environment to kill or regulate some type of life. By their nature, they are toxic and, therefore, dangerous products to some degree. Although pesticides are one of the most studied substances put into the environment:

- **There are significant differences of opinion about the relative merits of using pesticides.**

The very properties that make pesticides advantageous to use may be hazardous to humans, animals, and the environment if used improperly or without knowledge of their effects. Furthermore, studies have shown that pesticides can pose risks, even when used according to product labels. State and federal laws require that pesticides not pose an "unreasonable adverse effect" on the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide.[7] The difficulty involved in balancing pesticides' risks and benefits is exacerbated further by changing societal expectations and scientific advances that contradict past information.

State and federal laws require that pesticides not have an "unreasonable adverse effect" on the environment.

Pesticides offer many advantages. For example, using pesticides increases food production, which generally results in lower prices and wider selections for consumers. Pesticides also protect buildings and homes from structural damage

[5] Chapter 2 reviews the federal and state registration systems.

[6] Minnesota Department of Agriculture, *Registered Product Information System*; http://www2.mda.state.mn.us/webapp/lis/productsdefault.jsp; accessed November 15, 2005.

[7] *Minnesota Statutes* 2004, 18B. 07, subd. 1; 18B.01, subd. 31; and 7 *USC* 136(z)(bb)(1) (2000).

Disinfectants and sanitizers made up the largest proportion of pesticides registered in Minnesota last year.

Table 1.1: Pesticide Products Registered for Use in Minnesota by Type, 2005

Product Type	Number Registered	Percentage of Total	Product Description by Principal Use
Disinfectants and sanitizers	2,826	23%	All professional-use and homeowner-use disinfectants and sanitizer products, such as Sani-Flush
Agricultural crops	1,656	14	Agricultural herbicides, insecticides, and fungicides, such as Round-Up, and commercial sod production products
Garden and lawn	1,604	13	Outdoor products available for general public use that require no training or license to purchase
Home	1,076	9	Products generally used by homeowners inside homes, including houseplant sprays, ant and roach killers, and mosquito repellents
Turf and ornamental	995	8	Professional-use turf and ornamental products, horticultural and greenhouse products, and products for use on golf courses
Miscellaneous	895	7	Cooling tower microbiocides and slimicides, aquatic-use products, professional mosquito control products, and other miscellaneous products
Animal care	857	7	Products used to care for livestock and household pets
Pool, spa, and hot tub	660	5	Products for use in pools, spas, and hot tubs, excluding sanitizers and disinfectants
Structural	593	5	Fumigants, products for use inside industrial establishments, and products used by pest control operators
Industrial, right-of-way, and forestry	542	4	Pesticides used along highways and in industrial areas, products used to formulate other products, and forest management products
Wood preservatives, paints, and stains	305	3	Products designed to protect wood from decay and metal from fungus
Vertebrate control	186	2	Products designed to kill rodents, birds, and fish, or repel animals
Total	12,195	100%	

SOURCE: Minnesota Department of Agriculture, *Pesticide Products by Type* (St. Paul, August 12, 2005). The 12,195 products correspond to approximately 650 pesticide active ingredients.

due to termites, control disease transmitted by rodents and insects, sanitize drinking and recreational water, protect livestock and other domesticated

animals, and disinfect indoor areas, such as kitchens and bathrooms, as well as dental and surgical instruments.

At the same time, pesticide use—and misuse—may pose health and environmental hazards. The risk of acute poisoning and concern about long-term exposure to pesticides and pesticide residue on food remain unsettled. Within the last 10 to 15 years, questions have been raised about whether pesticides disrupt the human and animal endocrine systems.[8] Research on diseases such as Parkinson's disease raise questions about the effects of long-term, low-dose exposure to multiple pesticides, and some people are calling for more testing of the combined impact of pesticides routinely used together. Natural resources may be degraded when pesticides enter rivers or streams or leach into groundwater, thereby threatening public and private drinking water supplies. In addition, pesticides that drift from one site to another may harm or kill unintended plants as well as humans, birds, fish, bees, or other wildlife.

Although pesticide exposure can cause serious health problems and even death, such cases have been rare in Minnesota.

Exposure to pesticides can result in serious health concerns or even death, although such cases are rare in Minnesota. We looked at data on all pesticide-related calls received by the Minnesota Poison Control System since 2000.[9] Over that five-and-a-half-year period, of the reported 8,811 human exposures to pesticides for which medical outcome data were recorded, 1 resulted in death, 6 resulted in effects that were permanent or life threatening, and 68 resulted in moderate medical effects, as Table 1.2 shows. About two-thirds of the pesticide calls to the Poison Control System were for exposures to children under six years of age.

Amount and Type of Pesticides Used

In a recent report, the U.S. Environmental Protection Agency estimated that about 5.0 billion pounds of pesticides were used in the United States in 2001, with pesticides that serve as water disinfectants comprising the largest share (52 percent).[10] Conventional pesticides, which include herbicides, insecticides, and fungicides used in the agricultural, industrial, and homeowner sectors, comprised the next largest share at 18 percent. As Table 1.3 shows, most conventional pesticides were used for agricultural purposes.

Information on total pesticide use in Minnesota is not tracked. The best estimates of pesticide use in the state are for agricultural pesticides, and they must be inferred from distribution data submitted to the Department of Agriculture by

[8] An endocrine disrupter is an outside substance that interferes with the synthesis, secretion, transport, binding, action, or elimination of the body's natural hormones that are responsible for maintaining internal stability, reproduction, development, or behavior.

[9] Most calls to the Poison Control System are related to substances other than pesticides. In 2004, for example, pesticide calls represented 10 percent of the 17,025 incoming calls. Hennepin Regional Poison Center, *2004 Annual Report Minnesota Poison Control System* (Minneapolis, 2004), 9. Nearly all of the pesticide-related calls involved unintentional exposure to pesticides, but 1 percent were suicide attempts.

[10] U.S. Environmental Protection Agency, *Pesticides Industry Sales and Usage* (Washington, D.C., May 2004), 10; http://www.epa.gov/oppbead1/pestsales/01pestsales/market_estimates2001.pdf; accessed August 29, 2005.

Table 1.2: Medical Outcome of Pesticide Calls to Poison Control System, January 2000–June 2005

Medical Outcome	Number of Calls	Percentage of Total
Minimal toxicity with no clinical follow-up[a]	4,443	50%
Nontoxic with no clinical follow-up[b]	2,181	25
Unrelated or no effect	1,253	14
Minor effects were minimally bothersome to caller	708	8
Potentially toxic with no clinical follow-up[c]	151	2
Moderate effect[d]	68	1
Effects were life threatening or possibly permanent	6	<1
Death	1	<1
Total	8,811	100%

NOTE: Minnesota's Poison Control System received 9,773 calls regarding human exposure to pesticides between 2000 and June 2005, of which 8,811 had medical outcome data recorded.

[a] Call takers' judgment indicated that only minor effects were possible from the exposure.

[b] Call takers' judgment indicated that the substance was nontoxic or exposure was insignificant.

[c] Callers' exposure may have been toxic but the Poison Control System was unable to follow-up.

[d] Clinical effects were more pronounced, prolonged, or systemic than minor effects.

SOURCE: Office of the Legislative Auditor, analysis of Minnesota Poison Control System data for 2000 through June 2005, submitted August 18, 2005.

The best data on the amount of pesticides used in Minnesota are for agricultural pesticides.

product manufacturers or obtained from pesticide use surveys.[11] Distribution data estimate the amount of pesticides presumably "for sale" in Minnesota, not the amount of pesticides actually used. Some products may never be sold, while others may be sold, but not used. These data show that:

- **Pesticide manufacturers distributed about 34.2 million pounds of agricultural pesticides in Minnesota in 2004.**

As shown in Table 1.4, manufacturers marketed more pounds of glyphosate in Minnesota in 2004 than any other agricultural pesticide—almost three times more than acetochlor, the next top-marketed agricultural pesticide. Glyphosate, which is the primary weed control pesticide for soybeans, represented 30 percent of registrants' total distribution of agricultural pesticides in Minnesota in 2004.[12]

[11] *Minnesota Statutes* 2004, 18B.26, subd. 3(c). Pesticide manufacturers are referred to as registrants; they are not pesticide dealers who sell pesticides to the public.

[12] According to the U.S. Environmental Protection Agency, glyphosate, along with 2,4-D and pendimethalin, are three of the most commonly used conventional pesticides for nonagricultural purposes, such as weed control in lawns and golf courses. The Minnesota Department of Agriculture does not calculate how much nonagricultural pesticides are distributed in the state. U.S. Environmental Protection Agency, *Sales and Usage*, 15.

Table 1.3: Nationwide Estimates of Pesticide Use, 2001

Type of Pesticide	Pounds of Pesticides (in millions) 2001	Percentage of Total
Water disinfectants	2,609	52%
Conventional[a]		
Agricultural	675	14
Industry, commercial, and government applied by professional applicators	111	2
Home and garden applied by homeowners	102	2
Conventional subtotal	888	18
Wood preservatives	797	16
Specialty biocides[b]	363	7
Other[c]	315	6
Total	4,972	100%

NOTE: Percentages do not total 100 due to rounding.

[a] Conventional pesticides include herbicides, plant growth regulators, insecticides, rodenticides, fungicides, fumigants, fish and bird pesticides, and others.

[b] Specialty biocides include recreational and industrial water treatment chemicals (other than chlorine and hypochlorites), disinfectants and sanitizers, and products for other uses, such as in adhesives and sealants.

[c] Other includes sulfur, petroleum oil, and other chemicals used as pesticides, such as sulfuric acid, insect repellants, and moth control products.

SOURCE: U.S. Environmental Protection Agency, *Pesticides Industry Sales and Usage* (May 2004), 10-12, 18-19; http://www.epa.gov/oppbead1/pestsales/01pestsales/market_estimates2001.pdf; accessed August 29, 2005.

Nearly all of Minnesota's major crops are treated with pesticides, particularly herbicides.

Acetochlor, metolachlor, and atrazine, which are primarily used to control weeds in corn, comprised about 27 percent of total agricultural pesticide distribution.

According to the U.S. Department of Agriculture, Minnesota potato, corn, soybean, and wheat farmers report using about 23 million pounds of pesticides yearly to raise their crops. [13] Almost all of Minnesota's major crops are treated with pesticides. For example, Minnesota potato, corn, soybean, and wheat farmers report treating 94 to 99 percent of their acreage with herbicides to control

[13] Data for corn and potatoes are for the 2003 growing season while data for soybeans and wheat are for the 2004 growing season. U.S. Department of Agriculture, *Agricultural Chemical Usage 2004 Field Crops Summary* (Washington D.C.: U.S. Department of Agriculture, May 2005), 31, 44; and U.S. Department of Agriculture, *Agricultural Chemical Usage 2003 Field Crops Summary* (Washington D.C.: U.S. Department of Agriculture, May 2004), 31, 60.

In 2004, manufacturers distributed nearly three times more glyphosate than any other agricultural pesticide in Minnesota.

Table 1.4: Top Ten Agricultural Crop Production Pesticides Sold, Offered for Sale, or Distributed in Minnesota, 2004

Pesticide	Pounds	Percentage of Total
Glyphosate	10,094,294	30%
Acetochlor	3,794,383	11
Metam sodium	2,992,181	9
Metolachlor	2,702,512	8
Atrazine	2,656,458	8
Propionic acid	2,324,566	7
2,4-D	744,219	2
Dimethenamid	714,036	2
MCPA	681,026	2
Pendimethalin	607,516	2

NOTE: Data are based on information that product registrants (not dealers) must submit when registering their products regarding the amount sold, offered for sale, or distributed in Minnesota during 2004.

SOURCE: Minnesota Department of Agriculture, *Pesticide Active Ingredients Sold in Minnesota in 2004 Sorted by Pounds* (St. Paul, July 18, 2005); http://www.mda.state.mn.us/appd/pesticides/useandsales.htm; accessed December 5, 2005.

weeds. In addition, potato farmers report using insecticides and fungicides on 69 and 98 percent of their acreage, respectively; wheat farmers report using insecticides and fungicides on 10 and 46 percent of their acreage, respectively.

To put these numbers in perspective, we compared Minnesota with other states on the acreage treated with pesticides and average pounds of pesticides applied per acre per year. First, we looked at the use of restricted-use pesticides. Data from U.S. Department of Agriculture surveys of farmers nationwide show that:

- **Minnesota corn farmers generally reported using restricted-use pesticides on a lower percentage of their planted crop land—and applying them at lower rates—than farmers nationwide.**

Nationwide, atrazine and acetochlor are the two most frequently used restricted–use pesticides for corn.[14] As shown in Table 1.5, in 2003, farmers reported that they used atrazine on 68 percent of corn acreage nationwide, at an average rate of 1.13 pounds per acre. In comparison, Minnesota corn farmers reported that they used atrazine on 45 percent of corn acreage, at a rate of .64 pounds per acre. Minnesota potato farmers reported applying cyfluthrin to less of their acreage

[14] U.S. Department of Agriculture, *Agricultural Chemical Usage 2003 Restricted Use Summary* (Washington, D.C., October 2004), 4; http://usda.mannlib.cornell.edu/reports/nassr/other/pcu-bb/agcr1004.pdf; accessed November 28, 2005.

Table 1.5: Use of Certain Restricted-Use Pesticides, 2003

	Minnesota		Nationwide	
Pesticide by Crop	Percentage of Acreage	Pounds per Acre per Year	Percentage of Acreage	Pounds per Acre per Year
Corn				
Acetochlor	30%	1.73	26%	1.90
Atrazine	45	0.64	68	1.13
Potatoes				
Cyfluthrin	26	0.03	31	0.04
Esfenvalerate	16	0.03	17	0.06

SOURCES: U.S. Department of Agriculture, *Agricultural Chemical Usage 2003 Restricted Use Summary* (Washington, D.C.: U.S. Department of Agriculture, October 2004), 4, 6; and U.S. Department of Agriculture, *Agricultural Chemical Usage 2003 Field Crops Summary* (Washington, D.C.: U.S. Department of Agriculture, May 2004), 41, 67.

than farmers nationwide, but applied it at about the same rate. Unlike corn and potato farmers, farmers raising soybeans and spring wheat in Minnesota and nationwide reported that they rarely applied restricted-use pesticides.[15]

Furthermore:

Minnesota farmers reported using 28 percent fewer pounds of herbicides per acre of treated corn in 2003 than in 1994.

- **Since the mid-1990s, Minnesota farmers of corn and soybeans—two of the state's major crops—have generally reported using fewer pounds of herbicides per treated acre than farmers in similar states.**

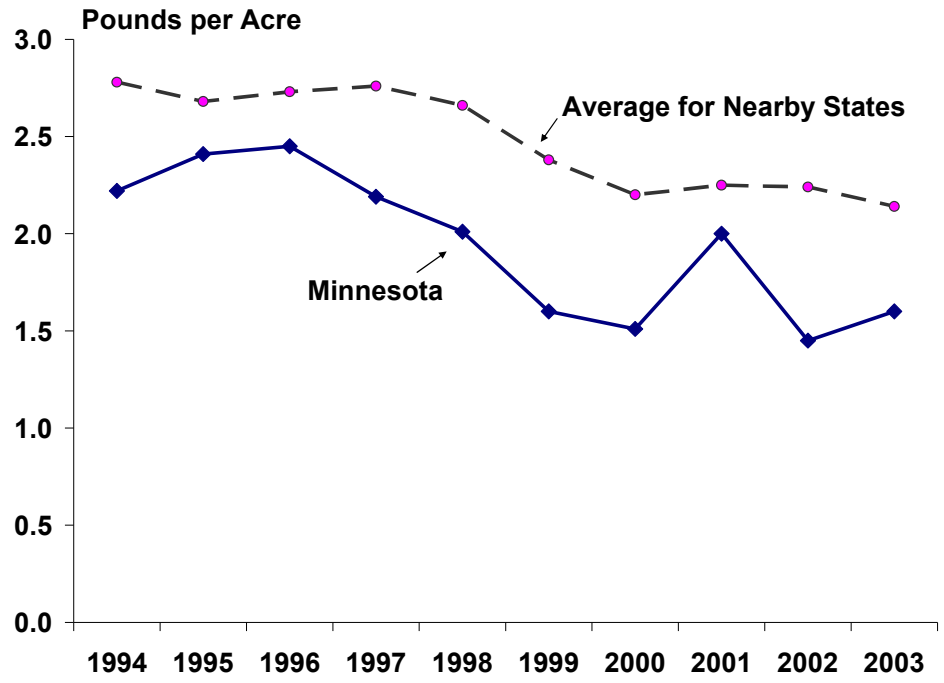
We examined the average amount of herbicides that farmers reported using per treated acre for two major crops: corn and soybeans.[16] As shown in Figure 1.1, from 1994 through 2003, Minnesota corn farmers reported using .25 to .79 fewer pounds of herbicides per treated acre of corn than the average of farmers in ten nearby states with high corn production.[17] In addition, overall reported herbicide use for corn in Minnesota dropped from 2.22 pounds per treated acre of corn in 1994 to 1.60 pounds per acre in 2003—a 28 percent decline. Average herbicide use also declined in our comparison states by 23 percent.

[15] U.S. Department of Agriculture, *Agricultural Chemical Usage 2004 Field Crops Summary* (Washington, D.C., May 2005), 35, 46; http://usda.mannlib.cornell.edu/reports/nassr/other/pcu-bb/agcs0504.pdf; accessed November 28, 2005; and U.S. Department of Agriculture, *Agricultural Chemical Usage 2004 Restricted Use Summary* (Washington, D.C., October 2005), 3-4; http://usda.mannlib.cornell.edu/reports/nassr/other/pcu-bb/agcr1005.pdf; accessed November 28, 2005.

[16] We excluded insecticides and fungicides because not all of our comparison states consistently reported these data.

[17] The ten states were: Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

Figure 1.1: Herbicides Used per Treated Acre of Corn, Minnesota and Nearby States, 1994-2003



NOTE: Nearby states include Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, Ohio, South Dakota, and Wisconsin except that Missouri and South Dakota data for corn were not collected in 2002; Kansas data for corn were not collected in 1994, 1997, and 2002; and North Dakota data for corn were not collected in any of the years except 2000, 2001, and 2003.

SOURCES: Office of the Legislative Auditor, analysis of U.S. Department of Agriculture, *Agricultural Chemical Usage* (various years) *Field Crops Summary* (Washington, D.C.: U.S. Department of Agriculture, 1995-2004).

Except for 1996, Minnesota soybean farmers reported using .05 to .23 fewer pounds of herbicides per treated acre than the average of farmers in ten nearby states with high soybean production, as Figure 1.2 shows. Reported herbicide use for soybeans in Minnesota increased from .94 pounds per treated acre in 1995 to 1.16 pounds per acre in 2004—a 23 percent increase. During the same time period, average use in our comparison states also increased, but at a much lower rate.

Federal laws set minimums for regulating pesticide use, and states can add stricter controls.

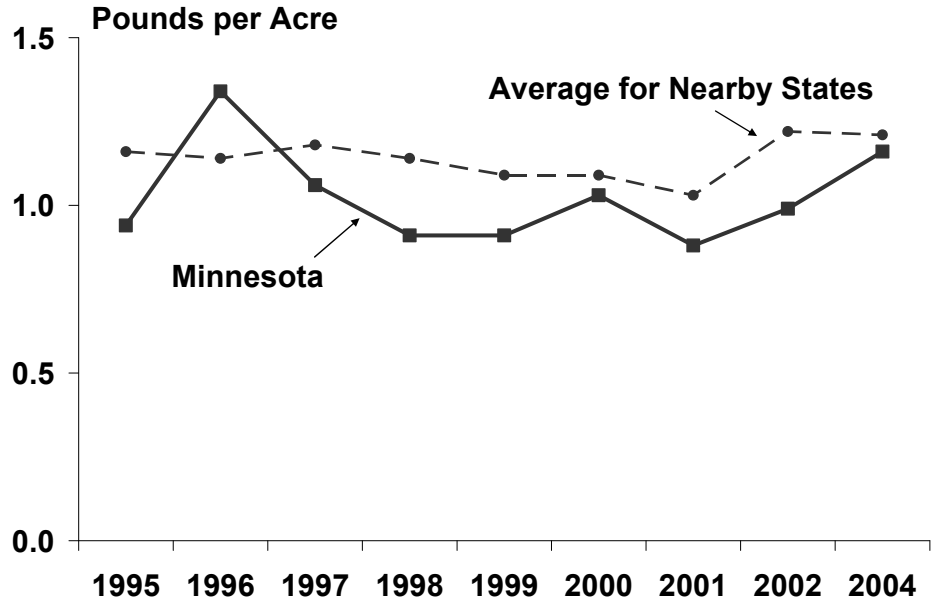
FEDERAL AND STATE LAWS

A combination of federal and state laws governs Minnesota's pesticide-related activities. Generally, federal laws set the minimums for regulating pesticide use, and state laws add stricter controls.

Federal Laws

Various federal laws apply to pesticide regulation:

Figure 1.2: Herbicides Used per Treated Acre of Soybeans, Minnesota and Nearby States, 1995-2002, 2004



NOTE: Nearby states includes Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin except that Kansas and South Dakota data for soybeans were not collected in 1995, 1996, and 2001; Wisconsin data for soybeans were not collected for any years but 1996, 1997, 2000, and 2002; and North Dakota data for soybeans were not collected for any years but 2000, 2002, and 2004. Soybean data were not collected in any of the previously listed states in 2003.

SOURCES: Office of the Legislative Auditor, analysis of U.S. Department of Agriculture, *Agricultural Chemical Usage* (various years) *Field Crops Summary* (Washington, D.C.: U.S. Department of Agriculture, 1996-2005).

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) is the cornerstone of pesticide regulation.

- **On the national level, the U.S. Environmental Protection Agency regulates pesticides through a complex set of laws and rules.**

The Federal Insecticide, Fungicide, and Rodenticide Act, commonly referred to as FIFRA, is the basis for regulating the sale, use, distribution, storage, and disposal of pesticides in the United States.[18] The act requires that the U.S. Environmental Protection Agency review and register pesticides for specific uses and sites, based on their relative risks and benefits. The act also requires that people who handle certain pesticides be certified.

Two federal laws regulate pesticides that are used in or on food or animal feed. First, the Federal Food, Drug, and Cosmetic Act authorizes the federal government to set maximum residue levels, also known as tolerances, regarding

[18] 7 *USC* 136-136y (as amended by *Pub. L.* No. 108-199 (2004)).

the amount of pesticide residue that can safely remain on food products.[19] Second, the Food Quality Protection Act, passed in 1996, amends the Federal Insecticide, Fungicide, and Rodenticide Act and the Federal Food, Drug and Cosmetic Act.[20] It establishes a single health-based standard for all pesticide residue on food. It also provides special protection for infants and children, and requires that all pesticides be tested for their potential to disrupt the human endocrine system.

The federal government sets standards for the amount of pesticides that can safely be found on food or in public drinking water supplies.

Likewise, two federal laws regulate pesticides in water. First, the Federal Safe Drinking Water Act establishes a process and schedule for developing enforceable maximum contaminant levels for pesticides in public drinking water supplies.[21] Second, the Federal Clean Water Act establishes a process for developing water quality criteria and standards for pesticides in surface waters, including lakes, rivers, and streams.[22]

Finally, the Federal Occupational Safety and Health Act, which is administered by the Occupational Safety and Health Administration rather than the Environmental Protection Agency, regulates pesticides relative to worker safety.[23]

State Laws

In Minnesota, state statutes involve a number of agencies in regulating and managing pesticides:

- **The Minnesota Department of Agriculture is the state's lead agency for enforcing state and federal pesticide requirements, but the University of Minnesota, Department of Health, and the Pollution Control Agency also play important roles.**

This section discusses various state laws related to pesticides and the agencies that enforce them.

General Enforcement Responsibilities

The Minnesota Pesticide Control Law, which mirrors the Federal Insecticide, Fungicide, and Rodenticide Act in many respects, regulates the sale, use, distribution, storage, and disposal of pesticides in the state.[24] Passed in 1987, the law establishes the Department of Agriculture as the state's lead agency for

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[19] 21 *USC* 346a (2000).

[20] *Pub. L.* No. 104-170 (1996).

[21] 42 *USC* 300f-300j-26 (as amended by *Pub. L.* No. 109-58 (2005)).

[22] 33 *USC* 1251 (2000).

[23] 29 *USC* 651 (2000). In addition, the Federal Insecticide, Fungicide, and Rodenticide Act sets forth various worker protection standards to safeguard the health and safety of pesticide workers and handlers.

[24] *Minnesota Statutes* 2004, 18B.01-18B.39.

enforcing state and federal pesticide laws and regulations.[25] This includes licensing pesticide applicators, registering pesticide products, and monitoring overall pesticide use and the effect of pesticides on the environment. The law specifically requires the department to work with the University of Minnesota Extension Service in developing educational programs, training materials, and examinations for pesticide applicators, as described more fully in Chapter 2.[26]

Minnesota's Chemical Liability Law empowers the department to enforce the Pesticide Control Law and others, including those on fertilizer use.[27] The law grants the department access to sites where agricultural chemicals—pesticides and fertilizers—are manufactured, used, stored, or transported. Through the power to administer oaths and issue subpoenas for witnesses and documents, the law authorizes the department to conduct investigations related to agricultural chemicals. It specifies the range of enforcement actions that the department may take when violations occur. Further, it establishes the Department of Agriculture as the lead agency in overseeing the clean up of agricultural chemical spills or leaks into the environment.

Water Monitoring Responsibilities

The 1989 Legislature passed the Groundwater Protection Act, which expanded the Department of Agriculture's responsibilities relative to groundwater.[28] The act requires that the department monitor pesticides in groundwater and take steps ranging from developing voluntary guidelines for using certain pesticides to imposing mandatory requirements to decrease pollution resulting from the normal use of pesticides. Taking these actions, however, depends on the establishment of health standards setting the amount of pesticides that can safely be in groundwater. The act authorizes the Minnesota Department

In Minnesota, the Department of Agriculture monitors groundwater for pesticides, but the Department of Health sets the standards for safe amounts of pesticides in groundwater.

One of the department's responsibilities is monitoring groundwater for pesticides.

[25] *Laws of Minnesota* 1987, chapter 358, sec. 43-81. The 1987 law replaced and expanded upon an an earlier chapter originally passed in 1976 (*Laws of Minnesota* 1976, chapter 53).

[26] *Minnesota Statutes* 2004, 18B.305, subd. 1-2.

[27] *Minnesota Statutes* 2004, 18D.301, subd. 1.

[28] *Laws of Minnesota* 1989, chapter 326, art. 1.

of Health, not the Department of Agriculture, to establish these standards, which are commonly referred to as health risk limits.[29] A health risk limit is the allowable concentration of a groundwater pollutant, or a mixture of pollutants, below which there is little or no risk to human health, even if consumed daily over a lifetime.

For surface water, the Minnesota Pollution Control Agency sets water standards, and the Department of Agriculture monitors for pesticides.

In contrast with groundwater, the Minnesota Pesticide Control Law gives the Department of Agriculture general regulatory authority over pesticides in surface water.[30] The department uses water standards developed by the Minnesota Pollution Control Agency pursuant to the federal Clean Water Act to help guide its surface water monitoring program and its development of voluntary guidelines to reduce pesticide pollution in surface water.[31] The federal act requires that the Pollution Control Agency develop both chronic and acute standards for surface water based on how a specific body of water is used, which the Pollution Control Agency does through the rulemaking process.[32] For example, surface water that is used primarily for recreation purposes or for drinking will have stricter water quality standards than surface water used primarily for agricultural purposes.

Pesticide Cleanup Responsibilities

Two state laws pertain to programs for cleaning up agricultural chemical accidents and spills, which help maintain clean water and mitigate other environmental threats. First, the Minnesota Environmental Response and Liability Act authorizes the Department of Agriculture to take remedial actions when pesticide or fertilizer accidents threaten public health or the environment.[33] When such accidents occur, the department must first identify responsible parties to clean up the contaminants or otherwise abate the threat. If this is not possible, the law authorizes the department to control the cleanup itself. The department investigates the environmental threats, monitors and tests to determine their extent, and directs a responsible party to contain the threat or clean the spill. In addition, the law establishes a remediation fund, intended in part to provide resources for the department's work related to these incidents.[34]

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[29] *Minnesota Statutes* 2004, 103H.201.

[30] *Minnesota Statutes* 2004, 18B.04.

[31] Because the Pollution Control Agency does not monitor surface water for pesticides, it relies on the Department of Agriculture to identify surface water sites that are contaminated due to pesticides. When pollutants, including pesticides, cause surface water to fall below water quality standards over a certain period of time, the Pollution Control Agency must conduct what is called a "total maximum daily load" study to identify the cause and source of the pollution.

[32] *Minnesota Rules* 2005, 7050.

[33] *Minnesota Statutes* 2004, 1115B.17, subd. 1. When hazardous substances other than agricultural chemicals are involved, the Minnesota Pollution Control Agency is authorized to take remedial action.

[34] *Minnesota Statutes* 2004, 116.155. Remediation fund revenues come from fees and costs recovered from responsible parties. Between 100 and 200 incidents involving agricultural chemicals are reported to the department each year, and the responsible parties bear the costs for most of them; only two current projects have no identified responsible party, meaning the remediation fund pays the clean-up costs.

Second, the Chemical Incident Reimbursement Law, passed in 1989, establishes an Agricultural Chemical Response and Reimbursement Account in the state's Agricultural Fund.[35] The account's purpose is to reimburse certain costs incurred by private parties when they clean up spills, leaks, and other agricultural chemical incidents. It is funded with revenues from a response and reimbursement fee imposed on the registration of pesticide products, inspection fees for fertilizer facilities, pesticide applicator and dealer licenses, and fertilizer facility licenses.[36] The Commissioner of Agriculture sets the response and reimbursement fee, based on statutory requirements. The law also creates a board, with members from the agricultural industry and state agencies, to determine the eligibility of applicants and set the amounts for reimbursement. In fiscal year 2005, the program reimbursed $1.9 million to people who cleaned up incidents in 93 separate projects. Wisconsin and Kansas are the only two states similar to Minnesota with comparable programs for reimbursing clean-up costs of pesticide spills.

Department personnel directed the cleanup at a site of a former creosote plant.

Only two states similar to Minnesota have comparable programs that reimburse the costs of cleaning up pesticide accidents and leaks.

MINNESOTA DEPARTMENT OF AGRICULTURE

As stated earlier, the Minnesota Department of Agriculture is responsible for regulating pesticides in the state. Among other duties:

- **The Department's Agronomy and Plant Protection Division does most of the pesticide-related work.**

A few other divisions in the department have some related work, as described briefly below.

Organization

The Agronomy and Plant Protection Division (1) enforces pesticide regulations through inspections and investigations, (2) licenses facilities where large amounts of pesticides are stored, (3) licenses and trains certain people who handle pesticides, (4) monitors for agricultural contaminants in groundwater and surface

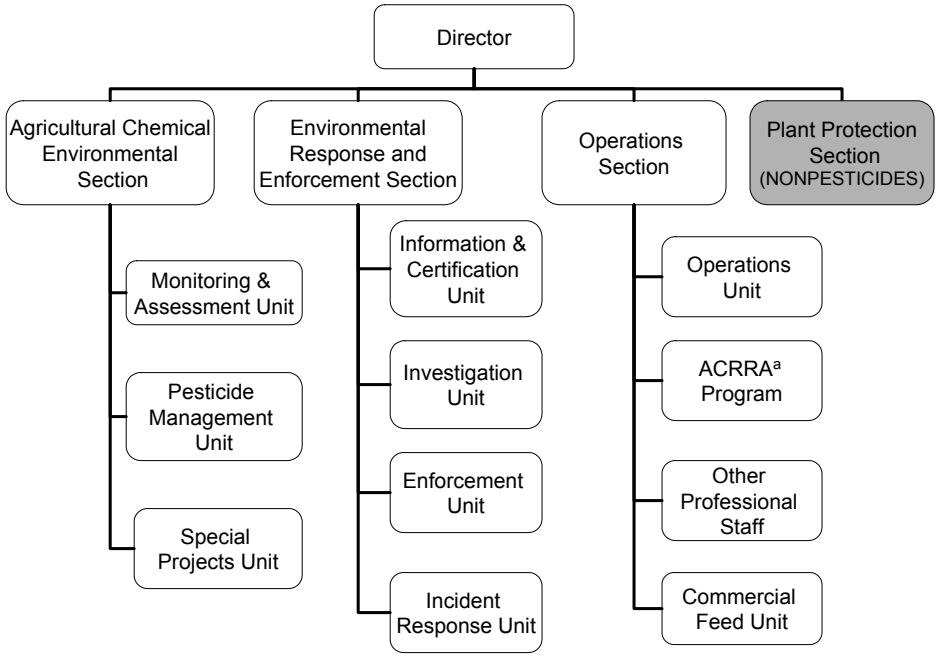
[35] *Minnesota Statutes* 2004, 18E.03, subd. 1.

[36] *Minnesota Statutes* 2004, 18E.03, subd. 4.

water, (5) responds to agricultural chemical emergencies (such as rollovers of trucks carrying pesticides), (6) directs the cleanup of contaminated sites, and (7) collects waste pesticides. Three of the division's four sections, as shown in Figure 1.3, have pesticide-related responsibilities, which are briefly described below. All three sections working with pesticide regulation also have work related to fertilizers. The fourth section (Plant Protection) does not deal directly with pesticides.[37]

In 2005, the Department of Agriculture's Agronomy and Plant Protection Division had three sections with pesticide responsibilities.

Figure 1.3: Organization of the Agronomy and Plant Protection Division, 2005



NOTE: This figure represents the division prior to a reorganization at the end of 2005, which renamed the division, altered some of the units, and moved the Plant Protection Section and Commercial Feed Unit outside the division.

[a] ACCRA refers to the Agricultural Chemical Response and Reimbursement Account.

SOURCE: Minnesota Department of Agriculture, December 13, 2005.

Agricultural Chemical Environmental Section

Work in the Agricultural Chemical Environmental Section covers a broad spectrum. This section monitors surface water and groundwater around the state to detect pesticides or their breakdown products. It registers pesticide products, which is necessary before they can be legally sold or used in Minnesota, and it

[37] In December 2005, the division underwent a reorganization intended to keep the three sections most closely involved with pesticides and fertilizers and move the Plant Protection Section into a different division. As of January 31, 2006, it was renamed the Pesticide and Fertilizer Management Division.

The department is required to develop "best management practices" for pesticide use.

oversees requirements related to safely storing pesticides. In addition, the section develops "best management practices" intended to guide the use of pesticides in ways that control their impacts on water and the environment. Finally, it tracks farming practices, such as how pesticides are used, by analyzing information periodically collected from users around the state, and it provides public education campaigns, such as safe practices for spraying weeds and lawns.

Environmental Response and Enforcement Section

The Environmental Response and Enforcement Section has four units with distinct duties but intertwined work. First, it licenses people who sell or apply agricultural chemicals and provides the training and testing required prior to certifying applicators. Second, it enforces pesticide regulations by inspecting agricultural chemical applications, dealers, and facilities as well as investigating violations and complaints. Third, it operates a waste-pesticide disposal program and reviews investigation results to determine when pesticide law violations warrant monetary penalties. Fourth, it responds when pesticides have spilled or are leaking and oversees work to remove or mitigate contamination. Cases often require employees from the various units to work together, such as when inspectors identify illegal sales of restricted-use pesticides to persons not certified to use them.

Operations Section

The Operations Section has multiple responsibilities for office-wide duties such as accounting, payroll, and support staff. Most relevant to pesticide regulation, however, is the section's work with the Agricultural Chemical Response and Reimbursement Account described earlier in this chapter. In preparation for review by the Agricultural Chemical Response and Reimbursement Account Board, staff accept applications for clean-up cost reimbursements, review them for eligibility, and recommend reimbursement amounts. Once the board makes its reimbursement decisions, staff send reimbursements to the appropriate people.

Other Department Divisions

Although pesticide regulatory authority resides in the Agronomy and Plant Protection Division, other divisions in the department have related work. As one example, the Laboratory Services Division tests water-monitoring samples for pesticides and their breakdown products. It also tests samples of soil, plants, clothing, and other materials for investigations of pesticide misuse. A second example is the Dairy, Food, Feed and Meat Inspection Division, which may become involved in pesticide misuse investigations when questions of food safety arise.

As another example, the Agricultural Resources Management and Development Division works with integrated pest management, which relies on a balanced approach of biological, cultural, and chemical means to control pests. It also does work related to organic farming by responding to farmers' inquiries, offering education and training opportunities, and supporting organic research. The Agricultural Marketing Service Division provides promotional and marketing assistance to organic businesses. The department's Agronomy and Plant Protection Division does not deal with organic farming, except to the extent it investigates pesticide misuse complaints coming from organic farmers and

develops general best management practices intended to help control pests with or without pesticides.

Funding and Personnel

Across all divisions:

- **The Department of Agriculture spent $10.7 million in fiscal year 2005 on regulating pesticides.**

The Agronomy and Plant Protection Division accounted for most of it, spending 86 percent of the total. Of the remaining $1.5 million, the department's laboratory spent 91 percent. Because the Agronomy and Plant Protection Division has primary responsibility for pesticide regulation, the following data are for it only.

Funding

The Agronomy and Plant Protection Division spent $9.2 million, or 66 percent of its total expenditures, on regulating pesticides in fiscal year 2005. This expenditure represents an 18 percent increase over pesticide-related expenditures in fiscal year 2004, as Table 1.6 shows.

Between fiscal years 2004 and 2005, the largest increase in pesticide-related spending was for cleaning up pesticide contaminations.

The largest single increase was for cleanups of pesticide contamination, for which expenditures rose by $878,584, a 60 percent increase. Most of this increase was due to clean-up costs at the site of a former creosote plant near Sandstone. Reimbursements for cleaning up pesticide spills and directing incident cleanups accounted for a large share—more than 46 percent—of the division's pesticide-related spending.

Funding for the division's spending comes from a variety of sources, although the Agricultural Fund predominates. Most of the funding for the Agronomy and Plant Protection Division in fiscal year 2005 came from fees and charges paid by the pesticide industry. As Table 1.7 presents, nearly two-thirds of the division's spending in fiscal year 2005 was from the Agricultural Fund, which receives most of its money from fees charged for registering pesticide products and licensing pesticide applicators and dealers.[38] Expenditures of General Fund appropriations made up just 12 percent of the division's spending that year. As a proportion of total spending, General Fund money was the same in fiscal year 2004, but an eight percentage point drop from 2003.

Within the Agricultural Fund, one account, the Pesticide Regulatory Account, comprises the bulk of funding for pesticide activities. Another account, the Agricultural Chemical Response and Reimbursement Account, is also sizable, but it pays for both pesticide and fertilizer cleanups. Revenues in the Pesticide Regulatory Account totaled $5.5 million in fiscal year 2005, and 82 percent of

[38] The 2005 Legislature increased license fees for pesticide dealers and aquatic and structural pest control businesses. It also increased late fees paid when certain pesticide applicators fail to renew their licenses on time. *Laws of Minnesota* 2005 First Special Session, chapter 1, art. 1, sec. 17-22.

Table 1.6: Expenditures by Pesticide Activity, Fiscal Years 2004-2005

	FY2004	FY2005	Percentage Change 2004-05
ACRRA[a]	$2,025,450	$1,971,566	-3%
Clean up pesticide accidents[b]	1,456,259	2,334,843	60
Investigations	960,639	925,089	-4
Administrative[c]	814,991	1,322,158	62
Water monitoring	626,735	685,625	9
Certifying pesticide applicators and licensing dealers	557,079	478,513	-14
Enforcement	547,344	691,526	26
Pesticide product registration and storage facility permits	509,956	500,260	-2
Special projects and other[d]	277,356	291,717	5
Total	$7,775,810	$9,201,296	18%

[a] Refers to the Agricultural Chemical Response and Reimbursement Account used to reimburse costs for cleaning up pesticide spills and other accidents.

[b] The FY2005 increase is due largely to significant clean-up costs at a former creosote plant.

[c] Includes division director, section managers, the Operations Unit, and other professional support staff. The FY2005 increase is due to a computer system project, a new position, new contracts for professional and technical services, and increased purchases of equipment and supplies.

[d] Includes pesticide-related spending on special projects and seed and noxious weed programs.

SOURCE: Office of the Legislative Auditor, analysis of Minnesota Department of Agriculture expenditure data, submitted October 10, 2005.

that came from fees paid by registrants for registering pesticide products in Minnesota, as Table 1.8 indicates.

In 2005, the Agronomy and Plant Protection Division had about 55 full-time equivalent staff working on pesticide activities.

Personnel

In fiscal year 2005, the Agronomy and Plant Protection Division had 108 full-time equivalent staff. Looking specifically at staff working on pesticide activities, the division had 54.7 full-time equivalent staff that year.

The number of full-time equivalent employees for pesticide work remained virtually unchanged from that in the two previous fiscal years. Two units in the division—those responding to spills and conducting inspections and investigations—each had about 10 full-time equivalent staff. The other units ranged from about two to nine staff each.

Table 1.7: Agronomy and Plant Protection Division Expenditures by Fund, Fiscal Year 2005

	Amount	Percentage of Total
Agricultural Fund[a]	$9,134,445	65%
Remediation Fund	1,814,371	13
General Fund	1,739,616	12
Federal funds	1,166,899	8
Special revenue funds and other[b]	127,804	1
Total	$13,983,135	100%

NOTE: Percentages do not sum to 100 due to rounding.

[a] Sources for the Agricultural Fund are the Pesticide Regulatory Account (50 percent), the Agricultural Chemical Response and Reimbursement Account (23 percent), fertilizer (7 percent), commercial feed (7 percent), seed (7 percent), and nursery (6 percent).

[b] Includes two special revenue funds and one gift fund.

SOURCE: Office of the Legislative Auditor, analysis of Minnesota Department of Agriculture data on expense summary by fund, submitted October 10, 2005.

Table 1.8: Revenues in the Pesticide Regulatory Account, Fiscal Year 2005

Most revenues in the Pesticide Regulatory Account come from fees charged to register pesticide products.

	Amount	Percentage of Total
Pesticide product registration fees	$4,447,319	82%
Pesticide applicator certification and license fees[a]	565,946	10
Civil penalties[b]	298,306	5
Interest	102,129	2
Pesticide dealer license fees	34,570	1
Permit fees[c]	2,750	<1
Total	$5,451,020	100%

NOTE: Percentages do not sum to 100 due to rounding.

[a] Includes license fees paid by companies providing structural or aquatic pest control as well as fees paid by individual applicators for licensing or certification.

[b] Refers to penalties collected from violators of pesticide regulations.

[c] Includes fees for chemigation permits and permits for bulk chemical storage facilities.

SOURCE: Office of the Legislative Auditor, analysis of Minnesota Department of Agriculture data on revenues by revenue source code, submitted October 10, 2005.

2 Registering Products and Licensing Users and Facilities

SUMMARY

Like most other states, the Minnesota Department of Agriculture relies on the federal pesticide registration process to help ensure that using pesticides will not result in unreasonable adverse effects on the environment or human health. While state statutes give the department broad authority for registering products, it has seldom requested additional information or imposed restrictions on products before registering them. Nor has the department developed criteria for when it will review product information in greater detail, but the department should develop these criteria. We found that the department meets or exceeds federal and state requirements for licensing pesticide applicators and dealers and regulating pesticide storage facilities. Minnesota's requirements for licensing pesticide applicators and dealers are generally equivalent to or stricter than those in similar states.

The Federal Insecticide, Fungicide, and Rodenticide Act, which authorizes the U.S. Environmental Protection Agency to regulate pesticides and their uses, allows the federal government to delegate many functions to states. This chapter examines some of those functions. It answers the following research questions:

- **How well does the Minnesota Department of Agriculture review pesticide products when registering them for use in Minnesota?**
- **To what extent does the department comply with state and federal registration requirements?**
- **How well does the department meet federal and state requirements for licensing and certifying pesticide applicators and dealers and permitting facilities?**
- **How does Minnesota's licensing of applicators and dealers compare with that in similar states?**

To answer these questions, we examined state and federal laws, rules, guidelines, studies, and reports related to registering pesticide products, licensing pesticide applicators and dealers, and permitting facilities. We interviewed staff at the Minnesota Department of Agriculture and talked with officials from the U.S. Environmental Protection Agency. We also reviewed registration files for certain types of pesticide products. Finally, to see how Minnesota's activities

compare with those of other states, we interviewed officials from ten states that raise similar crops and have similar geological terrain as Minnesota.[1]

PRODUCT REGISTRATION

Although the U.S. Environmental Protection Agency maintains a national registry of pesticides and pesticide products, federal law permits states to establish their own registration processes.[2] These processes can place more, but not less, restrictive requirements on pesticides. While states cannot change the federally-approved pesticide product label, they can issue a supplemental label to accompany a product when sold or used within the state. Through legislation or administrative procedures, states may also adopt more restrictive requirements, which may or may not appear on a supplemental product label specific to that state.

Overall, we concluded that:

- **Like most states, the Minnesota Department of Agriculture relies on the federal pesticide registration process to help ensure that using pesticide products will not result in unreasonable adverse effects on the environment or human health.**

In the following sections, we discuss how the department reviews registration applications, registration fees, and the process that other states use to register pesticide products.

Reviewing Registrations

State law gives the Department of Agriculture broad authority to require information when registering pesticide products for state use.

Like other states in the nation, Minnesota requires that pesticide products be registered in the state prior to their distribution or sale.[3] State law requires that registrants submit: (1) their name and address and the name that will appear on the product label, (2) product brand name, (3) product label, (4) a data sheet about product safety, and (5) any other information required by the Department of Agriculture, such as the complete product formula. The department may also require registrants to supply analytical methods and standards for the pesticide or its breakdown products, known as degradates.[4] Standards are necessary if the state conducts its own laboratory tests for product ingredients.

Minnesota statutes give the Department of Agriculture broad authority for registering pesticides. The department may request "any relevant information" from registrants, and it can impose use and distribution requirements on products

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[1] The ten states are Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

[2] 7 *USC* 136v(a) (2000).

[3] Products intended solely for sale or distribution outside the state do not have to be registered in Minnesota, nor do products that the U.S. Environmental Protection Agency classifies as minimum-risk pesticides.

[4] *Minnesota Statutes* 2004, 18B.26, subd. 2(b).

to prevent "unreasonable adverse effects on the environment."[5] Statutes define unreasonable adverse effects as "any unreasonable risk to humans or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide."[6] At the same time, Minnesota statutes limit the department's authority in that it cannot deny registration due to lack of need for a product.[7]

We found that:

- **The Department of Agriculture seldom uses its authority to request additional information or impose restrictions on pesticide products.**

The department does not routinely ask for or review studies that registrants have generated for the U.S. Environmental Protection Agency regarding pesticides' environmental effects. In the last 15 years, the department has never cancelled the registration of a product at its own initiative. It has denied registration once, and it has imposed additional restrictions on three new agricultural products.[8] The department initially denied registration for Balance, a new corn herbicide, because of water quality concerns. The department later offered to register the product if the manufacturer agreed to additional restrictions. However, the manufacturer did not register the product under the conditions offered. In the mid-1990s, the department registered acetochlor under a commissioner's order that included monitoring and use requirements specific to Minnesota. The department likewise imposed special requirements on Command because the product was very susceptible to pesticide drift; the manufacturer eventually improved the product to reduce drift.

Over the last 15 years, the department has imposed state restrictions on only three pesticide products.

According to staff, while statutes appear to give the department broad authority, it is difficult to prove that a product might have an unreasonable adverse effect on the environment if the Environmental Protection Agency has already registered it. Staff told us that they prefer to work through national organizations, such as the Association of American Pesticide Control Officials and the State-FIFRA Issues Research and Evaluation Group, to help ensure that restrictions are imposed at the federal level rather than the state level.[9]

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[5] *Minnesota Statutes* 2004, 18B.26, subd. 2(b) and 5(b).

[6] *Minnesota Statutes* 2004, 18B.01, subd. 31.

[7] *Minnesota Statutes* 2004, 18B.26, subd. 5(a).

[8] Working under a 1995 Memorandum of Agreement, the Department of Agriculture has delegated review authority over aquatic pesticides to the Department of Natural Resources, which issues permits for aquatic pesticide applications. The Department of Natural Resources determines which aquatic pesticides can be used in the state and whether any restrictions are necessary. Through its permitting process, this department has prohibited the use of some aquatic pesticides and placed additional restrictions on others. Department of Agriculture and Department of Natural Resources, *Memorandum of Agreement* (March 1995).

[9] The Association of American Pesticide Control Officers consists of state and federal pesticide regulatory staff. Its primary goal is to encourage uniformity among states' pesticide regulatory programs. The State-FIFRA Issues Research and Evaluation Group is a network of state officials that focuses on information exchange and cooperation among the states and federal government regarding pesticides.

Furthermore, the Department of Agriculture has allocated few staff resources to product registration—about two full-time equivalents.[10] As we discuss later, other states that conduct more detailed reviews of products before registering them devote significantly more resources to product registration than does Minnesota.

The federal approval process for new pesticide products takes 7 to 9 years to complete and requires about 120 different tests.

The U.S. Environmental Protection Agency has implemented an extensive pesticide review and approval process. It requires that registrants prove products will not result in unreasonable adverse effects on the environment if used according to label directions before the products can be used anywhere in the United States. The approval process involves an average of 120 different scientific studies and tests, based upon a pesticide's intended use.[11] Pesticides that are meant for use on food or feed crops must also meet certain residue limits (also known as tolerances) regarding the amount of pesticide that can legally remain in or on foods. Manufacturers generally spend seven to nine years developing and completing all of the studies required to register a new pesticide with the federal government. Once the pesticide is developed and tested, it typically takes the Environmental Protection Agency two years to review the application package. It has been estimated that manufacturers spend between $40 million and $50 million to develop and register a new pesticide.

The federal government has been reviewing previously registered pesticides in light of new safety standards.

In addition, federal law requires that the Environmental Protection Agency review the safety of currently registered pesticides. Over the last several years, the federal government has been re-examining the ingredients in pesticides initially registered before November 1984 in light of current scientific and safety standards.[12] The federal government has also been reassessing existing food tolerances, giving highest priority to pesticides posing the greatest risk to public health.[13] Finally, if there is evidence that a currently registered pesticide might pose an

Inspectors check labels as part of ensuring that pesticides are registered to be used in Minnesota.

[10] We tried to identify department expenditures for pesticide registration activities, but the department could not accurately separate its product registration costs from the rest of the unit's pesticide-related expenditures.

[11] Purdue University Cooperative Extension Service, *Pesticides and Water Quality* (West Lafayette, IN: Purdue University Cooperative Extension Service, May 2001), 18-19.

[12] By October 2004, the Environmental Protection Agency had completed reviewing 78 percent of the 612 groups of related "old" pesticides needing reassessment. *Federal Register,* vol. 70, no. 184, September 23, 2005, 55845.

[13] To date, the Environmental Protection Agency has reviewed nearly 7,100 food tolerance assessments and expects to have all 9,721 pesticide reviews completed by August 2006. *Ibid*., 55844 and 55849.

unreasonable risk, the Environmental Protection Agency can initiate a special review.

Although statutes give the department the authority to review pesticide products in detail before registering them:

- **The Department of Agriculture has not developed criteria to identify instances when it would be appropriate to review certain product information in greater detail before registering the products.**

There are instances where additional review may be warranted. For example, in registering new pesticides, the Environmental Protection Agency issues "conditional registrations," which allow new pesticides to be sold and used before all required studies have been completed.[14] For the most part, the Department of Agriculture does not scrutinize these products in any greater detail than it does other products when registering them. As noted previously, the department sought to impose restrictions on products three times in the last fifteen years. Two of those products were conditionally registered by the federal government.

Prior to registering certain types of pesticide products for use in Minnesota, additional state reviews may be warranted.

The Association of American Pesticide Control Officials and the State-FIFRA Issues Research and Evaluation Group States have expressed concerns about the conditional registration of new pesticides. The Environmental Protection Agency has tried to address their concerns by creating a process whereby it would refer certain new pesticide registration applications to a water quality team of state officials (including staff from Minnesota) for review before registration. Although the process has been in effect since July 2004, Department of Agriculture staff told us that, thus far, no new pesticides have triggered the federal process for pre-registration state review; thus, they have not been contacted for a review.

Another instance when additional review may be warranted prior to registration is when products have unenforceable label language. As part of the state's general registration process, the department reviews product labels that have already been approved by the Environmental Protection Agency. Although product labels have the force of law, some federal labels contain language that the state cannot enforce. For example, some products are prominently labeled "For Commercial Use," which suggests that they should only be applied by certain types of applicators. Because neither federal nor state law defines commercial use, department staff cannot and do not enforce that provision of the label. The Department of Agriculture does not review these products in greater detail when registering them, nor does its routine review ever result in use restrictions to help ensure that label requirements can be enforced.

Instead, the Minnesota Department of Agriculture has worked with the Association of American Pesticide Control Officials, the State-FIFRA Issues

[14] *7 USC* 136a(c)(7)(A) and (B) (2000). In addition, several years ago the Environmental Protection Agency began to routinely issue conditional registrations rather than full registrations as part of its program to review previously registered pesticides in light of current health and safety standards. These registrations are contingent upon the registrant submitting the necessary data for reregistration.

Research and Evaluation Group, and the U.S. Environmental Protection Agency to address the problem on a national level. As a result, the U.S. Environmental Protection Agency modified its *Label Review Manual* (which is not considered binding) in 2003 to indicate that such language should not appear on product labels.[15] However, some product labels continue to contain such language, and, in January 2006, at the urging of the State-FIFRA Issues Research and Evaluation Group, the federal government began to reexamine the issue.

RECOMMENDATION

The Department of Agriculture should develop criteria for when it will review pesticide product information in more detail before registering products.

The department could consider reviewing various types of registrations in greater detail, such as conditional registrations for either new pesticides or new uses for existing pesticides, or products with unenforceable label language. The purpose of increased state review would not be to question the Environmental Protection Agency's decision, but to learn more about federal concerns or possible adverse effects. For example, the department could, as a matter of routine, contact the federal government for more information whenever the department receives a request to register a new pesticide, or it could routinely obtain the Environmental Protection Agency's *Pesticide Fact Sheet* on new pesticides. Fact sheets summarize test results as well as any concerns that the agency might have. Alternatively, the department could require that registrants submit copies of the reviews that they receive from the Environmental Protection Agency or data evaluation record reports (which summarize test results) for department review prior to registration to ensure that any unique state situations are adequately addressed. Because there are not large numbers of these types of registrations, the department would not likely need additional staff resources. In federal fiscal year 2005, the Environmental Protection Agency granted conditional registrations to only 5 new pesticides and approved 32 new uses for previously registered pesticides.[16]

The department registers a small number of products for special local uses beyond the uses approved by the federal government.

We also looked at the Department of Agriculture's review process for products that address a special state need, known as "special local need" registrations. Federal laws allow states to register products for additional uses not specifically approved by the Environmental Protection Agency if (1) there is a special local need for that use in the state, (2) the appropriate safety standards are met, and (3) the federal government has not previously denied or cancelled the use.[17] In these cases, state and federal laws direct the department to ensure that products registered under special need provisions (1) have a composition that warrants

[15] U.S. Environmental Protection Agency, *Label Review Manual 3rd Edition* (Washington, D.C.: U.S. Environmental Protection Agency, August 2003), 11-9.

[16] U.S. Environmental Protection Agency, *Fact Sheets on New Active Ingredients* (Washington, D.C., November 15, 2005); http://www.epa.gov/opprd001/factsheets/; accessed November 23, 2005; and U.S. Environmental Protection Agency, *Registration Activities in the Office of Pesticide Programs* (Washington, D.C., October 3, 2005), 9; http://www.epa.gov/opprd001/workplan/fy05finaldecision.pdf; accessed November 23, 2005.

[17] 7 *USC* 136v(c) (2000).

proposed claims, (2) is labeled in compliance with legal requirements, (3) will work as intended without unreasonable adverse effects on the environment when used according to label directions, and (4) meet a special need that cannot be met by existing products.[18]

The number of special need applications that the department receives has varied over the last eight years, ranging from 4 to 16 applications per year. Since 1998, the department has received an average of 9 special need applications per year.

As of August 2005, 48 products were registered by the Department of Agriculture under special need provisions.[19] Such registrations are often "open-ended" in that they are routinely renewed each year upon payment of the annual registration fee. Of the 48 special need registrations in effect in 2005, the department initially approved 8 of them prior to 2000, with the remaining 40 products initially approved in 2000 or later. All were registered for statewide use.

We reviewed 25 special need registrations that were filed (and still in effect) from 2003 through 2005 and found that:

- **As required by state and federal law, the Department of Agriculture conducts a somewhat more rigorous review for product registrations that are considered "special need" than it does for products in general.**

Special local use registration allows use on crops not included in the product's federal registration.

Of the 25 registrations reviewed, 11 involved changing the application rate or mode of application from what was listed on the federal label. Ten other special registrations extended the products' use to a crop not specifically allowed by the federal label.

Most of the files that we reviewed contained information to support the special registration: 16 of the 25 contained letters of support documenting a product's need (generally from a local university), and 11 submitted some type of data that supported the product's proposed claims.[20] Fourteen of the 25 products also had special registrations in other states.

Based on our analysis, we found that:

- **The Department of Agriculture's review process for "special need" registrations has some minor problems.**

In our review, we noted that the department did not often change the proposed label that the registrant submitted. Consequently, in one instance, the final state supplemental label contained blank spaces where a ratio for the necessary wing

[18] *40 CFR* 162.153(b)(c)(d)(e) and *Minnesota Statutes* 2005, 18B.27, subd. 2.

[19] Minnesota Department of Agriculture, *Registered Product Information System;* http://www2.mda.state.mn.us/webapp/lis/productsdefault.jsp; accessed August 29, 2005.

[20] Files that did not contain letters of support or supporting data generally involved updating the registration of previously registered products or new registrations of products identical to ones currently registered.

span for aerial spraying should have appeared. In three other cases, the Environmental Protection Agency made substantial changes to labeling already approved by the department.

RECOMMENDATION

The Department of Agriculture should ensure that state supplemental labels for pesticide products are complete and contain language that complies with state and federal requirements.

Although it is the registrant's responsibility to write the state supplemental label for a pesticide, the department must approve it. Although we are not aware of any environmental problems due to incomplete or questionable labels, the department should scrutinize supplemental labels more carefully to help ensure that users can rely on them and the department can enforce them. The department does not receive a large number of requests for special registration, therefore, implementing this recommendation should not require additional resources.

We also looked at product registration activities in ten states similar to Minnesota and found that:

- **Most nearby states review and register pesticide products in a manner comparable to Minnesota.**

Seven of the ten states reviewed products in much the same manner as Minnesota—routine approval of applications as long as the necessary documents were submitted, with a somewhat more rigorous review of special need registrations.

Two states with dissimilar review procedures (Indiana and North Dakota) gave greater scrutiny to registration applications for "minimum-risk" pesticides and often required that registrants submit studies to support product claims. The Environmental Protection Agency has determined that such products do not pose enough risk to merit registration at the federal level. Many states, including Minnesota, likewise do not require that such products be registered on the state level. The third state (South Dakota) reported that it reviews new pesticide products in greater detail than other types of products.

Few states similar to Minnesota have ever refused to register pesticide products already registered by the federal government.

As is the case in Minnesota, very few of the states that we contacted had ever refused to register a product already registered with the Environmental Protection Agency or placed special restrictions on a product's use. Two states (Indiana and North Dakota) indicated that they had, over the last few years, refused to register at least ten products, but these products were generally minimum-risk products where efficacy studies did not support product claims.

Three states—dissimilar to Minnesota in terms of crops, terrain, weather, and crop production—have substantially more extensive product registration processes than Minnesota (and most other states). New York looks more closely at products when they: contain new ingredients; make major label changes regarding use; increase the exposure of nontarget organisms; or could have a significant impact on humans, property, or the environment. California, which

works jointly with the Environmental Protection Agency on several registration projects, examines efficacy data for all products that contain new ingredients or make unique label claims, among other things. Florida uses a Pesticide Registration Evaluation Committee to look more closely at registrations when the products contain new ingredients or propose new uses. It is important to note, though, that these states devote more staff and resources to registration than Minnesota. For example, in 2004-05, the California Department of Pesticide Regulation spent about $56.6 million and employed approximately 352 employees.[21] Pesticide registration activities, including reviews of products' potential health effects, accounted for 21 percent ($11.9 million) of that department's total expenditures.

Registration Fees

Product registration fees are set by state statute and based on annual gross sales.

Registrants must pay an annual application fee for each pesticide registered. The fee, which has not changed since 1992, is statutorily set at 0.4 percent of (1) annual gross sales within the state and (2) annual gross sales of pesticides sold elsewhere but used in the state, with a minimum fee of $250.[22] The annual registration fee for special need registrations is set at $150, and it is not based on sales.[23]

By March 1 of each year, registrants must report to the Department of Agriculture the amount and type of each registered product sold, offered for sale, or otherwise distributed in the state during the previous year.[24] Minnesota statutes require that registrants secure sufficient sales information from distributors and dealers, regardless of their location, to accurately determine (1) the value of pesticides sold and used in Minnesota as well as (2) the value of pesticides sold or distributed out-of-state but for use in Minnesota. Registrants can exclude the distribution and sales of pesticides within Minnesota for use in other states if they properly document the out-of-state use.

Our comparison with other states shows that:

- **Minnesota generally charges higher pesticide registration fees than other similar states.**

Of the ten states that we examined, eight states had flat registration fees ranging from $15 to $210 per product. The remaining two states based their registration

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[21] California Department of Pesticide Regulation, *Department of Pesticide Regulation 2004/05 Progress Report* (Sacramento: Department of Pesticide Regulation, January 2005), 19-20.

[22] *Minnesota Statutes* 2004, 18B.26, subd. 3(a).

[23] In addition, statutes set the registration fee for disinfectants and sanitizers—the largest category of products registered by the state—at $250. Statutes also set the annual fee for "experimental" pesticide product registrations at $150 and the fee for experimental genetically engineered pesticide product registrations at $125. In fiscal year 2005, the Department of Agriculture issued nine experimental registrations. The department has not received any applications for genetically engineered pesticides in the last three years.

[24] *Minnesota Statutes* 2004, 18B.26, subd. 2(c). The department relies on registrants to calculate their registration fees and does not audit the data that registrants' submit. Its review is largely limited to checking for math errors and ensuring that registration fees reflect all registered products.

fee on product sales in the state, as does Minnesota. Iowa sets this at 0.2 percent of sales (Minnesota's rate is 0.4 percent), while Wisconsin has a variable rate.

LICENSES AND PERMITS

State law requires the Department of Agriculture to implement and enforce pesticide regulations.[25] As part of its regulatory authority, the department tests and licenses pesticide applicators, licenses pesticide dealers, and grants facility permits to storage facilities. We concluded that:

- **The Department of Agriculture meets or exceeds federal and state requirements for licensing pesticide applicators and dealers and regulating pesticide storage facilities.**

The following sections explain how the department licenses people who apply or sell pesticides and how it regulates pesticide storage facilities. The department also conducts inspections of how pesticides are used, sold, and stored, which Chapter 3 describes.

Pesticide Applicators

Federal and state laws govern people who apply pesticides. Federal law requires people who apply restricted-use pesticides to be certified, which means that applicators are competent to use these chemicals.[26] To do this, applicants for certification take written tests based upon standards that demonstrate practical knowledge of pest control practices and safety. Federal regulations define the standards, which are listed in Table 2.1, and they distinguish between competency for "commercial" applicators, those who apply pesticides for hire, and "private" applicators, typically farmers.

Federal law requires people who apply restricted-use pesticides to be certified.

In Minnesota, statutes require certification for private applicators who apply restricted-use pesticides, meaning that applicants must pass a nonmonitored, open-book test.[27] For those other than private applicators, statutes require licensure within one of four types of applicator licenses; licensure requires successfully passing a supervised, closed-book exam.[28] Each of the four types of applicator licenses (commercial, noncommercial, structural, and aquatic) has multiple categories of licensure, as depicted in Table 2.2, and each category has a different exam designed to reflect the practices unique to that type of application. For instance, the commercial applicator license has 15 categories, such as "field crops pest management" for applying herbicides and insecticides to agricultural

[25] *Minnesota Statutes* 2004, 18B.03 subd. 1.

[26] 40 *CFR* 171.2(a)(7) (2004) and 40 *CFR* 171.4(b)(1) (2004).

[27] *Minnesota Statutes* 2004, 18B.36, subd. 1 and 2. Statutes refer to certifying, not licensing, private applicators; however, certification also refers to the requirement that pesticide applicators demonstrate competency before using restricted-use pesticides, as explained later in the chapter.

[28] *Minnesota Statutes* 2004, 18B.315, subd. 3; 18B.32, subd. 3; 18B.33, subd. 4; and 18B.34, subd. 3. Beyond exams, statutes require commercial applicators and businesses applying pesticides to either buildings or bodies of water to furnish proof of financial responsibility, such as performance bonds or insurance, prior to licensure. In addition, aquatic applications to public waters require a permit from the Department of Natural Resources.

Table 2.1: Practical Knowledge Standards for Testing Competency of Pesticide Applicators, 2005

Commercial Applicators	Private Applicators
• Pesticide labeling comprehension	• Understanding of labels and applying pesticides according to label instructions
• Safety (e.g., pesticide toxicity, precautions to guard against injury, first aid procedures)	• Recognition of poisoning symptoms and procedures to follow in case of an accident
• Environment (e.g., potential consequences on wildlife and how weather and terrain influence use)	• Recognition of local environmental situations to avoid contamination
• Pests	• Recognition of common pests
• Pesticides (e.g., types of pesticides and hazards with their use)	• Pest problems and pest control practices associated with particular agricultural operations
• Application techniques (e.g., which technique to use in given situations and how to prevent drift)	• Proper storage, use, and handling of pesticides
• Equipment use, maintenance, and calibration	• Proper disposal of pesticides and containers
• Laws and regulations	• Related legal responsibilities

NOTE: Additional standards apply to specific categories of commercial licensure, such as structural applicators, because applicators in each category carry out different activities; exam questions to demonstrate competency vary accordingly.

SOURCE: 40 *CFR* 171.4(b) and 171.5(a) (2004).

In 2005, the Minnesota Department of Agriculture certified 18,500 private applicators (mostly farmers) and 9,593 other applicators.

crops.[29] In 2005, Minnesota had 18,500 private applicators and 9,593 other applicators (most of whom held two or more categories of licensure). Private applicators renew every three years, but all other licenses must be renewed annually by paying fees, and the fee amounts are statutorily set.[30]

[29] Descriptions of the license categories for commercial and noncommercial applicators are in the appendix available via the Internet at: http://www.auditor.leg.state.mn.us/ped/2006/pesticide.htm.

[30] Commercial applicators pay $50 for annual license renewal; noncommercial applicators also pay $50 unless they are government employees, in which case they pay $10. Effective in 2006, aquatic pest control businesses and structural pest control businesses must each pay $200 annual license fees in addition to the $50 fee required of individual applicators. By statute, private applicators pay $10 every three years for recertification, but they pay an additional $35 to cover the University of Minnesota's training and exam costs. *Minnesota Statutes* 2004, 18B.315, subd. 6; 18B.32, subd. 6; 18B.33, subd. 7; 18B.34, subd. 5; 18B.36, subd. 3; and *Laws of Minnesota* First Special Session 2005, chapter 1, art. 1, sec. 19-22.

Table 2.2: Pesticide Applicator Certifications, Licenses, and Categories of Licensure, 2005

License Type and Categories	Number of Licenses or Certifications	
Private	18,500	
Structural Pest Control Applicator		
Master	210	
Journeyman	492	
Fumigator	243	
Aquatic Pest Control Applicator		
Master	16	
Journeyman	44	
General ground	56	
General aerial	4	
Commercial or Noncommercial[a]	*Commercial*	*Noncommercial*
General ground	5,337	3,317
General aerial	275	3
Field crops pest management	2,567	391
Turf and ornamentals	2,025	1,779
Forest spraying	121	162
Seed treatment	268	44
Rights-of-way	975	543
Mosquito control	136	271
Stored grain and fumigation	54	125
Pocket gopher	11	40
Wood preservatives	43	19
Agricultural pest control animal	22	---
Antimicrobial	5	---
Sewer root control	14	---
Noncommercial Only		
Aquatic	---	230
Food processing pest control	---	70
Noncommercial structural	---	2
Total Certifications and Licenses	38,414	

NOTE: The counts reflect the number of licenses and certifications granted, not the number of applicators. Most applicators have one license with multiple use categories. As of September 15, 2005, 9,593 persons held the 19,914 structural, aquatic, commercial, and noncommercial licenses.

[a] The commercial applicator license has 15 categories, including a "forage" category not shown above because no one is certified in it. The 15 commercial categories are the same as for the noncommercial license, but noncommercial licensing, covering applicators such as government employees, has three additional categories.

SOURCE: Minnesota Department of Agriculture, "Initial Response to Data Request Dated September 14, 2005; New Licenses by Category," September 30, 2005, e-mail.

Our study found that:

- **As federal law and state statutes require, the Department of Agriculture works with the University of Minnesota Extension Service to test and train pesticide applicators.[31]**

While the department oversees the testing for most license categories of applicators, the University of Minnesota Extension Service develops and annually updates the tests for private applicators.[32] The Extension Service also produces the study materials available for all categories of licensure, and the department's exams are based on these materials. Although state rules allow applicants for pesticide applicator licensure to attempt the test three times in any given year, most pass on their first attempt.[33] For instance, from January through September 2005, 91 percent of the commercial and noncommercial applicants taking tests passed on their first attempt, and the remaining applicants passed by their second or third attempt. Among those applying for private applicator certification, 99 percent had passed by their third attempt in 2005.

Pesticide applicators must periodically become recertified by retesting or completing workshops.

Minnesota requires pesticide applicators to periodically become recertified through either ongoing education (in the form of workshops) or testing. The department and Extension Service oversee the planning of dozens of applicator workshops annually to recertify applicators in most categories of licensure. Of the nearly 14,200 commercial and noncommercial recertifications in 2005, 98 percent occurred via workshops. Applicators who do not attend workshops must retest or, in some categories of licensure, take correspondence courses and submit correspondence-study answer sheets.[34]

Private pesticide applicators are required to be certified before applying restricted-use pesticides.

The department has made its training and testing widely available for pesticide applicators around the state. For most license categories, applicants may take

[31] *Minnesota Statutes* 2004, 18B.305, subd. 1 and 2; 7 *USC* 136u(c) (2000).

[32] Together, the Department of Agriculture and University of Minnesota Extension Service tested more than 3,370 new commercial and noncommercial applicators and 901 new private applicators in 2005.

[33] *Minnesota Rules* 2005, 1505.0960.

[34] Correspondence study is not available for structural pest control applicators or in five categories of commercial or noncommercial applicators: aerial, turf and ornamental, food processing, stored grain and fumigation, and noncommercial structural.

exams either at the Department of Agriculture's location in St. Paul or, for those outside the Twin Cities region, in facilities overseen by county agriculture agents.[35] In addition, applicators may now renew their licenses via the Internet and the department's on-line renewal system. Workshops to recertify applicators are held in various locations around the state each year.

States that certify pesticide applicators must have a state plan containing certification standards that conform to Environmental Protection Agency standards.[36] We found that:

- **The Department of Agriculture has a state plan for certifying pesticide applicators, as required, and Minnesota exceeds several federal requirements regarding who may apply pesticides.**

The state plan must also have assurances that the state agency has qualified personnel and adequate funds to carry out the plan. Minnesota's most recent state plan was approved in 2003 and is updated annually.[37] It details how department activities regarding certification meet state statutory and federal requirements.

Minnesota sets stricter controls than the federal government on commercial pesticide applicators.

In three ways, Minnesota statutes and the department's state plan set stricter controls on licensing and certification than those in federal law. First, Minnesota requires anyone who applies restricted-use pesticides to be licensed or certified.[38] It does not have a provision allowing applications by uncertified persons operating under the direct supervision of a certified applicator, which federal requirements allow.[39] Second, state statutes require all commercial applicators to be certified whether they apply restricted-use or general-use pesticides.[40] This is stricter than federal regulations, which require commercial applicators to be certified only if they apply restricted-use pesticides.[41] Third, Minnesota requires commercial applicators to demonstrate financial responsibility before they can be licensed, but federal law does not.[42]

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[35] In some cases, the department's nine agricultural chemical inspectors, who live in one of nine regions of the state, will administer the tests. Tests for structural applicators, on the other hand, are all conducted at the St. Paul headquarters because they involve identifying actual pests.

[36] 7 *USC* 136i(a)(2)(E) (2000).

[37] Minnesota Department of Agriculture, *Minnesota State Plan* (St. Paul, 2003); and U.S. Environmental Protection Agency, *Minnesota 2005 Annual Report* (Washington, D.C.: U.S. Environmental Protection Agency, 2005); http://134.121.87.199/candt/publicAccess/reviewReportShow.cfm?STATE_ID=24&ADMIN_REPORT_YEAR=2005; accessed November 29, 2005.

[38] Minnesota Department of Agriculture, *Minnesota State Plan* (St. Paul, 2003), 6 and 9.

[39] 40 *CFR* 171.6(a) (2004) and *Ibid.*, 6.

[40] *Minnesota Statutes* 2004, 18B.33, subd. 1.

[41] 40 *CFR* 171.2(a)(7)-(9) (2004).

[42] *Minnesota Statutes* 2004, 18B.33, subd. 6. Financial responsibility is demonstrated by either (1) proof of net assets of at least $50,000 or (2) a performance bond or insurance with prescribed liability limits and deductibles. Minnesota also requires proof of financial responsibility from licensed businesses in aquatic pest control and structural pest control.

We compared Minnesota's licensing requirements with those in ten similar states and found that:

- **The Department of Agriculture's requirements for certifying applicators are generally stricter than those in similar states.**

In general, Minnesota requires applicators to recertify more frequently than applicators in ten comparable states. For instance, Minnesota requires annual or biennial recertification in nearly every category of commercial licensure, while most states allow commercial applicators to go three or more years before being recertified, as shown in Table 2.3.

Most commercial applicators in Minnesota must be recertified more frequently than their counterparts in similar states.

Table 2.3: Years Between Pesticide Applicator Recertification, 2005

	Commercial Applicators	Private Applicators
Illinois	3	3
Indiana	5	5
Iowa	3	3
Kansas	3	5
Minnesota[a]	1 to 3	3
Missouri	3	5
Nebraska	3	3
North Dakota	3	3
Ohio	3	3
South Dakota	2	5

[a] Most commercial applicators in Minnesota must recertify every two years; only 3 of 15 licensure categories (field crops, forage pesticide use, and seed treatment) allow a three-year interval. Applicators in three other categories (aerial, commercial structural, and noncommercial structural) must recertify annually.

SOURCE: U.S. Environmental Protection Agency, *Certification and Training Plans and Annual Reports;* http://cru.cahe.wsu.edu/candt/ publicAccess/reviewReport.cfm?; accessed November 25, 2005.

Similarly, Minnesota, Illinois, and Wisconsin prohibit uncertified persons from applying restricted-use pesticides for hire, even when those persons are under the supervision of a certified applicator. The remaining eight states allow such applications for hire when the applicators are under the supervision of a certified applicator. Some of these states, such as Missouri and Ohio, require uncertified persons to have training in advance; Wisconsin allows uncertified persons to apply only general-use pesticides for hire, and they must be supervised.

Minnesota and nine of the ten similar states require commercial applicator licensure to apply any pesticide, whether it is restricted use or general use. This is stricter than in Nebraska, which licenses only those applying restricted-use

pesticides.[43] Minnesota and eight similar states require commercial applicators to take a closed-book examination, which is arguably more stringent than the open-book exams used elsewhere.

At the same time, in at least two respects, some states have stricter requirements than Minnesota. Six of the ten other states set a minimum age for licensure, while Minnesota has no minimum; three states require closed-book exams for private applicators, while Minnesota allows them to take open-book tests.

Pesticide Dealers

Minnesota regulates pesticide dealers who sell restricted-use pesticides and requires them to obtain licenses. Licensure is not required of hardware stores and other retail operations that sell general-use pesticides in packages sized for homeowner use. We found that:

- **The Department of Agriculture's licensing of pesticide dealers is generally equivalent to that in ten similar states, but Minnesota does not require dealers to be tested, as four states do.**

To sell restricted-use pesticides, dealers in Minnesota must annually obtain licenses; in 2005, the department licensed 658 such dealers.[44] The annual fee for dealer licensing is $150 and is set in statute.[45] All ten comparison states also require licensure of restricted-use pesticide dealers.

Similarly, all of the comparable states require their pesticide dealers to retain sales records for restricted-use pesticides. Minnesota requires retention for five years, while others require it for two or three years. A few states, including Minnesota, require dealers to annually submit information to their departments of agriculture. Dealers in Minnesota and Ohio must submit records of all sales of restricted-use pesticides.[46] The Minnesota Department of Agriculture uses these records to verify that sales of restricted-use pesticides occurred only to certified applicators. Three other states require dealers to report volumes of pesticides sold but not records of individual sales.

In the early 1990s, Minnesota discontinued testing pesticide dealers prior to licensing them.

Like six of the ten similar states, Minnesota does not require dealers to take training, pass tests, or otherwise establish their competency. Until the early 1990s, Minnesota required dealers to pass tests prior to initial licensure, but the department discontinued the tests after determining that testing did not improve dealer compliance with regulations. Four similar states—Illinois, Missouri, North Dakota, and South Dakota—currently require dealer examinations prior to licensure. Only Illinois requires dealers to take tests on an ongoing basis (every

[43] Nebraska requires commercial applicators to have licensure for applying any pesticide to structures or lawns.

[44] *Minnesota Statutes* 2004, 18B.31, subd. 1. Licensure is also required of dealers selling bulk pesticides, as described later in this chapter. The 2005 Legislature increased dealer license fees from $50 to $150. *Laws of Minnesota* First Special Session 2005, chapter 1, art. 1, sec. 18.

[45] *Minnesota Statutes* 2004, 18B.31, subd. 5.

[46] *Minnesota Statutes* 2004, 18B.37, subd. 1.

three years); the others either require only a one-time test or allow dealers to substitute training in lieu of an exam.

Pesticide Storage Facilities

Storing large volumes of pesticides requires meeting department standards for maintaining storage facilities and obtaining permits to build or alter the larger facilities. We found that:

- **The Department of Agriculture has set standards for the construction and maintenance of pesticide-storage facilities, which federal law does not require.**

The department regulates facilities that store "bulk" pesticides, defined as those held in an individual container of at least 56 gallons or 100 pounds.[47] It requires permits to build new facilities or substantially alter existing ones if facilities store pesticide containers of at least 500 gallons.[48]

Minnesota's safeguards for facilities storing "bulk" pesticides require storage containers to be structurally sound and have secondary containment areas in case of leaks.

State rules prescribe safeguards that cover items such as construction of loading areas and plans to respond to pesticide spills should they occur. Table 2.4 summarizes the safeguards. Facilities storing pesticides in "minibulk containers" —less than 500 but more than 56 gallons—are not required to have a permit, but they must still abide by the state's other pesticide storage rules.[49] The department periodically inspects facilities to ensure that they conform to safeguards for storing pesticides.

In contrast, federal regulations do not regulate pesticide-storage facilities and equipment.[50] Certain federal regulations apply either to facilities that manufacture or repackage bulk pesticides for distribution elsewhere, known as "producing establishments," or to facilities that sell pesticides in the marketplace.[51] Federal regulations for producing establishments focus on proper pesticide registration, packaging, and labeling to protect, in part, against adulterated or misbranded pesticides. They do not apply to properly constructing and maintaining facilities and equipment, as do Minnesota's facility regulations. In addition, the state's facility requirements apply to a larger number of facilities in Minnesota (631) than do federal requirements for producing establishments (422). Similarly, inspections of marketplace facilities are intended to check that pesticides are correctly registered, packaged, and labeled for distribution. They do not include inspecting the integrity of the building that houses pesticides.

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[47] *Minnesota Statutes* 2004, 18B.14, subd. 2(c); and 18B.01, subd. 4.

[48] *Minnesota Statutes* 2004, 18B.14, subd. 2(a). Permits are required if pesticides are stored for more than ten consecutive days.

[49] *Minnesota Rules* 2005, 1505.3040, subp. 5; and *Minnesota Statutes* 2004, 18B.01, subd. 4.

[50] Federal law allows the Environmental Protection Agency to issue requirements for storing or transporting pesticides when it has suspended or cancelled pesticide registrations. 7 *USC* 136q(a)(2)(A) (2000).

[51] U.S. Environmental Protection Agency, *Federal Insecticide, Fungicide, and Rodenticide Act Inspection Manual* (Washington, D.C.: Environmental Protection Agency, 2002), 7-1, 7-2, 7-4, and 7-16. Marketplace facilities are locations where pesticides are available either for distribution or wholesale or retail transactions, such as at hardware stores.

Table 2.4: Major Safeguards That Minnesota Requires of Pesticide Storage Facilities, 2005

Subject	Requirements
Storage containers	Containers must be: • Structurally sound and prevent the release of pesticides • Anchored to prevent instability • Secured against unauthorized access • Filled to no more than 95 percent capacity • Protected against risk of damage by moving vehicles • Bear a current product label • Dry pesticide containers must be covered by a roof and placed on raised platforms over an impervious surface
Loading areas	• Areas for loading must have a means of containment elevated above the surrounding area, of a particular size, and protected against pesticide-contaminated runoff • Underground plumbing to transfer rinsates or sediment must prevent release of pesticides into the environment
Secondary containment	Secondary containment areas must: • Be adequate to prevent liquid pesticides from moving to surface or ground water • Consist of a wall and liner made of specific materials to prevent leakage • Be of a capacity that will hold the volume of pesticide that could be released • Have bulk tanks placed at least one foot from the containment wall
Recovery of pesticide releases	• Pesticide releases must be recovered as soon as possible and used, stored, or disposed of according to label instructions • Records must be kept for five years of amounts recovered and crops to which they were applied • Operators must have a written plan to respond to pesticide releases, including procedures and equipment for recovering spilled pesticides • Employees must receive annual training on responding to pesticide releases
Inspection, maintenance, and recordkeeping	Operators must: • Record all inspections and maintenance of containers and surrounding areas • Inspect containers for leakage on a weekly basis during the growing season • Record the beginning and end amounts in each fixed storage container and the amount of bulk pesticides delivered, sold, and used
Underground storage	• After 1989, no new underground storage is allowed • Existing or exempted underground storage must perform a leak certification test
Abandoned containers	• Abandoned underground tanks must be thoroughly cleaned and removed • Abandoned aboveground tanks must be thoroughly cleaned, with hatches and valves or connections removed

NOTE: The safeguards (and additional ones not summarized in the table) apply to bulk pesticide storage facilities—those storing individual containers of at least 56 gallons or 100 pounds.

SOURCE: *Minnesota Rules* 2005, 1505.3010-1505.3140.

3

Enforcing Regulations

SUMMARY

The Department of Agriculture conducted more than 500 inspections of pesticide dealers, applicators, and storage facilities in 2004, identifying an average of 1.2 violations per inspection, for which it imposed various enforcement actions. Although the department takes steps to achieve consistent enforcement actions, particularly those involving monetary penalties, it needs to evaluate whether the full range of its enforcement actions is consistent and effective. In addition, while the department and certain other people have access to pesticide application records, pesticide application information in Minnesota is not sufficiently available for all people who could be affected by the applications. The Legislature should require land managers to provide advance notice about pesticide applications toxic to bees when nearby beekeepers formally request notification, and it should require the department to evaluate whether to extend similar requirements to comparably risky pesticide applications. The department generally has a reasonable process for investigating allegations of human or animal exposure to pesticides, but it needs to change its procedures for collecting certain pesticide application records. Finally, despite the department's intent for a statewide program of agricultural waste pesticide collection, one-third of the state's counties have declined to participate. The department should make changes to meet its statutory obligation for disposal options throughout the state.

Compliance with federal and state laws regulating pesticides helps ensure the safe use of pesticides. This chapter analyzes how the Minnesota Department of Agriculture enforces pesticide regulations. It addresses the following questions:

The Department of Agriculture is responsible for enforcing laws that regulate the use of pesticides.

- **To what extent does the Department of Agriculture enforce pesticide regulations?**
- **How sufficient is information on pesticide applications in Minnesota? How does this compare with similar states?**
- **How well does the department investigate complaints involving human or animal exposure to pesticides?**
- **How adequately does the department ensure proper disposal of waste pesticides?**

To answer these questions, we researched federal laws and state statutes and rules. We interviewed department staff regarding enforcement and analyzed data on the numbers and types of investigations, violations, and enforcement actions since 2000, as well as on how inspectors spend their time. For a small number of department inspections, we accompanied and observed inspectors on the job. We interviewed staff from the U.S. Environmental Protection Agency's Region 5,

which includes Minnesota. We compared some of Minnesota's enforcement activities and requirements on pesticide-application information with those in ten other states similar to Minnesota.[1] To understand a key area of the department's enforcement activities, we reviewed 94 cases involving allegations of human or animal exposure to pesticides, and we spoke with a small number of complainants from those cases. Finally, we analyzed the department's program for disposing of waste pesticides and spoke with state and county officials involved with the program.

INSPECTIONS AND INVESTIGATIONS

As authorized by federal law, a cooperative agreement between the Minnesota Department of Agriculture and the U.S. Environmental Protection Agency gives the department primary enforcement responsibility for pesticide-use violations.[2] State statutes authorize the department to enforce the state's laws and rules regarding how pesticides are used.[3] We found that:

- **The Department of Agriculture enforces pesticide regulations through inspections, additional compliance activities, and a range of enforcement actions in response to violations, but it does not fully evaluate the consistency or effectiveness of all of its enforcement actions.**

Enforcement includes conducting inspections and investigations. Investigations commence when (1) inspectors identify violations during inspections, (2) complaints come in to the department alleging pesticide misuse, or (3) pesticide spills or other accidents occur. Enforcement also includes imposing enforcement actions, such as written warnings or monetary penalties, when violations occur.

Inspections

For every inspection it conducted in 2004, the department identified an average of 1.2 violations.

Each year, the department conducts unannounced inspections of pesticide applicators, dealers, and storage facilities.[4] We observed that:

- **The Department of Agriculture relies heavily on inspections to achieve compliance with pesticide regulations.**

Department inspectors conducted 503 pesticide-related inspections in 2004, a 23 percent increase over 2003. Slightly more than half of them since 2000 turned into investigations as inspectors identified violations during the course of the inspection. The department found an average of 1.2 violations for every

[1] As in Chapter 2, the ten comparison states are: Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

[2] 7 *USC* 136w-1(b) (2000). The Environmental Protection Agency retains authority for enforcing regulations related to pesticide ingredients or products, such as whether products are properly registered. When appropriate, inspections conducted by Minnesota's Department of Agriculture are forwarded to the Environmental Protection Agency for enforcement actions related to pesticide product regulations.

[3] *Minnesota Statutes* 2004, 18D.301, subd.1(a).

[4] The department refers to these as "routine inspections."

inspection in 2004, which is slightly lower than the average 1.6 violations per inspection over the last five years. Table 3.1 illustrates the number of inspections conducted each year since 2000, the proportion of inspections in which violations were detected (triggering an investigation), and the rate of violations per inspection.

Table 3.1: Inspections and Resulting Violations, 2000-2004

	2000	2001	2002	2003	2004	Total 2000-04
Number of inspections	445	472	398	408	503	2,226
Percentage with violations	59%	62%	53%	50%	45%	54%
Average violations per inspection	1.9	1.8	1.5	1.4	1.2	1.6

NOTE: Inspections refer to the Department of Agriculture's ongoing, unannounced inspections of pesticide applicators, dealers, and facilities, which the department calls its "routine" inspections.

SOURCE: Office of the Legislative Auditor, analysis of data from the Minnesota Department of Agriculture, *Yearly Inspection Counts* and *Violations by File Type,* submitted August 25, 2005.

Based on past enforcement problems, the department decides each year what types of inspections to conduct and how many.

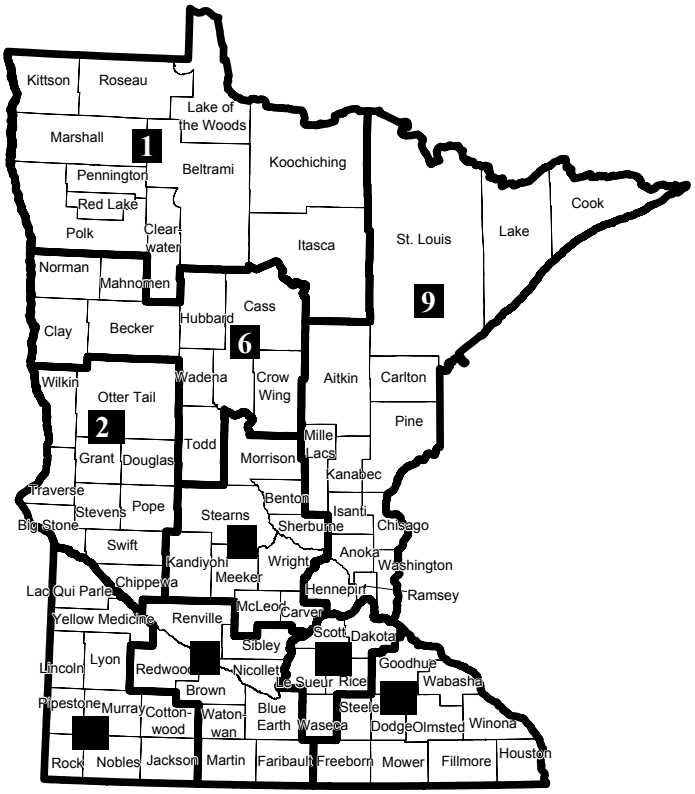
The department currently employs nine agricultural chemical inspectors (a tenth position is vacant). One works out of the department's St. Paul headquarters, while the others reside and typically work in one of nine designated regions around the state. Figure 3.1 delineates the regions. Inspectors conduct a variety of inspections, such as inspections of storage facilities and others of pesticide-worker protection standards. Besides inspections, the inspectors perform other duties, such as helping to train applicators at recertification workshops. About 44 percent of their pesticide-related work hours in fiscal year 2005 were for inspections, as Table 3.2 shows.

In planning how much of inspectors' overall work should be allotted to the different types of inspections each year, the department considers both state and federal needs. For instance, when the department identifies regulatory problems, such as an increase in illegal sales of restricted-use pesticides to uncertified applicators, it will plan additional inspections in the upcoming year, in this case to check dealers' compliance with the law. Likewise, if the U.S. Environmental Protection Agency has determined that certain pesticide products have generated labeling problems around the country, the department will focus inspection resources on those products.

The largest share of the department's inspections in federal fiscal year 2004 was "pesticide-use inspections"—observing applicators on the job and inspecting the use, storage, and handling of pesticides at facilities (which the department refers to as "fixed-site inspections"), as Table 3.3 shows. Each type of inspection the department conducts requires a somewhat different approach, and some types take more time than others. As an example, checking restricted-use pesticide records may take an inspector up to three times longer than inspecting a pesticide application because the former will likely involve an initial inspection at a

Figure 3.1: Regions for Department of Agriculture Pesticide Inspectors, 2005

The department's inspectors typically work in one of nine regions around the state.



NOTE: Inspectors have responsibilities for all agricultural chemicals, not only pesticides.

SOURCE: Minnesota Department of Agriculture.

dealership, office work to review records and check computerized data, and trips back to the dealership to verify findings.

The department has developed standard procedures for the different types of inspections, and inspectors' performance is evaluated in part on how well they follow the procedures. For instance, when inspecting a pesticide application, known as a "use-observation inspection," an inspector is typically at an application site observing applicators as they apply pesticides, documenting weather conditions, checking for pesticide drift, and monitoring other compliance requirements. Inspectors may also inspect applicators as they mix, load, and dispose of pesticides, or inspectors may conduct inspections after actual applications are completed.

As Table 3.2 shows, one of the larger portions of inspection time is spent on inspecting dealers' records of restricted-use pesticide sales. The department has acknowledged that dealer compliance with pesticide recordkeeping has

Inspectors also investigate allegations of pesticide misuse, help train applicators, and respond to spills.

Table 3.2: Agricultural Chemical Inspectors' Hours on Pesticide-Related Work, Fiscal Year 2005

	Number of Hours	Percentage of Hours
Inspections		
Facilities	1,789.5	28%
Dealers' restricted-use pesticide records and certified applicator records	1,583.5	24
USDA - private applicator records[a]	850.0	13
Worker protection standards for pesticide workers and handlers	839.0	13
Marketplace[b]	573.0	9
Producer establishments[c]	430.0	7
Observations of pesticide applications or following applications	414.5	6
Inspections subtotal	6,479.5	44
Investigations	3,155.5	21
General office work	2,882.0	19
Testing applicators	899.5	6
Education and outreach	709.0	5
Pesticide spill remediation	443.5	3
Urban initiative to instruct certain groups on safe pesticide use	229.0	2
Total pesticide-related work	14,798	100%

NOTE: Shaded rows highlight hours spent on inspections. Inspectors also reported hours (not included here) for fertilizer-related work, sick leave, vacation, training, and holidays.

[a] Although Minnesota does not require private applicators to keep records of restricted-use applications, the department helps enforce U.S. Department of Agriculture requirements for these records.

[b] Refers to inspections at retail and wholesale businesses for determining proper registration and labeling of pesticide products.

[c] Refers to inspecting pesticide products and labels, and obtaining samples from establishments that produce pesticides.

SOURCE: Office of the Legislative Auditor, analysis of data from the Minnesota Department of Agriculture, *Agricultural Chemical Inspector 2005 Project Summary*, submitted October 25, 2005.

generally been poor.[5] As described later in this chapter, violations of requirements for recording restricted-use pesticide sales have been one of the most frequent violations cited over the past five years.

[5] U.S. Environmental Protection Agency, *Federal Fiscal Year 2005 Mid-Year Report October 1, 2005 Through March 31, 2005: State of Minnesota* (Chicago: Environmental Protection Agency Region 5, April 8, 2005), 7.

Table 3.3: Types and Numbers of Pesticide Inspections, Federal Fiscal Year 2004

Type of Inspection	Number	Percentage of Total
Pesticide use on agricultural commodities[a]	202	22%
Marketplace[b]	179	20
Nonagricultural pesticide use, such as on lawns or in buildings[a]	158	18
Certified pesticide-applicator license and application records	110	12
Follow up[c]	101	11
Sales records of restricted-use pesticide dealers	77	9
Product, label, and container inspections at establishments that produce pesticides and hold them for distribution or sale	69	8
Other[d]	2	<1
Total	898	100%

NOTE: The table excludes Department of Agriculture inspections that are not reported to the U.S. Environmental Protection Agency.

[a] In "pesticide-use" inspections, the department includes its ongoing inspections of pesticide applicators, as well as of pesticide use, handling, and storage at pesticide facilities.

[b] Inspections conducted at retail, distribution, or wholesale facilities to check requirements such as those on product registration and labeling.

[c] Inspections in response to a complaint, referral, or tip following a pesticide application. Includes both agricultural and nonagricultural applications.

[d] Includes inspections of pesticide products imported into, or exported from, the U.S.

SOURCE: Office of the Legislative Auditor, analysis of data from U.S. Environmental Protection Agency, *FIFRA Tracking System Enforcement Actions Resulting from Inspections for the Period 10/01/2003 to 09/30/2004* (Chicago: Environmental Protection Agency Region 5, undated), 1.

We found that:

- **Although the Department of Agriculture inspects only a small percentage of dealers for sales of restricted-use pesticides, it effectively uses its inspection resources.**

Of the 650 dealers licensed in the state in 2004, a relatively small proportion was subject to inspections regarding restricted-use pesticides. In federal fiscal year 2004, the department reported conducting 77 on-site inspections of restricted-use pesticide dealers, which is about 12 percent of all licensed dealers.[6] At that rate, a dealer's sales of restricted-use pesticides would be inspected approximately once every eight to nine years.

[6] U.S. Environmental Protection Agency, *Pesticide Enforcement and Applicator Certification Cooperative Agreement Accomplishment Report Fiscal Year 2004* (Chicago: Environmental Protection Agency Region 5, October 27, 2004), 1.

The department conducts on-site inspections of pesticide dealers and reviews their records of restricted-use pesticide sales.

To enhance enforcement, however, the department has targeted inspections to particular dealers and supplemented inspections with additional work. In 2004 and 2005, the department focused inspections on dealers with high volumes of pesticide sales and dealers who had not been inspected for long intervals. It also updated its standard operating procedures for inspections of restricted-use pesticide sales to improve the inspection process. As a supplement to its on-site inspections, the department reviews a sample of pesticide dealers' records of restricted-use pesticide sales, which dealers are required to submit annually as part of renewing their license.[7] Periodically, the department looks for sales to unlicensed applicators by reviewing all sales records submitted by all dealers, as it did prior to relicensing dealers in 2001 and again in 2005. When illegal sales are found, staff send warning letters or refer the files within the department to determine whether to impose a monetary penalty.

Similarly, the department's inspections of pesticide use cover only a small share of the total number of licensed pesticide companies in the state in any given year. In federal fiscal year 2004, the department reported conducting 360 inspections of agricultural and nonagricultural pesticide use, which represents about 11 percent of all licensed pesticide companies in the state.[8] Nevertheless, as is described later in this chapter, the number of pesticide violations has declined since 2000.

Complaints

In addition to its inspections, the department investigates complaints called in about possible misuse of pesticides. The department investigated 86 complaints in 2004 and received an additional 109 requests for information and other calls that did not require full-fledged investigations.[9] Figure 3.2 shows the number of complaints and other calls over the past five years.

The department tracks calls and correspondence that do not require investigations in what it calls an "alpha" file—three-ring binders containing hand-written accounts of the calls and the department's response. We found that:

- **The Department of Agriculture has a process that is generally adequate for handling information requests and complaints that do not require full investigations.**

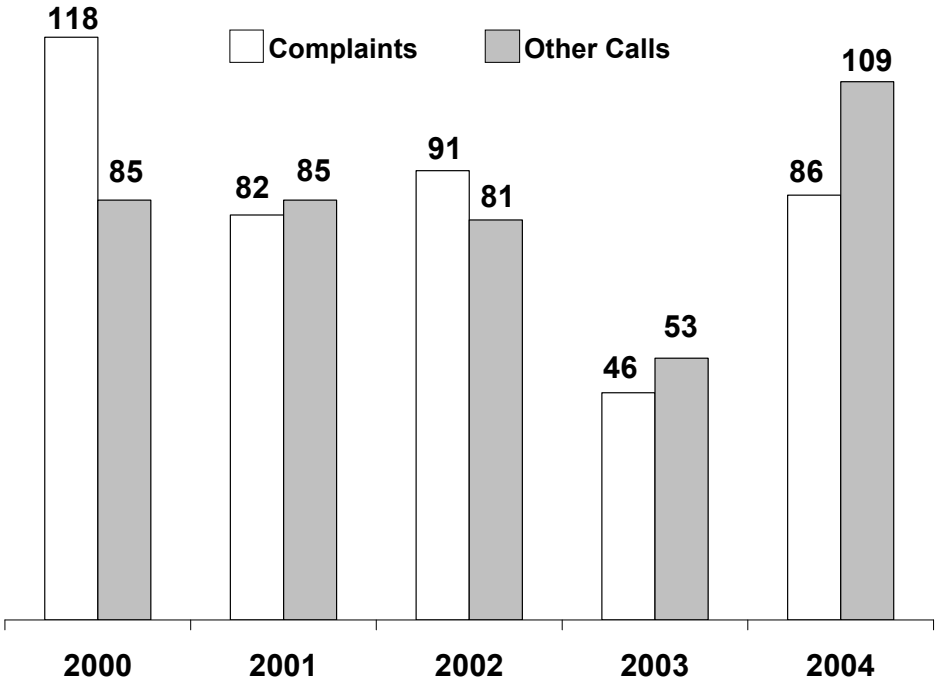
We reviewed the department's 145 records entered into its alpha file in 2004 and the first half of 2005. The great majority of the records appeared complete and adequately described the department's response, but nine (6 percent) did not. These nine case files did not make clear how the department responded to the

[7] *Minnesota Statutes* 2004, 18B.37, subd. 1(a)-(b).

[8] Data on the number of inspections come from the U.S. Environmental Protection Agency, *Pesticide Enforcement and Applicator Certification Cooperative Agreement Accomplishment Report Fiscal Year 2004* (Chicago: Environmental Protection Agency Region 5, October 27, 2004), 1.

[9] Later in this chapter we discuss in more depth investigating complaints related to human or animal exposure to pesticides.

Figure 3.2: Number of Pesticide Complaints and Other Calls to Department of Agriculture, 2000-2004



NOTE: "Complaints" include only pesticide-related complaints investigated by the department. "Other Calls" include pesticide- and fertilizer-related requests for information and calls that do not warrant a full-scale investigation.

SOURCES: Office of the Legislative Auditor, analysis of data from the Minnesota Department of Agriculture, *Investigations by Type,* submitted August 25, 2005, and *Alpha Calls*, analyzed September 7, 2005.

caller. Due to informal recordkeeping, there were two instances for which staff said that, in hindsight, full-scale investigations should have commenced.

Incidents

Since 2000, the department has averaged 77 new calls each year regarding pesticide spills or leaks.

The department investigates pesticide spills or "incidents" and oversees their cleanup. Incidents range from spills that occur when a vehicle carrying pesticides is in a road accident to the long-term accumulation of pesticides at either an active facility or abandoned site. Incident investigations are part of the department's array of activities related to two programs, described briefly in Chapter 1, for cleaning up agricultural chemical spills and accidents. In 2004, the department investigated 56 newly reported incidents, and there has been an average of 77 incidents reported annually since 2000. Beyond the newly reported incidents, the department typically oversees about 125 ongoing investigations and cleanups of long-term pesticide accumulations, each of which may take several years to complete. Between 2000 and 2004, incidents generated the smallest share (20 percent) of the department's new investigations compared

with investigations emanating from complaints (22 percent) or the department's inspections (57 percent).

Violations

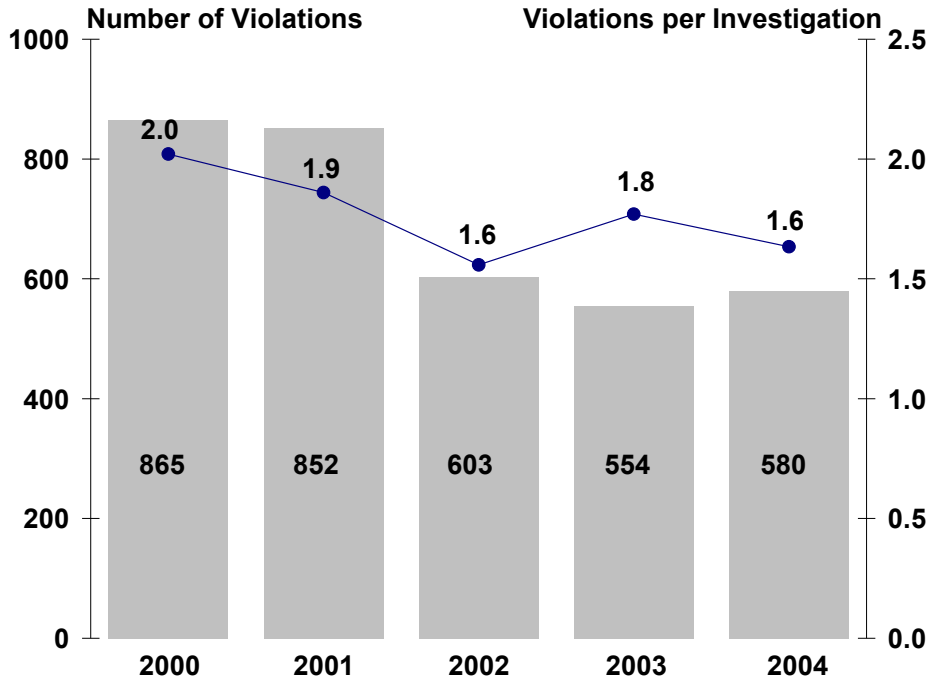
Through its investigations, the department gathers evidence and analyzes facts to substantiate violations of pesticide regulations. Any of the department's investigations, whether they started out as inspections, complaints, or incidents, may verify violations. Our analysis showed that:

- **The number of violations and the rate of violations per investigation have declined since 2000.**

From investigations in 2004, the department substantiated 580 actual violations, 33 percent less than in 2000. Because the number of violations will naturally vary by the number of investigations conducted, a better measure is the rate of violations per investigation. In 2004, there were 1.6 violations for every investigation, a rate that decreased 19 percent since 2000. Figure 3.3 shows the change in violations over the last five years.

The rate of pesticide violations per investigation decreased 19 percent between 2000 and 2004.

Figure 3.3: Violations and Rate of Violations per Investigation, 2000-2004



NOTE: Includes only pesticide-related violations resulting from investigations of complaints, incidents, and ongoing inspections in 2000 through 2004.

SOURCES: Office of the Legislative Auditor, analysis of data from the Minnesota Department of Agriculture, *Investigations by Type* and *Violations by File Type,* submitted August 26, 2005.

Even though the rate of violations has tended to decrease, the types of violations have generally stayed the same. We found that:

- **The seriousness of the violations identified by the Department of Agriculture has remained fairly constant since 2000.**

Out of hundreds of different violations identified, the top violations over the last five years were consistently one of either: improper commercial applicator records, lack of a pesticide-response plan, or use of a pesticide inconsistent with label directions. Two of the five most frequently substantiated violations between 2000 and 2004—pesticide drift and use of pesticides inconsistent with labels—were arguably more serious than the others in that they represented instances of actual misuse as opposed to the potential for misuse. Table 3.4 shows the most frequent violations by year. Together, the top three violations made up 22 percent of all violations during that five-year span.

Two of the most frequent violations in the last five years were "improper commercial applicator records" and "using pesticides in a manner inconsistent with label instructions."

Table 3.4: Top Three Pesticide Violations by Year, 2000-2004

	Number of Violations					
Violation	2000	2001	2002	2003	2004	Total 2000-2004
Improper commercial applicator records	97	85	53	54	46	335
Use of pesticide inconsistent with label	35	50	68	29	54	236
No release response plan	52	40	40	32	24	188
Pesticide drift	39	29	47	13	39	167
Improper restricted-use pesticide dealer sales records	46	33	11	4	3	97
All violations by year:	865	852	603	554	580	3,454
Top three as percentage of the total:	23%	21%	28%	21%	24%	22%

NOTE: Shaded cells indicate that the violation was one of the three most frequent that year. Data are of violations from pesticide investigations initiated in each calendar year.

SOURCE: Office of the Legislative Auditor, analysis of data from the Minnesota Department of Agriculture, *Violations by File Type*, submitted August 26, 2005.

After dividing the hundreds of types of violations into groups of similar violations, we saw that three groups made up 48 percent of all violations since 2000. Violations of bulk pesticide regulations (such as facilities failing to keep their required inspection records) were the most frequent, followed closely by applicator and dealer records violations (such as dealers' failure to report sales of restricted-use pesticides), and pesticide-use violations (such as pesticide drift).

Enforcement Actions

The Department of Agriculture uses an enforcement strategy with a range of responses that increase in severity as violations become more serious and numerous. According to staff, the first component of the strategy is informing pesticide users and others in the regulated community about pesticide regulations that pertain to them. That is followed by compliance assistance, which means department staff help farmers, applicators, and dealers understand what they have to do to comply with law. Next come department inspections and investigations to substantiate violations. Finally, the department uses a series of sanctions, referred to as enforcement actions, when violations occur. These actions range from a low-severity "advisory notice" (informing a violator that a violation was identified and should be corrected) to the most serious—a monetary penalty. We found that:

- **The Department of Agriculture has imposed a substantial number of enforcement actions, including monetary penalties, for pesticide violations.**

From investigations in 2004, the department imposed 430 enforcement actions, the most since 2001.[10] The rate of enforcement actions per investigation has risen over the last five years, as Table 3.5 shows. The most serious of the department's administrative enforcement actions involves a monetary penalty, and the proportion of actions with monetary penalties has remained steady or increased each year over the past five years.[11] Additionally, the number of severe penalties imposed on farmers increased recently. For example, in the first half of 2005, the department imposed monetary penalties on 72 farmers, a ninefold increase over that in 2000. The increase resulted largely from the department's attempt to focus on penalizing applicators who purchased restricted-use pesticides illegally.

Since 2000, the department has increased the number of its enforcement actions per investigation.

Amounts of monetary penalties were often sizable. Table 3.5 shows that, among penalties imposed for investigations from 2000 through 2004, the average penalty was $1,510. Penalties ranged from $100 to $45,000 over this period.

The department's number of enforcement actions is substantial compared with other states. Data on ten similar states show that the Minnesota Department of Agriculture imposed the third highest proportion of enforcement actions during federal fiscal year 2004, as Table 3.6 illustrates. It ranked fifth highest among the 11 states in terms of the share of its enforcement actions with monetary penalties.

Although the department has data on the number and type of enforcement actions it imposes, its information is incomplete. We found that:

[10] Some cases have multiple violations for which a single enforcement action is imposed, which explains in part why the number of yearly violations exceeds the number of enforcement actions.

[11] Serious violations can also end up as criminal complaints pursued in district courts, but they represented less than 1 percent of the enforcement actions for cases from 2000 through 2004.

The average monetary penalty that the department imposed in the last five years was $1,510.

Table 3.5: Enforcement Actions for Pesticide Violations Identified in Investigations, 2000-2004

Action	2000	2001	2002	2003	2004	Total 2000-2004
Corrective action order[a]	179	206	127	114	132	758
Written warning (for serious violations)	84	126	146	119	129	604
Monetary penalty (most serious action)	30	60	59	83	91	323
Advisory notice (for less serious violations)	54	70	55	14	15	208
Cease and desist order[b]	11	32	31	42	54	170
Other[c]	12	21	8	11	9	61
Total enforcement actions	370	515	426	383	430	2,124
Actions per investigation	0.9	1.1	1.1	1.2	1.2	1.1
Actions with monetary penalty	8.1%	11.7%	13.9%	21.7%	21.2%	15.2%
Average monetary penalty[d]	$2,609	$1,287	$1,218	$1,680	$1,221	$1,510

NOTE: Data are of enforcement actions for investigations initiated in each calendar year.

[a] Corrective actions are orders to correct an activity that is being done improperly.

[b] Cease and desist orders require a person to immediately discontinue the identified activities.

[c] "Other" includes orders to stop selling or using a pesticide, orders to submit records, administrative hearings, and criminal complaints in county courts.

[d] Penalty amounts are calculated by the year the penalty was imposed and come from a different source than all other data in the table, which are reported by the year the investigation began.

SOURCES: Office of the Legislative Auditor, analysis of data from the Minnesota Department of Agriculture, *Enforcement Actions by Type*, submitted August 26, 2005; and Minnesota Department of Agriculture, *Notice of Intent–Penalty Enforcement Actions*, submitted August 11, 2005.

- **The Department of Agriculture does not fully evaluate whether its enforcement actions are consistent and effective.**

Measures of an enforcement system's fairness are (1) how consistently similar enforcement actions are meted out for the same types of violations and violators, (2) whether the severest penalties are imposed for the most serious violations, and (3) whether the actions for violators with a history of violations are more severe than those for first-time violators. In addition, it is important to know how well the enforcement system deters repeat violators.

The department is unable to evaluate these measures of its enforcement system because it lacks a database that traces its enforcement actions back to actual violations. The department does not know how well the severity of its

When compared with ten similar states, the Minnesota Department of Agriculture had the third highest proportion of enforcement actions per inspection.

Table 3.6: Comparison of Enforcement Actions for Pesticide Violations, Federal Fiscal Year 2004

	Number of Inspections[a]	Percentage of Inspections Resulting in Enforcement Actions		Percentage of Enforcement Actions With Monetary Penalties	
		Percentage	Rank	Percentage	Rank
Illinois	1,676	33%	5	7%	8
Indiana	895	22	8	26	3
Iowa	833	49	4	4	9
Kansas	1,367	24	7	16	7
Minnesota	898	51	3	22	5
Missouri	2,822	13	10	0	10 (tie)
Nebraska	601	16	9	22	6
North Dakota	633	28	6	41	2
Ohio	659	63	1	0	10 (tie)
South Dakota	490	13	11	52	1
Wisconsin	296	57	2	23	4
Median	833	28	--	22	--

NOTE: Each state enforces its own unique set of pesticide-related laws and rules and may conduct inspections not reported to the Environmental Protection Agency or reported here. Iowa, Kansas, and Missouri reports were for their state fiscal years instead of the federal fiscal year.

[a] Inspections include unscheduled inspections, inspections that turn into investigations once inspectors identify violations, and investigations of complaints and tips.

SOURCE: Office of the Legislative Auditor, analysis of data from the U.S. Environmental Protection Agency, *Pesticides Enforcement and Applicator Certification Cooperative Agreement Accomplishment Reports for Federal Fiscal Year 2004* (Washington, D.C.: U.S. Environmental Protection Agency, undated).

enforcement actions match specific violations overall or even how many of the identified violations result in enforcement actions. It does not know how many violations of specific regulations (such as those prohibiting pesticide drift, for instance) receive monetary penalties versus other less stringent actions. Nor do department staff consistently track the number of times that enforcement actions are appealed.

Although the department is unable to evaluate the consistency of its enforcement actions overall, staff take steps to achieve consistency. For cases of all types, different units within the department review each investigation to determine what enforcement action is appropriate. For instance, the Investigation Unit uses a grid of criteria to assess the extent of pesticide damage, whether humans were exposed, the type of applicator, and whether a restricted-use pesticide was used. Based on these criteria, staff assign points to the case, with low scores receiving relatively mild or no actions and higher scores being referred for monetary

penalties. In addition, two staff separately scrutinize each investigation and review each other's conclusions on the appropriate enforcement action to impose.

The department takes steps to achieve consistency among the enforcement actions it imposes for law violations.

Beyond that, the department takes additional steps for consistency in cases with monetary penalties. First, staff consider what fines have been imposed historically for similar offenses, as well as several factors that are set in law, such as the violator's culpability and history of violations.[12] Second, exclusively for violations pertaining to sales of restricted-use pesticides, staff follow a penalty matrix that indicates the amount of the penalty based on the number of illegal sales and whether the violator is a first-time or repeat violator. Third, section and division managers review the proposed amounts of significant penalties focusing on consistency with past penalties and violations with similar circumstances. As a final step toward consistency, if the penalty is greater than $4,000, the commissioner also reviews it.

RECOMMENDATION

The Department of Agriculture should evaluate the consistency and effectiveness of all of its enforcement actions.

The department is replacing a database that has prevented it from evaluating the consistency of all of its enforcement actions.

Evaluating the consistency and effectiveness of its full range of enforcement actions—including lower level administrative actions and monetary penalties—will require the department to improve its compliance database. Department staff acknowledge the limitations of the existing database used to manage investigations, violations, enforcement actions, and compliance information. The department had undertaken efforts as far back as 1998 to improve its database capabilities. Although the department initially hoped for a data system that would cover functions across multiple divisions including the need for compliance monitoring, funding was eventually discontinued, and only pieces of the system were developed with the remainder of the project postponed. The Agronomy and Plant Protection Division renewed efforts in 2005 to replace its current compliance information system. A new system is being designed to increase consistency and automate several functions that staff now perform manually. The division began testing the new information system in early 2006 with the intent of implementing it for some pesticide-facility inspections conducted in the spring. As it continues to design and test the information system, the department should ensure that the system has the capabilities to help determine whether enforcement actions are fair and adequately deter violations.

PESTICIDE APPLICATION INFORMATION

Information on pesticide applications comes in one of three forms: application records maintained by pesticide applicators, advance notification as required for certain types of pesticide applications, and the posting of warning signs as required when certain other types of applications are made. Based on our analysis, we concluded that:

[12] *Minnesota Statutes* 2004, 18D.315, subd. 1(a). Other factors are the economic gain received by the violator and the gravity of the violation in terms of damage to human health and the environment.

- **Pesticide application information in Minnesota is not sufficiently available to all people who could be affected by the applications.**

As described below, federal and state regulations require pesticide applicators to keep records about their applications and, in certain circumstances, post warning signs or alert people in advance of an application. However, pesticide application information is not readily available to people who live or work next to an application site, except in limited instances.

Federal law requires certified applicators of restricted-use pesticides to maintain records regarding the type and amount of pesticide they use.[13] The requirements apply only when the state does not have its own record regulations; consequently, in Minnesota, federal requirements apply to private applicators. At the same time, Minnesota has requirements for records to be kept by commercial, noncommercial, and structural applicators.[14] Table 3.7 summarizes the required information. Although commercial applicators are required to furnish copies of

Table 3.7: Information Required in Pesticide Application Records, 2005

Federal Requirements for Private Applicators[a]	Minnesota Requirements for Other Types of Applicators[b]
• Brand name and EPA registration number	• Brand name and EPA registration number
• Total amount used	• Dosage used
• Location and size of area treated	• Location of the site and number of units treated
• Crop or commodity to which product was applied	• Customer name and address
• Month, day, and year of application	• Date of the application and time completed
• Name and certification number of the applicator	• Name, signature, and license number of the applicator and address of applicator company
	• Temperature, wind speed, and wind direction

[a] Apply to private pesticide applicators in Minnesota who use restricted-use pesticides. Records are to be retained for two years.

[b] Apply to commercial, noncommercial, and structural applicators. Noncommercial applicators need to keep records only when applying restricted-use pesticides. Additional state requirements apply to structural applicators. Records are to be retained for five years.

SOURCES: 7 *CFR* 110.3(a) (2005) and *Minnesota Statutes* 2004, 18B.37, subd. 2.

[13] 7 *USC* 136i-1(a)(1) (2000) and 7 *CFR* 110.3(a) (2005).

[14] *Minnesota Statutes* 2004, 18B.37, subd. 2(a) and 3(a). In addition, *Minnesota Statutes* 2004, 18B.37, subd. 4 requires these applicators to have a response plan that details how they store, handle, and dispose of pesticides. Although statutes do not specifically require application records or response plans of aquatic pest control applicators, department policy has required them.

their application records to their customers, we found that:

- **Few people have access to the pesticide application records required of pesticide applicators in Minnesota.**

Although physicians and veterinarians have legal authority to access pesticide application records through the Minnesota Department of Agriculture, no requests have been made.

Although Minnesota applicators must keep application records, they are required to share the records in only three instances. First, they must supply a copy of the record to the customer for whom the application was made.[15] Second, they must allow the Department of Agriculture to inspect the records at any reasonable time.[16] Third, when physicians or veterinarians need the information as part of their diagnoses or treatment of patients, they may request access to the records from the department.[17] Department staff told us, however, that no medical personnel have ever submitted requests. Nor did our analysis reveal such requests, despite charges during previous legislative sessions that the department failed to respond to requests from medical professionals.

Statutes protect the application records as private or nonpublic. This means that the data are not available to the public, but are accessible to the subject of the data; in this case, the manager of the site at whose request pesticides are applied. In general, applicators are not obligated to provide application information to people who live or work next to application sites, with the few exceptions described below. At the same time, in practice many pesticide applicators provide information about their applications when asked, even without legal obligations to do so. We found that:

- **Minnesota statutes require advance notification about pesticide applications or the posting of information at application sites in only a few situations.**

Federal requirements govern posting of certain pesticide application areas in three instances. First, regulations are in place to protect people who are employed to work with pesticides on farms or in nurseries, greenhouses, or forests. Among these so-called "worker protection standards" is one that requires greenhouses to post warning signs for all pesticide applications; another requires farms, nurseries, and forests to post signs when a product's label calls for such posting.[18] Second, federal law specifies that applicators of fumigants registered for use in a greenhouse must notify workers and post warning signs outside greenhouse entrances.[19] Finally, users of pesticide products from the most toxic of four toxicity categories must notify workers of the application and post warning signs at entrances to treated areas.[20] Minnesota Department of

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[15] *Minnesota Statutes* 2004, 18B.37, subd. 2(d) and 3(d).

[16] *Minnesota Statutes* 2004, 18B.37, subd. 5.

[17] *Minnesota Statutes* 2004, 18B.37, subd. 6. If such a request were submitted, the Commissioner of the Department of Agriculture is to consult with the Commissioner of the Department of Health and determine whether to release the information. Federal regulations require Minnesota's private applicators to provide application records when requested by a licensed medical professional as part of treating someone exposed to a restricted-use pesticide. 7 *CFR* 110.5(a) (2005).

[18] 40 *CFR* 170.120(a) and (b) (2004).

[19] 40 *CFR* 156.210(b)(2) (2004).

[20] 40 *CFR* 156.210(b)(1) (2004).

Agriculture staff told us that they were unaware of any list of all such pesticide products that require posting signs.

Minnesota requires advance notice of pesticide applications only when applicators treat for mosquitoes, gypsy moths, and similar pests, or when they apply pesticides to reduce public health risks.

Beyond these federal requirements, Minnesota statutes require that applicators treating for mosquitoes notify residents at least 24 hours in advance.[21] In the seven-county metropolitan area, the Metropolitan Mosquito Control District does this in four major ways: (1) a hotline that people can call for application information, (2) direct e-mail notification to persons who request it, (3) posting information on the agency's Web site, and (4) newspaper advertisements. The other situation in which residents in an area to be treated must be notified is when applicators are controlling gypsy moths or similar pest species or applying pesticides to reduce public health risks.[22] Notification may be through mailings, public meetings, posted placards, newsletters, or other means.

Minnesota requirements also go beyond federal regulations by requiring applicators to post warning signs at the site of pesticide applications in two circumstances. In the first, applicators applying pesticides through irrigation systems must post signs during the treatments.[23] In the second, cities have the authority to pass ordinances requiring turf applicators to post warning signs where they apply pesticides to a lawn or park.[24] Details about the requirements for these postings are in Table 3.8. The decision to pass ordinances requiring such posting is entirely a local one, and local governments, not the Department of Agriculture, enforce them.

Although the federal requirements on pesticide application information apply equally nationwide, state requirements differ from state to state. We found that:

- **Information about some types of pesticide applications is more readily available in certain other states than in Minnesota.**

Minnesota cities can require applicators who apply turf pesticides to post warning signs.

Officials in five of our ten comparison states told us that they require either posting or advance notification for specific types of pesticide applications. Unlike Minnesota, all five—Illinois, Indiana, Iowa, Ohio, and Wisconsin—have statewide regulations on posting or prenotification when applying pesticides to lawns, known as turf applications. Generally, the states require applicators (excluding homeowners) to (1) post warning signs on common access points when applying pesticides to residential or commercial lawns and (2) notify nearby landowners prior to making the applications. Wisconsin also requires

[21] *Minnesota Statutes* 2004, 18B.07, subd. 2(d)(3).

[22] *Minnesota Statutes* 2004, 18B.07, subd. 2(e). Other statutes require schools to notify parents about plans to apply restricted-use pesticides or pesticides of certain toxicity levels. *Minnesota Statutes* 2004, 121A.30, subd. 2-4, 6. The Department of Education, not the Department of Agriculture, enforces these provisions.

[23] *Minnesota Rules* 2005, 1505.2300, subp. 5. Mixing pesticides with water and applying them to crops through irrigation systems is called chemigation.

[24] *Minnesota Statutes* 2004, 18B.09, subd. 1-3.

Table 3.8: Minnesota Requirements for Posting Pesticide-Application Warning Signs, 2005

	Irrigation	Turf
Applicators affected:	• Those applying pesticides using chemigation systems[a]	• Those applying pesticides to turf in cities that have passed ordinances regulating such applications
What is required:	• Post signs at sites during treatment	• Post warning signs on treated turf areas
Sign dimensions:	• At least 8.5 by 11 inches	• Sign must project at least 18 inches above top of the grass
Locations for signs:	• Usual points of entry for all sites • Property corners for nongreenhouse sites adjacent to nonagricultural property	• On the lawn between two and five feet from the sidewalk or street
Special placement:	• At sites adjacent to a public area such as a park, school, or residential area, signs must be no more than 100 feet apart	• For parks, golf courses, and other recreational areas, the sign must be posted adjacent to treated areas and at property entrances
Information on signs:	• Information on toxicity from pesticide label • Name of pesticide • Date of treatment • Reentry date	• Name of business or person applying the pesticide • Statement that the lawn has been chemically treated and to keep children and pets off[b] • Reentry date
Sign appearance:	• Contrasting colors for letters and background	• Contrasting colors and capital letters at least 0.5 inches high
Other provisions:	• Applicator must remove signs after reentry date expires	• Sign may include the name of the pesticide used • Sign must be rain resistant and remain in place up to 48 hours after application

[a] Chemigation means mixing agricultural chemicals with water and applying them to crops through an irrigation system.

[b] In lieu of this language, the applicator may convey a similar message by using a universally accepted symbol and text approved by the Commissioner of the Department of Agriculture.

SOURCES: *Minnesota Rules* 2005, 1505.2300, subp. 5, and *Minnesota Statutes* 2004, 18B.09, subd. 1-3.

applicators to provide advance notice about certain other pesticide applications, including aerial applications and applications made to residential structures.[25]

Some states require advance notice to beekeepers before applicators may apply pesticides toxic to bees.

Iowa, Ohio, and Wisconsin also require advance notification of certain pesticide applications near bee colonies. For instance, Wisconsin requires owners of areas where pesticides toxic to bees will be applied to notify any beekeeper who has requested advance notice and is located within 1.5 miles of the application site. Minnesota does not require advance notice of pesticide applications to beekeepers. It requires beekeepers to register their colonies with the Department of Agriculture, although not all beekeepers have complied. Pesticide use in areas where bees forage has been the source of controversy in Minnesota, even though the number of complaints related to bees has been a small proportion of all pesticide complaints the department has received. In 2005, the Minnesota Supreme Court upheld claims of certain central Minnesota beekeepers that landowners with knowledge of foraging bees had a "duty of reasonable care" to avoid injuring the bees when applying pesticides toxic to bees.[26] Further, as part of an agreement to settle the lawsuit, the state agreed to pay the beekeepers $335,000; the Department of Natural Resources also agreed to provide advance notice to the beekeepers before future spraying and to develop for landowners and others an educational brochure that includes explanations of certain pesticides' effects on bees and methods to protect pollinating animals.

RECOMMENDATION

The Legislature should require land managers to provide advance notice about pesticide applications toxic to bees when nearby beekeepers request notification, and it should require the Department of Agriculture to evaluate whether similar requirements should extend to comparably risky applications.

Requiring the department to collect and store all pesticide application records would be costly and impracticable.

People responsible for property where pesticides toxic to bees will be applied should be required to offer advance warning to beekeepers who (1) formally request such notice and (2) demonstrate that they have colonies located within the foraging range of the application site.[27] In turn, it should be the responsibility of beekeepers to provide contact information and request advance notice from the adjacent land managers at the beginning of a growing season. We are not recommending that the state require applicators to submit copies of each application record to the department, as has been suggested in previous legislative sessions. Doing so would be costly and impracticable given the millions of pesticide applications estimated to take place each year and the limited number of department staff.

[25] More details about the other states' requirements related to turf applications and advance notice requirements for pesticide applications in Wisconsin are in an appendix available via the Internet at: http://www.auditor.leg.state.mn.us/ped/2006/pesticide.htm.

[26] Jeffrey Anderson, et al, v. State of Minnesota, Department of Natural Resources, 693 N.W. 2d 181 (Minnesota Supreme Court March 3, 2005).

[27] In some cases, the person responsible for the property would be the land owner, but in other cases, such as when people rent their property for use by others, the responsible person would be whoever decides to apply (and pay for) the pesticide.

Advance information about pesticide applications would allow beekeepers to protect their colonies and avoid economic losses without excessively adding to the responsibilities of land managers having pesticides applied. Based on other states' experiences, we think it is possible to improve the availability of pesticide application information without building a new bureaucracy to collect and process the information.

Although requirements for advance notice of pesticide applications could be imposed more broadly, we believe that, at least to start, Minnesota should focus on types of applications that pose high risk—that is, those that have demonstrated a great threat to human health or the potential for serious economic harm. Because the scope of imposing new requirements is a policy matter that cannot be based purely on results of pesticide studies, the Legislature should require the Department of Agriculture to monitor the workability of the new requirement related to beekeepers. The department should report on the feasibility of extending similar requirements to comparably risky pesticide applications.

HUMAN OR ANIMAL EXPOSURE TO PESTICIDES

Since 2000, the department has conducted more than 90 investigations of alleged human or animal exposure to pesticides.

As mentioned earlier, among the complaints investigated by the Department of Agriculture are those pertaining to humans or animals exposed to pesticides. Because of the seriousness of these types of complaints, we reviewed the department's 94 cases alleging human or animal exposure from 2000 through April 2005. We also interviewed a small number of complainants who had requested some of these investigations. Overall, we found that:

- **The Department of Agriculture generally has a reasonable process for investigating cases alleging human or animal exposure to pesticides, but it needs to improve certain parts of the process.**

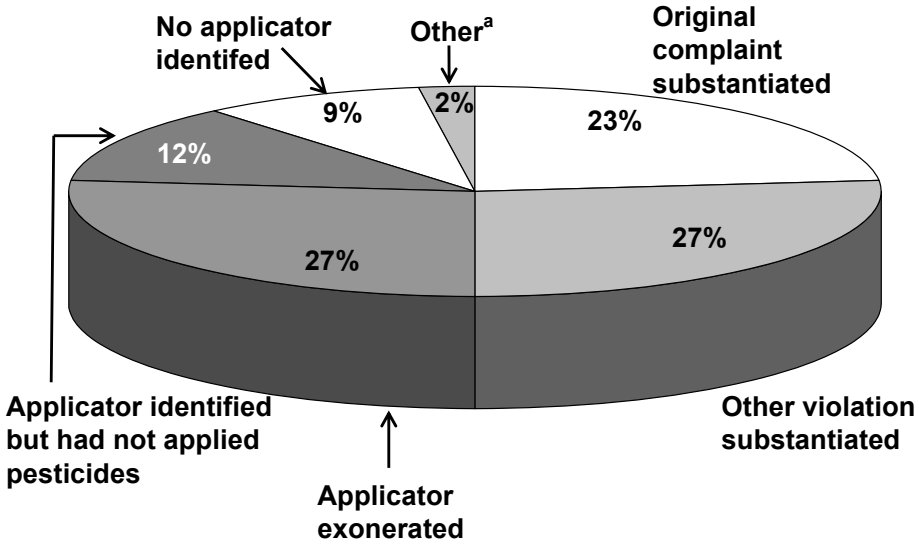
Investigating pesticide complaints involves many steps. When complaints occur, standard operating procedures call for the department to complete a record of the complaint and refer it to the inspector for the area. In general, inspectors visit and interview the complainant; inspect, photograph, and map the damaged site and the site of the application; collect samples of vegetation, soil, clothing, or other items that may be contaminated; interview pesticide applicators; review pesticide application records; verify weather conditions; and interview other relevant parties, such as nearby landowners. After inspectors complete their work, they submit the cases to the department's St. Paul headquarters, where each case is reviewed by staff in units appropriate to any identified violations. Cases with improper applicator licensing, for instance, will be reviewed by the Information and Certification Unit. Department managers then determine the enforcement actions to impose, in a process described earlier in this chapter.

In reviewing the outcomes of investigations of human or animal exposure to pesticides, we found that:

- **Since 2000, the Department of Agriculture substantiated violations in 50 percent of the cases alleging human or animal exposure to pesticides, and its most frequent enforcement action for these violations was a monetary penalty.**

For about half of the cases with violations, the department substantiated the complainant's original complaint, and for the other half, the department substantiated other violations, as Figure 3.4 shows. In 48 percent of the cases alleging human or animal exposure, the department did not substantiate violations or was unable to identify the applicator responsible. Investigations found that the remaining 2 percent of cases did not involve pesticides or Minnesota applicators. Most of our ten comparable states did not have data that would allow us to make comparisons. One state with data had four cases last year involving pesticide exposure to humans or animals, only two of which had violations substantiated and penalties imposed.[28]

Figure 3.4: Outcomes of Cases With Alleged Human or Animal Exposure to Pesticides, 2000-2004



[a] "Other" includes one case with no identified pesticide use and one in which the investigation substantiated that a pesticide was applied in another state by an applicator licensed outside Minnesota.

NOTE: Four of the 94 reviewed cases were still open at the time of analysis and are not included here.

SOURCE: Office of the Legislative Auditor, analysis of Minnesota Department of Agriculture's case files on human or animal exposure to pesticides.

In cases where the department imposed monetary penalties for human or animal exposure to pesticides, the average penalty was $1,929.

The department imposed monetary penalties for many cases where violations were identified. Table 3.9 shows that the most frequent enforcement action for the human or animal exposure cases was a monetary penalty. In these cases, the average penalty was $1,929, with penalties ranging from $100 to $9,000.

[28] Lori Bowman, Bureau of Agrichemical Management, Wisconsin Department of Agriculture, Trade and Consumer Protection, interview by author, Telephone conversation, St. Paul, Minnesota, October 25, 2005.

Table 3.9: Enforcement Actions for Cases of Human or Animal Exposure to Pesticides, 2000-2004

	Number	Percentage
Monetary penalty	24	41%
Corrective action, stop use, or cease and desist[a]	16	27
Written warning (for more serious violations)	12	20
Advisory notice (for less serious violations)	7	12

NOTE: For some cases, the department imposed more than one type of enforcement action.

[a] Corrective actions are orders to correct an activity that is being done improperly. Stop-use orders require a person to stop using a pesticide. An order to cease and desist requires a person to immediately discontinue the identified activities.

SOURCE: Office of the Legislative Auditor, analysis of Minnesota Department of Agriculture's case files on human or animal exposure to pesticides.

We looked at the timeliness of these cases and found that:

- **The Department of Agriculture promptly started its investigations of human or animal exposure cases and closed most, but not all, in a timely manner.**

Even though some cases took a long time to close, the department substantiated pesticide law violations in most of them.

Promptly starting investigations is important because pesticides break down over time and other evidence may erode. For 78 percent of the human or animal exposure cases with complete data on the investigation start date, the department began the investigation the same day it received the complaint or the next day, as Table 3.10 illustrates. In cases where investigations began four or more days after the initial complaint, the circumstances reasonably explained the delay, such as complainants who were unsure whether they wanted an investigation to commence.

The department closed most of its investigations of human or animal exposure cases in a timely manner, but a few took many months to close for no apparent reason. As shown in Table 3.10, 73 percent of the 90 cases were closed within six months, which is the timing guideline called for in the department's standard operating procedures for pesticide misuse investigations.[29] Of the 24 cases exceeding the department's six-month guideline, 17 had obvious sources of delay: either the cases were particularly complex, lawyers contested the findings, cases went to court, or persons outside the control of the department delayed the case. Seven cases took between seven and nine months for reasons that were not clear. At the same time, the delay did not necessarily work against the complainant: for 19 of the 24 cases exceeding six months, the department substantiated pesticide law violations.

[29] Minnesota Department of Agriculture, "ACIU Misuse Investigation Guidance Addendum, Appendix B," *Standard Operating Procedure for Investigating Pesticide Misuse Complaints* (St. Paul, 2003), B1.

Table 3.10: Timeliness of Cases With Alleged Human or Animal Exposure to Pesticides, 2000-2004

	Cases	
	Number	Percentage
Days until investigation began after receipt of complaint[a]		
0 to 1	68	78%
2 to 3	9	10
4 or more	10	12
Total	87	100
Days until investigation was completed[b]		
1 to 90 (up to 3 months)	28	31
91 to 180 (from 3 up to 6 months)	38	42
181 to 270 (from 6 up to 9 months)	21	23
>270 (more than 9 months)	3	3
Total	90	100
Cases completed within the department's guideline of 6 months	66	73

NOTE: Percentages may not sum to 100 due to rounding.

[a] Seven cases we reviewed had incomplete data on when the investigation began and are excluded here.

[b] Four cases we reviewed were still open at the time of our analysis and are excluded here.

SOURCE: Office of the Legislative Auditor, analysis of Minnesota Department of Agriculture's case files on human or animal exposure to pesticides.

For 60 percent of the cases in which inspectors took samples, the department's laboratory detected pesticides.

In addition to timeliness, we analyzed how frequently pesticides were detected when inspectors took samples of soil, vegetation, clothing, or other items to test for pesticide residues. To control quality when sampling during misuse investigations, the department has developed detailed standard operating procedures, including using disposable or decontaminated sampling equipment, collecting the samples as soon as possible, and preserving and shipping samples appropriately.[30] In 60 percent of the 67 cases where inspectors took samples, the laboratory's testing revealed pesticide residues, and in 30 percent the laboratory did not detect pesticides. In the remaining 10 percent, the sample was not tested due to other circumstances in the cases.

In one part of our analysis, we reviewed how inspectors collect and analyze pesticide application records. We found that:

[30] Minnesota Department of Agriculture, "Sampling Manual, Appendix C," *Standard Operating Procedure for Investigating Pesticide Misuse Complaints* (St. Paul, 2003), C1-C12.

- **In many human or animal exposure cases, Department of Agriculture investigators sought pesticide application records using methods that were not always thorough.**

To identify applicators, inspectors interview complainants, nearby farmers or landowners, and local pesticide dealers or cooperatives. Part of the interviews with applicators includes inspecting application records. The department's operating procedures instruct the inspector to collect the application record, review it for completeness, and verify the record's weather conditions using data from nearby weather stations.[31]

In our analysis of case files, we observed that it was not uncommon for inspectors to ask for application records to be faxed instead of personally reviewing application records on site. Often, the need to quickly obtain application records justifies this practice, and other evidence collected during the inspections allows inspectors to corroborate records received this way.[32] But we noted that this method was sometimes used even in those cases where the actual application or its date was in question. Without going through the application records, particularly when an application is being disputed, the department cannot be assured that it has viewed all relevant pesticide applications. Given the adversarial nature of some cases, investigations that rely solely on applicators' selection of records may be incomplete.

Inspectors did not consistently review pesticide application records in person, even when the application was in dispute.

An inspector collects plant samples during an investigation.

From interviewing 11 of the complainants involved in these types of cases, we learned about their dissatisfaction regarding investigations. Several said that the department did not take their complaints seriously enough or neglected to identify all the possible pesticide applications that could have played a role in their case. We think some complainants have legitimate concerns about the department's thoroughness in obtaining pesticide application information for their cases. At the same time, data show that department investigations are typically well managed and often result in substantiating violations of pesticide

[31] Department of Agriculture, *Standard Operating Procedure for Investigating Pesticide Misuse Complaints*, 6-8.

[32] In addition, a person who knowingly offers a false record or makes a false statement during a pesticide investigation can be found in violation of law. *Minnesota Statutes* 2004, 18D.302.

regulations; this suggests that the investigations do not require wholesale revision. Further, in the one instance when the U.S. Environmental Protection Agency Region 5 was called upon to review a set of cases allegedly mishandled by the Minnesota Department of Agriculture, the agency concluded that Minnesota's investigations were "timely and thorough."[33]

RECOMMENDATION

When investigating allegations of pesticide misuse, the Department of Agriculture should change its procedures for collecting application records by specifying when to require inspectors to examine records in person.

Inspectors should conduct in-person reviews of pesticide application records for some, but not all, cases.

An independent, in-person verification of application records is appropriate for certain cases in particular, and the department should set parameters defining when in-person and on-site reviews are to be done. For instance, in cases where the actual date of an application is in question, it may be necessary for the inspector to view all records of applications occurring within four or five days of the alleged misuse. However, in-person reviews of records would likely add to the time needed by inspectors to conduct investigations, particularly given the size of the regions inspectors cover. Moreover, they may not be needed when the identity of the applicator and the timing of the actual application are not disputed or when other evidence collected by the inspector corroborates the application records. For these reasons, the department's current procedures may remain acceptable for many cases. Because statutes already grant the department access to application records, our recommendation would not require legislative action.

In our analysis of case files, we reviewed the communications sent by the department to complainants. We found that:

- **Department of Agriculture communications with complainants were sometimes incomplete, difficult to understand, or nonexistent.**

The department typically sends two main communications to complainants. One provides information on laboratory results in those cases where inspectors collected samples to test for pesticide residue. We noted that the laboratory results are difficult to understand, particularly for people who lack a background in chemistry. Some of the complainants we interviewed told us they found the laboratory results confusing at best.

The second communication from the department is a letter at the end of the case stating the final conclusions. Some of the complainants, such as migrant laborers who reside in the state only temporarily, are difficult to track over time and may not receive such letters from the department. Others, such as regulatory officials from other agencies or states, do not expect or often request such letters. Excluding those complainants, 26 percent of the remaining 80 case files did not contain evidence that the department sent a final letter. Most cases missing final letters were from investigations originating in 2000 through 2003; only two cases in 2004 and 2005 lacked evidence of the letters.

[33] U.S. Environmental Protection Agency Region 5, unpublished responses to questions by the Legislative Auditor's Office, October 28, 2005, 6.

Furthermore, although the final letters were not form letters, they did not consistently provide details important to the conclusion of the case. Due to vague or unclear language, some of the final letters did not explain what actions the department took when it found violations of law.

Department letters to complainants should avoid uncommon terminology and explain what enforcement actions were imposed.

RECOMMENDATION

The Department of Agriculture should improve its written communications with complainants.

When sending letters with laboratory analyses, the department should define uncommon terminology and offer an interpretation of the results. Likewise, when sending final letters reporting a case's conclusions, the department should avoid unclear terminology and explain the full extent of the actions it took when it substantiated violations. Further, the department should change its internal procedures to verify that written communications are sent to all identifiable complainants, as appropriate.

WASTE PESTICIDE DISPOSAL

The department has specific responsibilities to dispose of unwanted, left-over pesticides in Minnesota. From our analysis we found that:

- **The Department of Agriculture only partially fulfills its statutory obligation to collect waste pesticides in the state.**

Statutes require that the department establish a program to collect waste pesticides generated in the state and designate a place at least every other year for residents of each county to dispose of unused pesticides.[34] Statutes also specify that the department spend at least $300,000 each fiscal year from the Pesticide Regulatory Account for a waste-pesticide collection program.[35]

Beginning in 1989 and up through 2003, the department held one-day events at which farmers and agricultural businesses could drop off their unwanted pesticides. The department held "collection events" in the northern half of the state one year followed by events in the southern half the following year. In the beginning, the department collected only waste pesticides generated by farmers and agricultural businesses. But after 1996, the department also used its one-day events to collect from some counties waste pesticides generated by households that had been dropped off at a county household hazardous waste facility during the year. Through these practices, the department has collected 3.2 million pounds of waste pesticides since fiscal year 1990. Table 3.11 shows how much has been collected and disposed of over time. A comparison by the U.S. Environmental Protection Agency shows that Minnesota's waste-pesticide

[34] *Minnesota Statutes* 2004, 18B.065, subd. 1 and 2a.

[35] *Minnesota Statutes* 2004, 18B.26, subd. 3(a).

Table 3.11: Pounds of Waste Pesticides Disposed, Fiscal Years 1990-2005

Fiscal Year	Household[a]	Agricultural	Total
1990-1994	--	550,000	550,000
1995-2000	470,603	1,189,505	1,660,108
2001	187,748	131,264	319,012
2002	112,133	69,321	181,454
2003	65,207	89,686	154,893
2004	81,361	40,476	121,837
2005	211,714	19,238	230,952
Total 1990-2005	1,128,766	2,089,490	3,218,256

NOTE: Amounts include only those disposed of through the Department of Agriculture's waste-pesticide collection program.

[a] Starting in fiscal year 1995, the department began to accept some waste pesticides generated by households in addition to those generated by farmers and agricultural businesses.

SOURCE: Office of the Legislative Auditor, analysis of data from the Minnesota Department of Agriculture, *Waste Pesticide 95-05*, submitted December 7, 2005.

Through October 2004, Minnesota's waste pesticide program had collected more pounds of waste pesticides than all but two other states.

collection program had collected through October 2004 the third highest amount of waste pesticides in the country, behind only California and Texas.[36]

The department sought a change to the program and its funding level in 2003 when it faced prospects of reduced revenues and competing budget priorities. In turn, the 2003 Legislature modified statutes to lower the minimum amount set aside annually for waste-pesticide collection from $600,000 to $300,000.[37] The department subsequently discontinued the biennial one-day collection events. As a replacement, it sought cooperative agreements with counties that had household hazardous waste programs.

Counties signing the agreements agreed to collect and store waste pesticides from farmers and agricultural businesses, in addition to the household-generated pesticides they were already collecting. Farmers and agricultural businesses could drop off up to 300 pounds of waste pesticides at no charge. Counties would use a state-contracted firm to transport and dispose of the pesticides. The state would pay the costs for the equipment and waste transportation and disposal. Counties were responsible for all county labor costs involved in the collection and management of the wastes until the point of disposal. Participating counties would receive two allotments from the department—one to

[36] Nancy Fitz and Bill McClelland, U.S. Environmental Protection Agency, *National Pesticide Disposal Pilot Project: National Pesticide Stewardship Alliance and CropLife America,* handout for presentation at the 2004 National Pesticide Stewardship Alliance Conference, November 7-10, 2004.

[37] *Laws of Minnesota* 2003, chapter 128, art. 3, sec. 26.

cover disposal costs for waste pesticides generated by farmers and agricultural businesses and the second for waste pesticides generated by households. Each county's allotment would be based on a formula accounting for the number of households, farmsteads, and licensed pesticide dealers within the county.

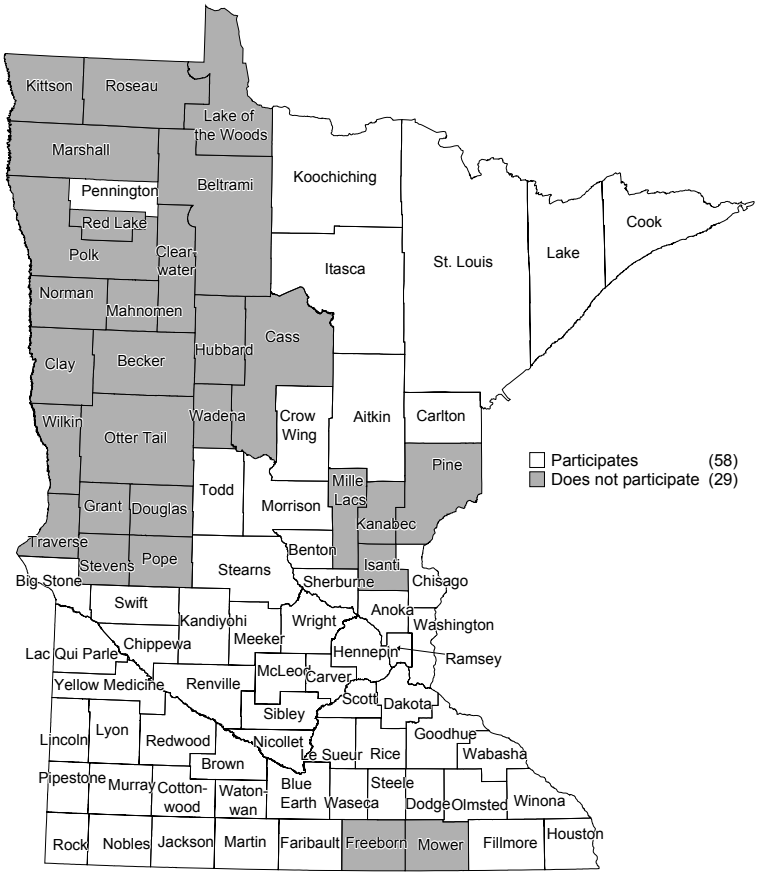
After 2003, the intent of the department's program was to eventually have all county household-hazardous waste programs collect agricultural waste pesticides.

Although the department intended that cooperative agreements with county household-hazardous waste programs would eventually be in place statewide, a number of counties decided against participating. For fiscal year 2004, 44 counties signed agreements with the department for the revised program, and an additional 14 counties did so in subsequent months. Yet, as of early 2006:

- **One-third of the state's counties declined to participate in the department's program and have no place for collecting agricultural waste pesticides.**

Currently, 29 of Minnesota's 87 counties, many of which are primarily agricultural, have not signed agreements with the department for waste pesticide disposal. Figure 3.5 depicts the counties that have declined to participate.

Figure 3.5: Counties Not Participating in the Department of Agriculture's Waste-Pesticide Disposal Program, 2005



SOURCE: Minnesota Department of Agriculture, September 2005.

Officials from some of these counties told us that they accept only household-generated waste pesticides; when farmers approach counties with agricultural waste pesticides, these counties tell them to contact the Department of Agriculture. Counties sometimes suggest that farmers travel to another county that is accepting agricultural waste pesticides. But county officials told us that farmers would have to pay a fee to that county, and they said that farmers balk at prospects of both travel and fees.

In each of the two fiscal years since the program was changed, the full amounts allotted for disposal have not been spent, as Table 3.12 shows. This happened in part because not all counties had signed up for the program and in part because farmers and agricultural businesses dropped off fewer waste pesticides than anticipated. At the same time, many counties had larger amounts of household-generated waste pesticides than their allotment covered; as the end of the fiscal year approached, the department allowed counties to use unspent portions of their agricultural allotment on disposal costs for household waste pesticides.

Some of the dollars allotted for collecting agricultural waste pesticides went unspent during the last two fiscal years.

Table 3.12: Expenditures on Disposal of Waste Pesticides, Fiscal Years 2004-05

	Total Allotment[a]	Allotment to Counties[b]	Amount Counties Spent	Unspent Amount
FY2004	$300,000	$250,000	$130,332[c]	$118,725
FY2005	300,000	368,725[d]	240,559	128,166

[a] Of the total, the Department of Agriculture reserves $50,000 for its administration of the program, education, and outreach efforts.

[b] Each county's allotment is based on a formula accounting for the number of households, farmsteads, and licensed pesticide dealers located in the county. Counties receive one allotment for waste pesticides generated by households and a second for those generated by farmers and agricultural businesses.

[c] Includes $41,812 spent by the department in FY2004 for disposing of chemicals from abandoned agricultural chemical facilities.

[d] Includes $118,725 carried over from FY2004.

SOURCES: Office of the Legislative Auditor analysis of data from Minnesota Department of Agriculture, *2005 Fiscal Year End Report Minnesota Waste Pesticide Collection Program,* (St. Paul, 2005), 3; and *Minnesota Department of Agriculture New Waste Pesticide Collection Program Fiscal Year 2004 Year End Report* (St. Paul, 2004), 3.

Based on interviews with county officials in several counties that have not signed agreements with the department, we concluded that:

- **It is likely that certain regions of the state will continue to lack disposal sites for agricultural waste pesticides.**

In the fall of 2005 the department met with representatives of a group of counties in northwestern Minnesota to discuss joining the program, but the counties later decided against it. County officials acknowledged to us that signing the agreements would, first, provide a service to local farmers and businesses that

currently go unserved and, second, add revenues to counties' operations for household waste pesticides.

But the counties continued to opt out of the department's program for a number of reasons, some of which are beyond the department's control. First, local officials fear that participating in the program subjects them to a risk that increasing amounts of county tax revenues would be required to supplement state revenues reallocated for other purposes. They point to the department's 2003 reduced allotment as evidence that it is not fully committed to maintaining spending on the program. Counties also point to changes in how the state has used revenues from surcharges paid by households and businesses on their garbage collection bills. The revenues are used in part to support local programs for recycling and household hazardous wastes. Over time, however, counties' share of the costs for these programs have increased while the state's share has declined, forcing some counties to reduce programs or increase local property taxes.

Second, county officials view the 2003 statutory change reducing the money for waste pesticide disposal as a diversion of money from its originally intended purpose to other unrelated department activities. In actuality, the 0.4 percent fee paid annually by registrants for registering pesticides has always been used by the department for multiple activities related to agricultural chemicals, not only waste pesticide collection.[38] From the counties' perspective, however, the fee is intended to pay the full costs for waste pesticide disposal. When farmers and others buy a pesticide, they are paying for the costs of its production, including its registration cost. Consequently, county officials argue that the purchasers should not be required to "pay a second time" for disposing of waste pesticides.

A farmer drops off waste pesticides.

Some counties feared that participating in the department's waste pesticide program would require them to spend more local tax dollars.

Third, county officials say the amounts allotted for accepting waste pesticides are insufficient to cover their costs. For instance, one county estimated that costs to dispose of residential waste pesticides alone were between $3,115 and $4,515 per year, but the department's allotment would have provided just $2,519. Because

[38] As Chapter 1 describes, the Pesticide Regulatory Account, comprising pesticide registration fees and other charges, funds a substantial portion of the department's pesticide activities, including environmental monitoring, pesticide-use studies, dealer and applicator licensing and applicator training, facility inspections, and enforcement of pesticide regulations.

it was largely agricultural, the county was concerned that opening its doors to agricultural pesticide wastes would commit the county to accepting potentially large volumes that it could not manage.

Fourth, counties are concerned that signing the agreements and accepting agricultural businesses' waste pesticides may lead to having to accept all hazardous wastes generated by businesses of all types. County representatives said that many of the counties are not licensed to accept large quantities of hazardous waste, nor are they equipped or staffed to do this.

Not all of the counties' objections to participation are within the department's control to address, as mentioned earlier, and some county reservations may not actually materialize. Nonetheless, the objections indicate that the counties are unlikely to soon sign cooperative agreements with the department, which leaves those areas of the state without disposal options for agricultural waste pesticides.

RECOMMENDATION

The Department of Agriculture should ensure that waste-pesticide disposal options exist in areas of the state now lacking them.

Despite department efforts to design a program for statewide disposal options, the consequence of counties declining to participate is that the department is meeting only part of its statutory obligation to designate disposal sites for residents of each county at least every other year. One possible alternative is to expand the department's existing cooperative agreements in certain counties that agree to accept agricultural waste pesticides from outside their boundaries. Counties willing to do this may have to transport wastes from other counties, and this should be factored into their allotment. The approach would avoid creating incentives for counties to abandon their agreements, as might be the case if the department were to simply revert back to staging its own collection events.

Ensuring that all areas of the state have viable ways to dispose of agricultural waste pesticides would likely be less costly than cleaning up contamination from pesticides inappropriately dumped.

Another possibility is revising the formula to realign counties' funding allotments. If the formula were to account for some portion of a county's administrative costs for the agricultural waste pesticides, and if it were weighted to provide more to heavily agricultural counties, it may provide enough funds to encourage nonparticipants to join. The department could also consider adjusting the formula to reserve amounts specifically to cover costs in those primarily agricultural counties that fear being inundated with agricultural waste pesticides.

We recognize that even these changes may be insufficient to reduce the uncertainties that currently preclude some counties from participating. The department may have to allot more than the minimum $300,000 set in statute, and it has authority to do so. As it is, we are concerned that leaving large sections of the state without viable disposal options invites people to forego land stewardship responsibilities and instead inappropriately dump waste pesticides. Such occurrences could create larger cleanup costs than what would be necessary to prevent them with appropriate disposal options.

4 Monitoring Environmental Effects

SUMMARY

The Minnesota Department of Agriculture has done a good job monitoring the use and environmental effects of agricultural pesticides in the state's most sensitive areas. In 2002 and 2003, the department identified agricultural pesticides that were placing groundwater and surface water at risk and developed voluntary practices to help farmers better manage these pesticides statewide. In contrast, the department has not paid enough attention to the use and effects of pesticides in urban parts of the state. The department does not (1) have a consistent process to monitor urban pesticide use on a biennial basis, as required by statute, (2) adequately address urban pesticide use in its Pesticide Management Plan, or (3) monitor surface water in urban areas for nonagricultural pesticides. Until 2005, the department was not analyzing urban groundwater samples for nonagricultural pesticides. We recommend that the Department of Agriculture increase surface water monitoring activities in sensitive urban areas and develop a consistent approach to comply with statutory requirements for monitoring urban pesticide use. We also recommend that the department develop and implement a plan to evaluate its best management practices for groundwater and surface water as soon as possible.

Monitoring the environmental effects of pesticides is an important component of pesticide regulation.

As noted previously, certain research has shown that pesticides can have negative effects on the environment, including on human beings, even when used according to label directions. For example, some pesticides can leach through the soil and contaminate groundwater, which is one of the state's major sources of drinking water. Others can enter the state's surface waters through soil erosion, rainfall, or high winds. Pesticides can also breakdown into other substances known as degradates that can, at times, pose additional environmental risks. It is difficult to gauge the direct effect of pesticides on humans. Most of the health-related research on pesticides comes from laboratory studies on animals, some of which suggest an increased risk of cancer, reproductive problems, and gene mutation for some pesticides. Therefore, it is important to monitor the environmental effects of pesticides, even when used according to label directions. This chapter focuses on the Department of Agriculture's monitoring activities and addresses the following major questions:

- **Does the Department of Agriculture adequately monitor pesticide use in Minnesota?**
- **To what extent does the department's Minnesota Pesticide Management Plan adequately set forth strategies for protecting groundwater and surface water from pesticide contamination?**

- **Does the department have a reasonable process for monitoring the environmental effects of pesticides, and what do monitoring results show?**

- **To what extent has the Department of Agriculture developed and monitored best management practices for pesticide use, and is its process for doing so reasonable?**

To answer these questions, we examined state and federal laws, rules, guidelines, plans, reports, and studies related to measuring pesticide use and monitoring their effects. We talked with staff at the Minnesota departments of Agriculture, Health, and Natural Resources, the Environmental Quality Board, and the Pollution Control Agency. We also accompanied and observed Department of Agriculture staff a small number of times as they collected water samples. Finally, to see how Minnesota's monitoring activities compare with those of other states, we interviewed officials from ten states that raise similar crops and have similar geological terrain to Minnesota.[1]

MEASURING PESTICIDE USE

Minnesota statutes require that the Department of Agriculture monitor rural and urban pesticide use on a biennial basis, with the information collected and automated consistent with Environmental Quality Board standards.[2] Whereas rural use generally relates to agricultural pesticides for livestock or crops, urban use covers a much broader range of sites. It includes pest control in buildings and homes; bodies of water; lawns, golf courses, and landscapes; and nonagricultural open areas, such as roadways. We found that:

- **While the Department of Agriculture has recently developed and implemented a good process for measuring rural pesticide use in Minnesota, it has not developed one for urban pesticide use.**

The Department of Agriculture has measured the use of agricultural pesticides for about 15 years.

The department fulfills its statutory responsibility to monitor rural pesticide use—broadly defined to include both the amount used and management techniques applied—in four ways. First, together with the U.S. Department of Agriculture, the Minnesota Department of Agriculture has been collecting statewide rural pesticide-use data for specific agricultural crops for several years. For example, the two departments have surveyed Minnesota corn farmers annually for about 15 years concerning the amount and type of pesticides applied to corn statewide.

Second, over the last few years, the Minnesota Department of Agriculture has been examining ways to better use the statewide data that the U.S. Department of

[1] The ten states are Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

[2] *Minnesota Statutes* 2004, 18B.064. Although statutes require that the Environmental Quality Board integrate certain data, including pesticide-use data, into the state's land management information system according to published data compatibility guidelines, the board has never adopted data standards for agencies to use. See *Minnesota Statutes* 2004, 103B.151, subd. 1(6).

Agriculture collects.[3] After a series of pilot projects that helped refine how it would collect data, in January 2005 the department released its first report on the amount and type of pesticides used on four major Minnesota crops during 2003.[4] In this report, the department expanded the number of surveys that the U.S. Department of Agriculture conducts so that data would be representative of farmers by different regions of the state known as pesticide management areas.[5] It intends to use the information to help design and implement water quality monitoring and pesticide education programs as needed and to evaluate best management practices for specific pesticides.[6]

Third, to measure the extent to which farmers were using generally accepted pest management practices, the department surveyed 4,000 corn farmers statewide in mid-2005.[7] The department expects to issue the results—analyzed statewide as well as by pesticide management area—in early 2006. To comply with statutory requirements for biennial reporting of rural use, the department plans to continue to issue reports in alternate years on the amount of pesticides applied and on pesticide practices, such as using buffer zones.

A pesticide applicator applies pesticides to turf at a golf course.

The department collects data on the amount of pesticides that farmers use and on how they manage pests.

Finally, the department has conducted numerous isolated studies of pesticide use in rural areas—measuring both the amount of pesticides and management practices. For example, the department has developed a diagnostic tool called Farm Nutrient Management

[3] For example, see: Minnesota Department of Agriculture and Minnesota Agricultural Statistics Service, *"Expanded Minnesota Agricultural Statistics Pesticide Use Data* (St. Paul, August 2003); http://www.mda.state.mn.us/appd/ace/2001massarmsenhanced.pdf; accessed March 28, 2005; and U.S Environmental Protection Agency, *Federal Fiscal Year 2003 Year-End Report October 1, 2002 through September 30, 2003: State of Minnesota Department of Agriculture* (Chicago: U.S. Environmental Protection Agency, November 2003), Appendix J.

[4] Minnesota Department of Agriculture and Minnesota Agricultural Statistics Service, *2003 Pesticide Usage on Four Major Minnesota Crops* (St. Paul, January 2005).

[5] As we explain later, the Department of Agriculture has divided the state into ten management areas based on a variety of factors, such as geologic and soil conditions, crops, and rainfall.

[6] As we discuss later, statutes authorize the Department of Agriculture to develop best management practices for pesticides in general and for specific pesticides. Best management practices are practical, voluntary actions that can be taken to reduce the need for pesticides or minimize their negative effects on the environment.

[7] Minnesota Department of Agriculture and Minnesota Agricultural Statistics Service, *Annual Pesticide Survey: Herbicide Applications and Practices on Corn in Planning for or During the 2004 Growing Season* (St. Paul, 2005).

Assessment Process, which measures existing farm practices regarding fertilizers, manures, and pesticides. The department conducts these studies in cooperation with multiple stakeholders, including local governments, generally in response to concerns about the vulnerability of a community's water supply. Over the last ten years, 4 of the department's 21 such studies have included information about pesticide use.[8]

In contrast, the department has not conducted any similar statewide surveys that measure the amount of pesticides used in urban areas, nor has it developed a process for doing so. In 2000 and 2001, the department examined various pest management practices in K-12 schools and state-owned buildings statewide, but it did not examine the amount of pesticides used.[9] Most of the department's work regarding urban pesticide use has focused on isolated surveys that measure pest management practices in particular watersheds. For example, in the early to late 1990s, the department worked with the University of Minnesota Extension Service and various cities and counties to conduct periodic lawn care surveys.[10] However, the department has not conducted similar surveys in the last several years.

The department has not collected statewide data on the amount of pesticides used in urban areas.

Partly because it is difficult to measure urban pesticide use, the Department of Agriculture has focused instead on educating urban pesticide users. Through its Urban Initiative Education Program, the department educates urban communities about illegal pesticide use, pest management practices, and, if needed, proper pesticide use. The program involves a short presentation, a demonstration, and a free pest management kit containing several items for controlling indoor pests such as cockroaches, ants, mice and spiders.[11] The program also has a "train-the-trainer" component for greater outreach. Since the program started in late 2000, the department has worked with 216 federal, state, local, community, and environmental organizations, made 423 presentations to more than 8,720 people, and distributed about 20,870 pieces of educational material.[12]

When we talked with officials from ten states similar to Minnesota, we found that none of these states was required to collect pesticide-use data, either rural or urban. Aside from participating in U.S. Department of Agriculture surveys, none

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[8] The four individual studies are summarized in Minnesota Department of Agriculture, *Summary of Four Pesticide Use Surveys in Minnesota (1996 to 2000)* (St. Paul, undated); http://www.mda.state.mn.us/appd/ace/1996to2000finalfour.pdf; accessed November 25, 2005.

[9] Minnesota Department of Agriculture, *Overview of "The Minnesota Public & Private K-12 Schools Pest Management Practices Survey"* (St. Paul, April 2000); http://www.mda.state.mn.us/ipm/SurveyOverview.pdf; accessed November 25, 2005; and Minnesota Department of Agriculture, *Pesticide Use, Storage and Integrated Pest Management Assessment In and Around State-Owned Buildings and Public K-12 School Buildings: A Report to the MN Legislature* (St. Paul, January 2001); http://www.mda.state.mn.us/ipm/pestuseexecsumm.pdf; accessed November 25, 2005.

[10] Minnesota Department of Agriculture, *Pesticide Use in Minnesota* (St. Paul, undated), 1.

[11] In 2002, the program also surveyed workshop participants about their pest management practices.

[12] Minnesota Department of Agriculture, *Urban Initiative: Minnesota Pesticide Exposure Reduction Program* (St. Paul, undated).

of the other ten states routinely collected data regarding the amount of pesticides applied or the pesticide management practices utilized.[13]

RECOMMENDATION

The Department of Agriculture should develop and implement a consistent approach to monitor urban pesticide use biennially, as required by state statute.

One way to measure urban pesticide use is to focus on particular applications, such as those made to turf by commercial applicators.

Monitoring urban pesticide use is not a simple task, and there are few, if any, models available for the state to emulate. However, urban pesticide use is an important issue. As we discuss later in this chapter, the department routinely detected low levels of pesticides commonly associated with urban uses in surface water before it discontinued such testing in 2003. While a complete accounting of all urban pesticide use is impractical, the department could consider a number of options that would provide meaningful data to help monitor water quality or assess the use of high-risk pesticides in urban areas. For example, it could focus on monitoring certain types of nonagricultural pesticide applications, such as those made by structural applicators or turf and ornamental applicators. Statutes require that commercial, noncommercial, and structural applicators maintain application records for five years.[14] The department could sample these records to estimate the amount and type of pesticides used statewide. Alternatively, elementary and secondary schools or school districts could be surveyed regarding the amount and types of pesticides used. The department has already conducted two statewide surveys regarding pest management practices in schools. Supplementing these data with information about the amounts and types of pesticides used would not only provide information on urban pesticide use, but it would also help the state determine how well integrated pest management is working in schools.[15] Finally, the department could collect product sales data during the registration process in a manner that would allow staff to calculate the amount of nonagricultural pesticides distributed in the state.

PESTICIDE MANAGEMENT PLAN

In 1989, the Minnesota Legislature required the Department of Agriculture to develop a pesticide management plan for preventing, evaluating, and mitigating the occurrences of pesticides or their breakdown products in Minnesota's groundwater and surface waters.[16] As a condition of receiving a federal grant for groundwater monitoring, the federal government also requires that the

[13] Almost every state in the nation, including Minnesota, participates in crop surveys by the U.S. Department of Agriculture's National Agricultural Statistics Service. These surveys cover various aspects of agriculture nationwide, including the amount of specific pesticides used and crop management practices. Very few states collect more than what is compiled in these reports.

[14] *Minnesota Statutes* 2004, 18B.37, subd. 2(e) and 3(c). Noncommercial applicators are only required to keep records of restricted-use pesticides.

[15] *Minnesota Statutes* 2004, 17.114, subd. 4 requires the state to promote and facilitate the use of integrated pest management techniques to minimize the need for pesticides. These techniques stress a more balanced approach to managing pests than relying heavily on pesticides.

[16] *Laws of Minnesota* 1989, chapter 326, art. 5, sec. 17.

department have a management plan for responding to pesticide detections in groundwater.

Minnesota's Pesticide Management Plan is intended to prevent and mitigate pesticide contamination in groundwater and surface waters.

The Department of Agriculture began developing its first management plan in 1990, adopted it six years later, and revised it slightly in 1998.[17] By 2002, the department was concerned that it could not comply with all of the plan's elements, given its limited staff and resources at the time. It also recognized that many of the plan's processes could be streamlined and that some sections could be better written. After soliciting input from various stakeholders, the department adopted a new management plan in late June 2005.[18]

We reviewed the department's 2005 plan in relation to department responsibilities and activities. Overall, we found that:

- **The *Minnesota Pesticide Management Plan* does not adequately address issues related to urban pesticide use, aquatic pesticides, and product registration.**

We have three major concerns about the department's management plan. First, although pesticides are used widely in both agricultural and nonagricultural sectors, the plan focuses primarily on agricultural pesticides. The plan indicates that it will be "focusing initially on agricultural use yet recognizing that the concepts and policies presented in the [plan] are applicable to other types of uses (e.g., urban, structural, forestry, and rights-of-way)."[19] However, the plan does not set forth a strategy for how the department will fulfill its statutory responsibilities regarding these other uses. As noted earlier, the department does not routinely monitor urban pesticide use, although this is required by statute.

Second, the management plan specifically excludes aquatic pesticides that are generally applied to lakes to control weeds.[20] The department has delegated the review of aquatic pesticide products to the Department of Natural Resources, which issues permits for their use. In 1995, the two departments entered into a cooperative agreement outlining each agency's responsibilities related to registering aquatic pesticides.[21] While the Department of Natural Resources monitors a small percentage of pesticide applications in public water, it does not monitor the environmental effects of aquatic pesticides. The Department of Agriculture's routine surface water monitoring program has not included

[17] Minnesota Department of Administration, *State Register* (St. Paul, October 21, 2002), 591.

[18] Minnesota Department of Agriculture, *Pesticide Management Plan* (St. Paul, June 2005); http://www.mda.state.mn.us/appd/ace/reports/2005-06-27pmp.pdf; accessed November 29, 2005.

[19] *Ibid*., 3.

[20] *Ibid.,* 3.

[21] Minnesota Department of Agriculture and Minnesota Department of Natural Resources, *Memorandum of Agreement: Cooperative Consultation and Determination/MnDNR Use Restrictions on Registered Pesticides* (St. Paul, March 1995).

monitoring lakes for pesticides.[22] The department plans to include more urban lakes in its surface water monitoring program, if resources permit.[23]

Third, although the management plan suggests that product registration plays an ongoing role in preventing pesticide contamination, it does not set forth registration strategies aimed at preventing water contamination.[24] As noted in Chapter 2, the department can require additional documentation from product registrants and can place additional restrictions on product use, but it has rarely done so.[25] The department does not have a process to identify the types of products that it might want to examine in greater detail, nor has it developed criteria for determining when to do so.

RECOMMENDATION

The Department of Agriculture should revise the Minnesota Pesticide Management Plan to better address issues of urban pesticide use, aquatic pesticides, and product registration.

The plan should set forth more specific strategies regarding pesticides used in urban areas.

Because the *Minnesota Pesticide Management Plan* provides overall guidance for the department's activities, both current and future, we think that it should set forth the department's strategies in key areas. Although the agricultural sector likely comprises the bulk of pesticide usage, urban areas are also susceptible to pesticide-related problems. As we will see in the following section, many of the pesticides that are commonly used by homeowners and commercial applicators in nonagricultural settings have been detected in the state's surface waters. Furthermore, ten years after adopting its first pesticide management plan, the department should be well beyond the initial stages of plan implementation and ready to move into areas other than agricultural use. In addition, if the department expects the product registration process to play an ongoing role in preventing pesticide contamination, as the plan suggests, it needs to better define how registration will do so.

WATER QUALITY MONITORING

This section focuses on how the Department of Agriculture monitors the impact of pesticides on the environment. Overall, we concluded that:

[22] During the mid to late 1990s, the Department of Agriculture did some limited pesticide sampling on Lake Harriet in Minneapolis. Results showed the presence of several pesticides commonly used in urban areas as well as some agricultural pesticides.

[23] Minnesota Department of Agriculture, *Draft Surface Water Pesticide and Nutrient Assessment Monitoring Design Document* (St. Paul, November 9, 2005), 10.

[24] For example, see Department of Agriculture, *Pesticide Management Plan*, 23-24, 28, and 78.

[25] As part of the Department of Natural Resources' permit process for applying pesticides directly to public water, the department places restrictions on the use of aquatic pesticides. Homeowners and commercial applicators must receive a permit from the department before applying aquatic pesticides.

- **The Department of Agriculture has done a good job monitoring the effects of agricultural pesticides in the state's most sensitive rural areas, but it has not paid enough attention to effects in urban areas.**

First, we examine how the department monitors groundwater and surface water for pesticides. Second, we look at the results of its monitoring efforts.

Groundwater and Surface Water Monitoring

The Department of Agriculture's major monitoring activities center on the state's groundwater and surface waters. Currently, the groundwater program consists of four separate networks: central sand plains, natural springs, and the expanded network, as summarized in Table 4.1. We looked at the number and location of the department's groundwater monitoring sites and how these have changed over time and found that:

The department plans more groundwater monitoring sites for 2006.

Table 4.1: Groundwater Monitoring by the Department of Agriculture, 2005

Central Sand Plains Network

- Established in 1999; first samples collected in 2000
- 86 monitoring sites (193 monitoring wells) in 10 central and west central counties in Minnesota
- Wells specially designed for monitoring purposes

Natural Springs Network

- Established in 2000
- Six springs in southeastern Minnesota
- Located at three Department of Natural Resources' fish hatcheries
- Relies on grab samples rather than well samples

Expanded Network

- Established in 2004
- 40 wells in northwestern, southwestern, south central, and west central Minnesota
- 30 additional wells planned for north central and northwestern Minnesota; 10 additional wells planned for east central Minnesota

Urban Network

- Sample collection at Pollution Control Agency monitoring wells in three urban areas

SOURCES: Minnesota Department of Agriculture, *Minnesota Department of Agriculture Pesticide Monitoring in Water Resources: 2002 Data Repor*t (St. Paul, March 22, 2002); Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, February 24, 2005); and Minnesota Department of Agriculture, *Regional Sampling Design Document Draft* (St. Paul, September 19, 2005).

- **The Department of Agriculture has been increasing the number and location of its groundwater monitoring sites, and it has recently begun to monitor groundwater in urban areas.**

In response to the passage of the Minnesota Pesticide Control Law, the Department of Agriculture established its groundwater monitoring program in 1987.[26] When the Legislature passed the Groundwater Protection Act two years later, the department expanded its program to eventually include monitoring activities at over 400 shallow wells throughout most of the state.[27] By 1996, however, the department had concluded that it needed a new groundwater monitoring system because many of its monitoring wells were old and not designed for monitoring purposes.

A network of wells in Minnesota's central sand plains is the cornerstone of the department's groundwater monitoring program.

Consequently, the department decided to implement a statewide monitoring network consisting of specialized, dedicated wells, to be phased in over several years. As a first step, the department worked with 12 counties to establish groundwater monitoring wells in the central sand plains area of the state. The department chose to initially focus its efforts in this area because of the area's heavy agricultural use, sensitivity to pesticide leaching, and previous monitoring results indicating the presence of pesticides. The central sand plains monitoring network became operational in late 1999 and the department began collecting its first groundwater samples in 2000. By 2005, the department had 86 monitoring sites (193 wells) located in 10 counties in the central sand plains, as shown in Figure 4.1.

Two groundwater monitoring wells at a west central Minnesota site.

The department also monitors a small number of natural springs in southeastern Minnesota.

As part of its groundwater program, the department also established a small number of monitoring sites at natural springs in southeastern Minnesota in the early 2000s. Located at Department of Natural Resources' fish hatcheries, the Department of Agriculture has used monitoring results from these springs to assess groundwater conditions in southeastern Minnesota.[28] By 2005, the department had expanded the number of sites monitored in southeastern

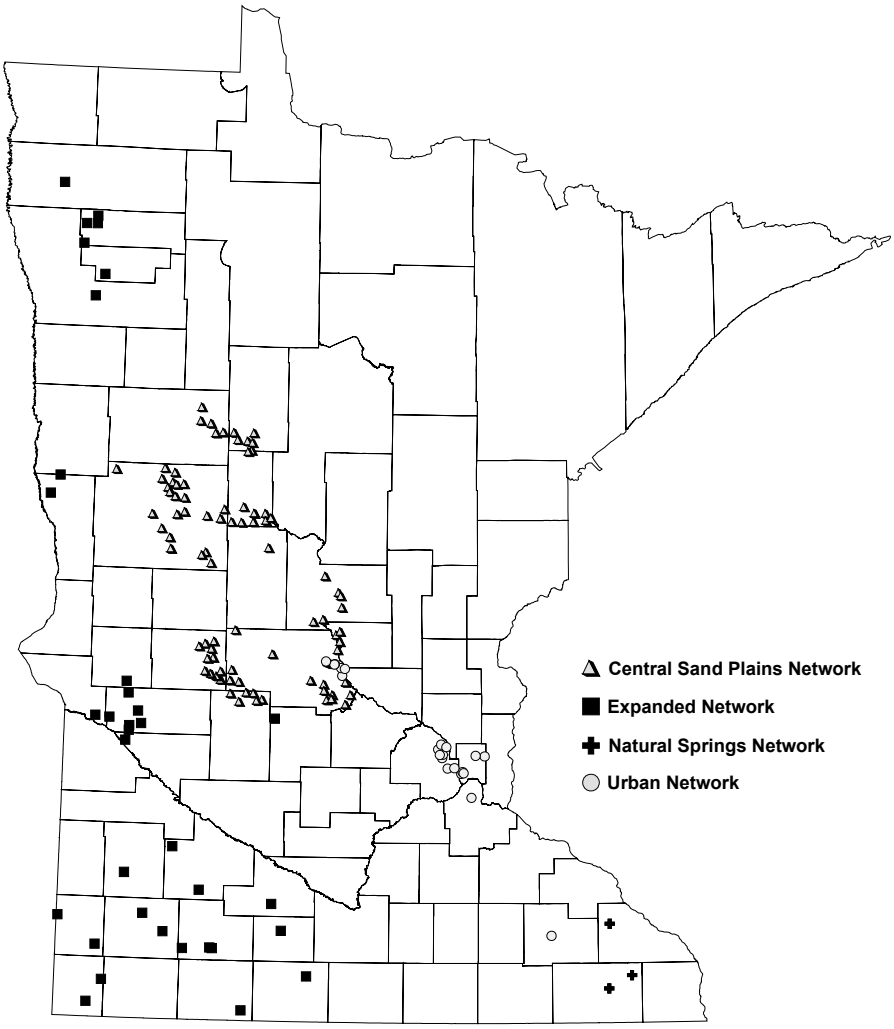
[26] Minnesota Department of Agriculture, *Regional Sampling Design Document, Draft* (St. Paul, November 30, 2005), 1.

[27] Very few monitoring wells were located in northeastern and southeastern Minnesota.

[28] In southeastern Minnesota, spring water and groundwater are closely linked. Geologic conditions allow the department to sample natural spring water as it emerges from the ground. However, because it is not sampled through a monitoring well, the department analyzes spring results separately from other groundwater results.

Minnesota to six springs at three Department of Natural Resources' hatcheries, as shown in Figure 4.1.

Figure 4.1: Department of Agriculture Groundwater Monitoring Sites, 2005



SOURCE: Minnesota Department of Agriculture, 2005.

The department does not monitor groundwater in the northeastern parts of the state where there is little agricultural activity.

In 2004, the department began expanding its groundwater monitoring network based on its ten pesticide monitoring regions.[29] Eventually, the department plans to select or install seven to ten wells in each pesticide monitoring region, beginning with those regions most susceptible to agricultural pesticides leaching

[29] The department divided the state into ten pesticide management areas based on crops, soil and geological characteristics, rainfall, and other characteristics. The department used these ten management areas to develop corresponding monitoring regions. The monitoring regions are distinct from the nine investigation areas shown earlier in Figure 3.1, which the department uses to conduct inspections.

into groundwater. As a first step, the department collected additional groundwater samples from 18 wells, mostly located in parts of southwestern Minnesota that had not been monitored since 1994. However, the expansion has not come without problems. Many of the wells that it planned to sample—Department of Natural Resources' observation wells—were dry or unusable. The Department of Agriculture had planned on using new or existing wells to expand its monitoring program and agreed to help the Department of Natural Resources fund 30 new observation wells. However, changing priorities in the natural resources department have forced the Department of Agriculture to assume all costs for new well construction. To date, the department has constructed 19 additional wells in southwestern, south central, and west central Minnesota. The department anticipates drilling more wells in east central and northwestern Minnesota in 2006.

The department recently began to monitor urban groundwater for nonagricultural pesticides.

In addition, the department has recently expanded its groundwater monitoring program into major urban areas. Working under a memorandum of understanding, the Minnesota Pollution Control Agency collected 11 groundwater samples in 2004 and 23 samples in 2005 from the Twin Cities, Rochester, and St. Cloud areas for the Department of Agriculture to analyze.[30] However, as we discuss later, the additional groundwater samples were not analyzed until 2005 for pesticides commonly used in urban areas.

The expansion of its groundwater program addresses concerns raised in a recent report sponsored by the Department of Agriculture, which found that the location of the department's central sand plains and natural springs networks did not necessarily correspond well with agricultural pesticide-use patterns.[31] The department is implementing this report's recommendations by establishing or identifying additional groundwater wells in southwestern and southeastern Minnesota.

In addition to groundwater, we looked at the location and number of monitoring sites for surface water. Currently, the department's surface water program consists of a network of automated stations and an expanded network, as summarized in Table 4.2. Similar to our findings for groundwater, we found that:

The department also monitors rivers and streams for agricultural pesticides.

- **The Department of Agriculture has been increasing the number and location of its surface water monitoring sites, but its efforts remain focused on agricultural areas.**

Also in response to the Minnesota Pesticide Control Law, the department established its surface water monitoring program in 1990, focusing on particular watersheds most sensitive to agricultural practices.[32] For surface water

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[30] Minnesota Department of Agriculture, Minnesota Department of Health, and Minnesota Pollution Control Agency, *Agreement to Operate an Integrated Ground Water Quality Monitoring System for the State of Minnesota* (St. Paul, February 11, 2004).

[31] David Mulla and Solomon Folle, *Target Acroecoregions for Pesticide BMP Promotion, Evaluation and Future Monitoring* (Minneapolis: University of Minnesota, February 24, 2005), unnumbered.

[32] Minnesota Department of Agriculture, *Minnesota Department of Agriculture Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, February 24, 2005), 21.

Some surface water sites have wells that automatically collect water samples during rainstorms.

monitoring, the department collects water samples in two ways. First, automatic sampling equipment maintained by the department automatically collects water samples at preset intervals during rain events. These samples are referred to as "storm event" samples. Monitoring staff periodically travel to the sites to pick up the already collected samples. Second, the department supplements storm event samples with "grab" samples, which staff collect manually at least monthly during nonstorm periods by lowering water collection tubes into rivers and streams at predetermined sites. Together, storm event and grab samples, along with data on the duration of pesticide concentrations, provide a complete picture of surface water quality at a particular site relative to pesticides.

Table 4.2: Surface Water Monitoring by the Department of Agriculture, 2005

Automated Surface Water Network

- Established in 1990
- Five sampling stations in southeastern and south central Minnesota
- Automated equipment automatically collects samples during storms
- Grab samples obtained during nonstorm periods
- Focused on rivers and streams in agricultural areas

Expanded Surface Water Network

- Established in 2002
- 51 sites throughout agricultural parts of Minnesota
- Grab sampling; no automated equipment
- Monitoring confined to rivers and streams

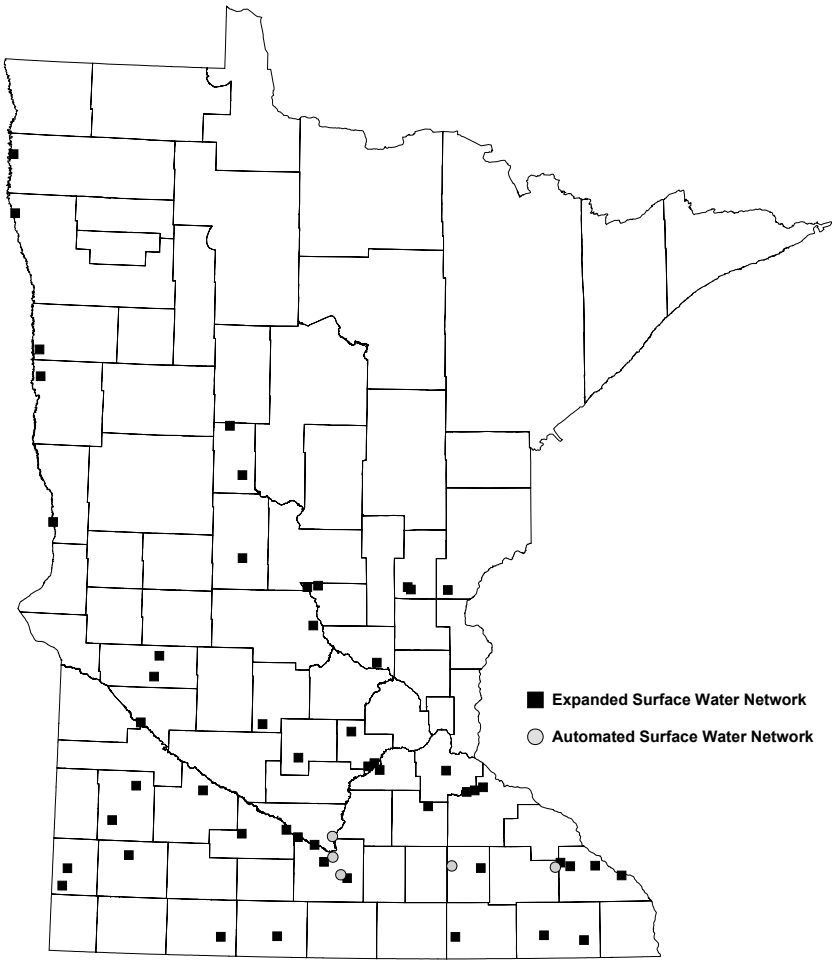
SOURCES: Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, February 24, 2005); and Minnesota Department of Agriculture, *Draft Surface Water Pesticide and Nutrient Assessment Monitoring Design Document* (St. Paul, November 9, 2005).

The number of automated sites has varied due to budget concerns and changing priorities.

The number of automated surface water monitoring sites that the department uses has fluctuated over the years, largely in response to budget concerns and changing priorities. In 2003, the department eliminated four of its nine surface water monitoring stations. The four eliminated stations were located in Carver and Scott counties, and represented a mixture of residential, agricultural, and suburban uses. The five remaining stations were all in rural counties and reflected the agricultural use of pesticides. In 2005, the department maintained automated sampling stations on five rivers and streams, all located in agricultural areas in southeastern and south central Minnesota, shown in Figure 4.2.

To expand its surface water program, the Department of Agriculture began collecting grab samples at mostly agricultural sites throughout a large part of the state in 2002. From the onset, though, the department has had problems collecting the additional samples as scheduled, and the lack of laboratory and staff resources further limited the amount of sampling and analysis that could be done. In 2005, the department collected grab samples at 51 sites located throughout eight of the department's ten pesticide monitoring regions. Because

Figure 4.2: Department of Agriculture Surface Water Monitoring Sites, 2005



SOURCE: Minnesota Department of Agriculture, 2005.

At most of the department's surface water sites, samples are collected by hand.

the sites were in rural agricultural areas, the department did not analyze the samples for pesticides commonly used in urban areas.

Expanding its surface water program statewide addresses some of the recommendations made in a recent report sponsored by the Department of Agriculture.[33] Noting that the department's surface water monitoring sites were not always in the state's most vulnerable areas based on soil erosion potential and pesticide use, the report recommended establishing additional sites in southeastern Minnesota and on portions of the Minnesota River.

In addition to the department's groundwater and surface water monitoring programs, we found that:

[33] Mulla and Folle, *Target Acroecoregions,* unnumbered.

- **The Department of Agriculture has periodically conducted additional water monitoring activities that supplement the work of other state and local agencies.**

At times, the department has worked with the Minnesota Department of Health to monitor drinking water wells.

For example, in response to contamination problems in St. Peter's water supply in the late 1990s, the Department of Agriculture joined a consortium of interested parties to develop wellhead protection strategies. The department began using a local farm that had an existing tile-drainage system to measure water quality in relation to specific agricultural practices. The demonstration project, known as Red Top Farms, continues today, with the department monitoring water collected from the drain tiles for the presence of pesticides used to raise corn and soybeans.

Also, to update information about pesticides in drinking water, the Department of Agriculture worked with the Department of Health and the Pollution Control Agency to survey public noncommunity and private drinking water wells. From January through March 2004, the department sampled 71 wells located in agricultural areas of the state for pesticides.

Finally, the department has conducted occasional studies of rainfall, mostly in the mid- to late-1990s. Concerned that pesticides were contaminating the air through drift, wind erosion, and evaporation, the department has been analyzing rainfall samples at one site in southeastern Minnesota since 1994.[34]

In addition to looking at where the department monitors water quality, we also looked at how it collects water samples. We found that:

- **The Department of Agriculture has developed and implemented a rigorous quality-control program to help ensure the integrity of its water monitoring program.**

The department has developed protocols for collecting water monitoring samples.

In the past, the Department of Agriculture has relied on its own highly trained staff to collect groundwater and surface water samples for analysis by the department's laboratory. To expand its surface water monitoring program, the department began using other state and local government staff to help collect water samples. Trained by the Department of Agriculture, these staff are typically from agencies such as the Department of Natural Resources, Pollution Control Agency, Soil and Water Conservation Districts, and county environmental services offices, and they are already involved in collecting water samples for nutrients and other types of substances.

Department of Agriculture staff—and others helping them—collect water samples according to a set of operating procedures that the department developed.[35] For example, samples are collected and stored according to

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[34] Department of Agriculture, *2002 Data Report*, 37.

[35] Minnesota Department of Agriculture, *Quality Assurance Project Plan* (St. Paul, March 31, 2003). The department has also developed various operating procedures for water monitoring, including: *Grab Sampling Protocol for Survey Sites; Sampling Equipment Cleaning Standard Operating Procedures; Surface Water Sample Collection Standard Operating Procedures; Analytical Chemistry Result Reporting; Field Numbering of Samples; and Field Quality Control Samples.* The department is currently developing operating procedures for site selection and grab and composite sample collection.

established protocols, "blank" samples are periodically collected for analysis, and all analyses are conducted in the department's laboratory according to its own set of operating guidelines.

To help ensure the quality and consistency of its groundwater samples, the department uses a system of groundwater wells designed and dedicated exclusively to monitoring water quality. In addition, the Environmental Protection Agency has approved the department's *Quality Assurance Project Plan* for the central sand plains area, which is necessary to receive federal funds.

Finally, we looked at the types of tests that the department conducts on water monitoring samples. For laboratory testing purposes, pesticides can generally be grouped into one of three categories, based on their chemical composition: base-neutrals, base-neutral degradates, and acid herbicides. Each category has its own method or test for detecting the presence of pesticides. The first is the base-neutral test, which can detect more than 30 different pesticides, including some of the most commonly used agricultural pesticides in the state, including acetochlor, atrazine, and metolachlor. However, while the test can detect atrazine breakdown products, commonly referred to as degradates, it cannot detect the breakdown products for other heavily used agricultural pesticides. A second test, one for base-neutral degradates, must be conducted to detect degradates such as acetochlor ESA and alachlor OXA. A third test, one for acid herbicides, can identify pesticides such as 2,4-D and dicamba, pesticides that are commonly used in both rural and urban areas.

We found that:

- **Because the Department of Agriculture collects few water samples from urban areas, it has conducted only limited analyses for nonagricultural pesticides.**

Due to limited financial resources, in 2003, the department stopped analyzing all water samples for pesticides commonly used for nonagricultural purposes, such as 2,4-D, dicamba, and MCPP, even though these substances had been frequently detected in surface water. In 2005, the department began analyzing urban groundwater samples collected by the Pollution Control Agency for the presence of nonagricultural pesticides, but the department did not do so for its surface water samples.

A department staff person collects a grab sample from a south central Minnesota river.

Several factors limit the Department of Agriculture's ability to test for pesticides in water samples. First, analysis of water samples is

expensive. Although the department's laboratory does not operate on a fee-for-service basis, analyzing each water sample costs between $200 and $325, depending on the type of test conducted. This makes tests that detect only one type of pesticide difficult to justify, especially if there is no evidence of a problem. For example, the department does not currently analyze water samples for glyphosate, one of the most heavily used agricultural pesticides in the state, in part because it requires a separate test.[36]

Analyzing water monitoring samples can be expensive and time consuming.

Second, analyzing samples is time consuming. According to the department, it requires twice as much analytical effort to conduct acid herbicide tests than it does to conduct base neutral tests. The Department of Agriculture laboratory can do only a limited number of pesticide-related analyses—averaging about 1,260 samples per year. In addition, because of the immediate risks involved, analyses of samples collected for investigations of pesticide misuse or spills often have higher priority than water monitoring samples. Nevertheless, the majority of samples that the laboratory analyzes are water monitoring samples—ranging from 62 percent in 2001 to 81 percent in 2004.[37]

Finally, the lack of available standards and testing methodologies approved by the U.S. Environmental Protection Agency limits the laboratory's ability to analyze samples for some pesticides. For example, the department's tests (and those of almost all laboratories nationwide) cannot detect the presence of cyanazine degradates in water. Consequently, the Department of Agriculture is obtaining groundwater sample analyses for cyanazine degradates from a research laboratory in Kansas, at a cost of $350 per sample.[38]

RECOMMENDATION

The Department of Agriculture should increase its water monitoring activities to include surface water sites in sensitive urban areas and, at a minimum, test the samples taken from these areas for nonagricultural pesticides.

The department was correct to initially focus its monitoring on highly sensitive agricultural areas.

According to the Department of Agriculture, its first priority is to monitor groundwater and surface water in agricultural areas of the state. Given the department's limited resources, we think that it was correct to initially focus its water monitoring efforts in the state's most sensitive agricultural areas. At the same time, the department's recent decision to analyze groundwater samples from urban areas will provide a more complete picture of the condition of groundwater relative to both agricultural and nonagricultural pesticides. Likewise, to provide a more complete picture of surface water, we think that the

[36] In addition, the laboratory is not satisfied with the precision of the test for glyphosate and is currently trying to develop a more precise test.

[37] Minnesota Department of Agriculture, *Total Samples Received for 2001 Through June 2005* (St. Paul, undated).

[38] The Minnesota Department of Agriculture tests for cyanazine, the parent compound. At one time, cyanazine was frequently used in Minnesota, but it has not been available for use for several years. The department has not detected cyanazine in groundwater samples, but it has detected it in a very small number of surface water samples in both 2003 (2 of 117 samples) and 2004 (3 of 155 samples).

department needs to expand its surface water monitoring into highly sensitive nonagricultural areas. Currently, the department does not have surface water sites in primarily urban areas, nor does it monitor any of Minnesota's lakes for pesticides. As we will see later in this chapter, earlier surface water monitoring efforts in largely agricultural areas detected pesticides used by both agricultural and urban users.

The department is exploring ways to enhance its surface water program by working more closely with other entities. For example, the department is talking with the Metropolitan Council, which has staff monitoring several rivers and streams for pollutants (excluding pesticides) in the seven-county Twin Cities metropolitan area. It is considering asking Metropolitan Council staff to collect water samples for the department to analyze from streams that the council already routinely monitors.

The 2005 Legislature gave the department additional money to increase its groundwater and surface water monitoring activities.

However, the department has indicated that it does not currently have the resources to analyze for nonagricultural pesticides in surface water samples collected from urban areas. The 2005 Legislature appropriated an additional $300,000 for the biennium to the department for increased monitoring of groundwater and surface water throughout the state, to be used primarily for sample collection and analysis.[39] According to the department, about 30 percent of the additional funds will pay for adding a hydrologist to the water monitoring staff, 20 percent will be spent to develop a method to detect cyanazine degradates in groundwater and analyze samples for them, and 18 percent will be spent to expand the department's groundwater monitoring system.[40] The department has not allocated any of the additional funds to expand its surface water program. The department indicated that it is unlikely to do so until it has finished expanding its groundwater network, which it hopes to complete by the end of fiscal year 2007.

We recognize that finding the resources to expand surface water activities into urban areas may involve difficult choices for the department. As one option, the department could ensure that water samples from the state's most vulnerable urban areas are appropriately analyzed before greatly expanding its groundwater activities. Alternatively, the department could shift resources from other areas of the department; allocate to surface water monitoring any cost savings from becoming more efficient; or request additional funds from the Legislature.

Water Monitoring Results

This section examines the results of the department's groundwater monitoring activities in the central sand plains and the results of its automated surface water stations.[41] We looked at both the frequency of pesticide detections and the

[39] *Laws of Minnesota* First Special Session 2005, chapter 1, art.1, sec. 2, subd. 2.

[40] About 29 percent of the additional funds will cover indirect costs and the division's operations and administration costs; the remaining 3 percent will fund a pilot program for screening drinking-water wells. According to the department, the additional funds appropriated by the 2005 Legislature will become part of the department's base funding in future years.

[41] Monitoring results from the natural springs and expanded networks are similar to results obtained from the department's central sand plains network.

maximum concentration of those detections relative to the various standards established for pesticides in groundwater and surface water.

Regarding groundwater, data show that:

- **While the Department of Agriculture has frequently detected pesticides in groundwater samples, concentrations have generally been low and have seldom exceeded health standards.**

As shown in Table 4.3, five pesticides or their breakdown products have been commonly found in groundwater samples from the central sand plains: acetochlor, alachlor, atrazine, metolachlor, and metribuzin. Atrazine and its breakdown products have been detected most frequently—in 86 percent of the samples taken in 2004.

From 2000 through mid-2004, pesticides exceeded health standards in only 2 out of nearly 760 samples of groundwater.

The maximum concentration of pesticides detected in groundwater samples collected from the central sand plains network has seldom approached Department of Health standards.[42] Of the nearly 760 groundwater samples analyzed from 2000 through summer 2004, the Department of Agriculture found only 2 samples that contained a pesticide or its breakdown products at a concentration exceeding a health standard.[43] Both samples were for acetochlor degradates. Table 4.4 shows the maximum concentration of pesticides frequently detected in groundwater since 2000 and the appropriate health standards.

Regarding surface water, monitoring results show that:

- **The Department of Agriculture has frequently detected pesticides in surface water samples, and maximum concentrations at several monitoring stations have exceeded water standards.**

Many of the same pesticides that are most frequently detected in groundwater are also frequently detected in surface water. As Table 4.5 shows, the proportion of samples containing pesticide detections has generally been increasing. For example, the percentage of surface water samples testing positive for atrazine increased from 65 percent in 2000 to 95 percent in 2004.

To save money, the Department of Agriculture eliminated some surface water monitoring sites and stopped analyzing surface water samples for urban-use pesticides after 2002. As Table 4.5 also shows though, the department frequently detected these pesticides in surface water. For example, from 2000 through 2002, the department detected 2,4-D in 28 to 58 percent of its samples.

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[42] As noted earlier, the Groundwater Protection Act authorizes the Minnesota Department of Health to develop health standards, which are known as health risk limits, for pesticides in groundwater. Statutes require the department to adopt health risk limits as rules under the Administrative Procedures Act. Because rules are infrequently revised, the department also adopts health-based values as interim guidelines. While they are largely the same as health risk limits, health-based values do not have legal standing because they have not been adopted as rules. The department is currently revising many of its health standards via rulemaking.

[43] Department of Agriculture, *Annual Data Report* (2005), 15.

Five pesticides or the products created as they decompose have frequently been found in groundwater.

Table 4.3: Frequency of Detections of Select Pesticides in Groundwater, 2000-2004

Pesticide and Degradates	Percentage of Samples With Pesticide Detections				
	2000	2001	2002	2003	2004[a]
Acetochlor	1%	0%	2%	3%	5%
Acetochlor ESA			30	34	24
Acetochlor OXA			8	4	3
Acetochlor and degradates			24	36	30
Alachlor	1	1	1	1	0
Alachlor ESA			48	47	49
Alachlor OXA			10	7	6
Alachlor and degradates			36	47	50
Atrazine	44	47	39	39	51
Deethylatrazine	65	68	64	78	85
Deisopropylatrazine	35	38	28	27	33
Atrazine and degradates	70	71	70	80	86
Dimethenamid	0	1	0	0	0
Dimethenamid ESA			4	5	8
Dimethenamid OXA			2	1	3
Dimethenamid and degradates			3	5	8
Metolachlor	28	16	34	15	10
Metolachlor ESA			53	50	60
Metolachlor OXA			35	30	33
Metolachlor and degradates			50	53	60
Metribuzin	14	6	9	9	14
Metribuzin DA	8	4	6	6	9
Metribuzin DADK	22	25	26	26	25
Metribuzin DK	8	6	4	8	13
Metribuzin and degradates	26	26	26	26	26

NOTE: Blank cells indicate that data were unavailable because the Department of Agriculture did not begin testing for degradates of acetochlor, alachlor, dimethenamid, and metolachlor until 2002.

[a] Data are for the first three quarters of 2004.

SOURCES: Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: 2003 Data Report* (St. Paul, March 25, 2003), 10; Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, May 13, 2004), 12; and Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, February 24, 2005), 14.

The concentration levels of frequently found pesticides have generally been low relative to their health standards.

Table 4.4: Maximum Concentration of Select Pesticides Frequently Detected in Groundwater, 2000-2004

Pesticide	Standard[a]	Maximum Concentration (in micrograms per liter) 2000	2001	2002	2003	2004[b]
Acetochlor	10	0.05	nd	0.03	0.03	0.03
Acetochlor ESA	10			8.97	12.10	4.14
Acetochlor OXA	10			2.08	13.50	0.14
Alachlor	4	0.72	0.21	0.54	0.10	nd
Alachlor ESA	100			20.10	10.90	8.93
Alachlor OXA	4			1.66	1.64	1.55
Atrazine	20	0.38	0.51	0.35	0.25	0.26
Deethylatrazine	20	1.11	1.28	0.72	0.65	0.63
Deisopropylatrazine	20	3.40	1.91	1.98	2.15	1.43
Dimethenamid	40	nd	0.18	nd	0	nd
Dimethenamid ESA	40			1.68	1.02	2.22
Dimethenamid OXA	40			0.57	0.11	1.09
Metolachlor	100	31.20	31.50	1.12	0.89	0.27
Metolachlor ESA	100			17.70	26.10	15.60
Metolachlor OXA	100			11.90	12.60	8.54
Metribuzin	200	2.34	0.62	1.63	1.17	0.43
Metribuzin DA	200	1.18	0.50	0.50	1.27	1.17
Metribuzin DADK	200	38.00	4.88	7.98	7.56	8.55
Metribuzin DK	200	1.56	1.63	1.80	3.68	1.06

NOTE: Instances where the maximum concentration of a pesticide exceeds the standard are shaded. Blank cells indicate that water samples were not analyzed for the particular pesticide or degradate. "nd" refers to no pesticide detection. Results are for the central sand plains network only.

[a] Groundwater standards refer to the lowest health risk limit or health-based value established by the Minnesota Department of Health. The department is currently revising many of the standards. In the absence of a health standard for a particular pesticide degradate, the Department of Agriculture uses the health standard developed for the parent compound.

[b] Data cover the first three quarters of 2004.

SOURCES: Minnesota Department of Agriculture, *Minnesota Department of Agriculture Pesticide Monitoring in Water Resources: 2003 Data Report* (St. Paul, March 25, 2003), 9; Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, May 13, 2004), 11; and Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, February 24, 2005), 12 and 15.

Some of the same pesticides have been detected in both surface water and groundwater.

Table 4.5: Frequency of Detections of Select Pesticides in Surface Water, 2000-2004

Pesticide and Degradates	Percentage of Samples With Pesticide Detections				
	2000	2001	2002	2003	2004[a]
Acetochlor	46%	46%	48%	53%	69%
Alachlor	11	5	6	6	16
Atrazine	65	66	77	77	95
Deethylatrazine	38	68	68	62	85
Deisopropylatrazine	16	19	18	9	18
Cyanazine	15	3	3	2	2
Dimethenamid	14	25	37	22	59
Metolachlor	47	57	58	68	91
Metribuzin		1	6	4	4
Pendimethalin	3		4	1	
Propazine				4	13
2,4-D	28	34	58		
Clopyralid		1	27		
Dicamba	19	23	50		
MCPA	2	3	7		
MCPP	15	17	12		

NOTE: Results are for the automated surface water network only and show the overall percentage of all samples collected during storm and nonstorm periods. In general, pesticides are more frequently detected in surface water samples collected during storm periods than during periods of nonstorms. The shaded area represents acid herbicide pesticides. Many acid herbicide pesticides are frequently used in urban areas; the Department of Agriculture discontinued testing for them in 2003. Empty cells indicate that the department did not specifically test for the pesticide that year.

[a] Data are for the first seven months of 2004.

SOURCES: Minnesota Department of Agriculture, *Minnesota Department of Agriculture Pesticide Monitoring in Water Resources: 2002 Data Report* (St. Paul, April 3, 2002), 25; Minnesota Department of Agriculture, *Minnesota Department of Agriculture Pesticide Monitoring in Water Resources: 2003 Data Report* (St. Paul, March 25, 2003), 22; Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, May 13, 2004), 22; and Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, February 24, 2005), 26-27.

We also looked at the concentrations of select pesticides detected in surface water in relation to each pesticide's water quality standard.[44] Since 2000, two pesticides (acetochlor and atrazine) have exceeded appropriate surface water standards at several of the department's monitoring stations.[45] As shown in

[44] As noted previously, the Pollution Control Agency develops and adopts standards for surface water through the rulemaking process. Because rules are infrequently revised, the department also adopts various advisory standards that do not have the force of law.

[45] Minnesota Department of Agriculture, *Minnesota Department of Agriculture Pesticide Monitoring in Water Resources: 2002 Data Report* (St. Paul, March 22, 2002), 26-28; Minnesota Department of Agriculture, *Minnesota Department of Agriculture Pesticide Monitoring in Water Resources: 2003 Data Report* (St. Paul, March 24, 2003), 76-77; Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, May 13, 2004), 24-28; and Department of Agriculture, *Annual Data Report 2005*, 28-34.

Table 4.6, in 2004, the maximum concentration of acetochlor at four of the department's six monitoring sites exceeded standards, while the maximum concentration of atrazine exceeded the standard at one site.[46] Although maximum concentration levels of metolachor have not exceeded water standards, they exceeded 10 percent of the standard at five of the department's six monitoring sites in 2004. This is meaningful because, as we discuss later, under the department's *Minnesota Pesticide Management Plan,* the department considers developing best management practices whenever pesticide concentrations in surface water exceed 10 to 50 percent of the appropriate standard.

Compared with groundwater, more surface water samples have contained pesticides exceeding the appropriate standard.

Although not shown in Table 4.6, the maximum concentrations of nonagricultural pesticides frequently detected in surface water, such as dicamba and 2,4-D, were low relative to their standards of 85 and 97 micrograms per liter, respectively. For example, in 2002, the maximum concentration of dicamba detected at the sites shown in Table 4.6 ranged from 0.26 to 1.35 micrograms per liter, and the maximum concentration of 2,4-D ranged from 0.49 to 3.0 micrograms per liter.[47]

Other States' Monitoring Efforts

We asked agriculture officials in ten states similar to Minnesota about their water monitoring programs for pesticides and found that:

- **The Minnesota Department of Agriculture has a better developed and more extensive water monitoring program for pesticides than do other similar states.**

Only four of the ten agriculture officials with whom we talked said that their departments have a routine water monitoring program for either groundwater or surface water. Two of those states—Illinois and Wisconsin—have a groundwater monitoring program as rigorous as Minnesota; that is, they use monitoring wells specifically dedicated to that purpose and use trained staff to draw the samples according to a sampling plan. Like Minnesota, monitoring wells in Wisconsin are located in areas most sensitive to pesticide use, while wells in Illinois are placed in shallow aquifers statewide. Only Wisconsin's agriculture department routinely monitors both groundwater and surface water specifically for pesticides.

Best management practices are voluntary actions to help reduce the need for pesticides or minimize their negative effects.

BEST MANANAGEMENT PRACTICES

Best management practices are practical, voluntary actions that can be taken to help reduce the need for pesticides or prevent or minimize their negative impact on the environment. The practices may be for generic use of pesticides or directed at using specific pesticides.

[46] In general, pesticides are detected more frequently and at higher concentration levels in surface water samples collected during rainstorms than during nonstorm periods.

[47] Department of Agriculture, *Annual Data Report* (2004), 26-27.

Table 4.6: Maximum Concentration of Select Pesticides in Surface Water, 2000-2004

Monitoring Site and Pesticide	Standard[a]	Maximum Concentration (in micrograms per liter) 2000	2001	2002	2003	2004[b]
Bevens Creek						
Acetochlor	1.4	0.95	3.10	1.69		
Atrazine	10.0	3.05	1.33	9.10		
Metolachlor	10.0	0.18	0.27	0.47		
Blue Earth River						
Acetochlor	1.4	3.80	6.50	1.50	0.86	1.76
Atrazine	10.0	1.38	2.20	2.87	0.98	1.88
Metolachlor	10.0	2.52	2.52	0.52	0.46	0.71
Le Sueur River						
Acetochlor	1.4	3.55	9.00	7.10	2.38	1.52
Atrazine	10.0	2.80	3.80	2.97	0.43	1.95
Metolachlor	10.0	0.85	1.44	0.65	0.68	1.30
Whitewater River						
Acetochlor	1.4	5.00	7.80	9.60	1.19	2.17
Atrazine	3.4	18.00	17.40	29.40	7.15	32.00
Metolachlor	10.0	7.90	0.69	4.30	3.90	1.25
Minnesota River						
Acetochlor	1.4	0.62	0.42	1.09	0.43	0.85
Atrazine	10.0	0.77	.98	2.24	0.55	1.40
Metolachlor	10.0	3.12	3.36	0.65	0.37	2.46
Root River						
Acetochlor	1.4					1.37
Atrazine	10.0					7.40
Metolachlor	10.0					1.82
Seven Mile Creek						
Acetochlor	1.4				1.04	1.80
Atrazine	3.4				2.59	1.35
Metolachlor	10.0				1.65	3.20

NOTE: Results are for certain sites in the automated surface water network; pesticides shown are those exceeding 10 percent of the standard in one or more samples at one or more sites. Cells are shaded when the maximum concentration of a particular pesticide exceeds the standard. Exceedances must be compared against exposure durations (4 days for aquatic toxicity or 30 days for human health toxicity) before violations or impairments can be determined. Empty cells indicate that the monitoring site was not in use those years or that data were not collected for the year.

[a] Surface water standards refer to the lowest chronic or toxic standard, criteria, or advisory value developed by the Pollution Control Agency.

[b] Data are for the first seven months of 2004.

SOURCES: Minnesota Department of Agriculture, *Minnesota Department of Agriculture Pesticide Monitoring in Water Resources: 2002 Data Report* (St. Paul, March 22, 2002), 26-28; Minnesota Department of Agriculture, *Minnesota Department of Agriculture Pesticide Monitoring in Water Resources: 2003 Data Report* (St. Paul, March 24, 2003), 76-77; Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, May 13, 2004),24-28; and Minnesota Department of Agriculture, *Pesticide Monitoring in Water Resources: Annual Data Report* (St. Paul, February 24, 2005), 28-34.

Legislation adopted in 1987 and 1989 allows the Department of Agriculture to develop such practices to guide people's use of pesticides.[48] The department develops best management practices for groundwater protection pursuant to the Groundwater Protection Act. Under the act, the department must develop the practices whenever there is a likelihood of groundwater pollution due to the normal, legal use of a pesticide, referred to as a common detection.[49] If the practices are shown to be ineffective in preventing or minimizing groundwater pollution, the Department of Agriculture may then adopt mandatory requirements, referred to as water resource protection requirements.[50]

Statutes require the department to develop best management practices when normal use of pesticides is likely to place groundwater at risk.

Although statutes allow the department to develop best management practices for protecting surface water, they do not require this; nor do they set forth a process for doing so. To help guide its process for surface water, the Department of Agriculture relies on standards developed by the Minnesota Pollution Control Agency.[51]

Overall, we found that:

- **In the last several years, the Minnesota Department of Agriculture has been aggressive in developing best management practices for certain pesticides.**

We characterize the department's efforts as "aggressive" for three reasons. First, in deciding which pesticides warranted best management practices, the department went beyond the recommendations of an advisory group established pursuant to the *Minnesota Pesticide Management Plan* in effect at the time. Based on water monitoring results, the advisory group recommended in December 2001 that the department develop groundwater best management practices only for atrazine.[52] In February 2002, however, the department determined that atrazine, metolachlor, and metribuzin and their breakdown products were being detected often enough in groundwater to warrant best management practices.[53] A year later, the department declared that acetochlor and alachlor and their degradates were appearing often enough in groundwater,

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[48] *Laws of Minnesota* 1987, chapter 358, sec. 46; and *Laws of Minnesota* 1989, chapter 326, art. 1, sec. 6, subd. 2-3.

[49] *Minnesota Statutes* 2004, 103H.251, subd. 1(b); and 103H.005, subd. 5.

[50] *Minnesota Statutes* 2004, 103H.275, subd. 1(b); and 103H.005, subd. 15. Partly because the department has yet to evaluate its best management practices, the department has not adopted any water resource protection requirements.

[51] The federal Clean Water Act requires that the Pollution Control Agency adopt water quality standards based upon how a specific body of water is used and the type of life protected by the standard (aquatic or human). The agency has established both aquatic and human health standards for some pesticides, while others just have an aquatic standard. Aquatic standards allow for greater amounts of pesticides in surface water than do human standards. The agency uses these standards to declare surface water "impaired" due to pesticide pollution.

[52] The department originally adopted best management practices for atrazine in 1998. According to the department, changes in federal labeling made the practices obsolete, and the department allowed the management practices to expire in January 2001.

[53] Minnesota Department of Agriculture, *Notice of Determination of Common Detection for Atrazine, Metolachlor, and Metribuzin in Groundwater of Minnesota* (St. Paul, February 12, 2002); http://www.mda.state.mn.us/appd/ace/commdetermine.pdf; accessed November 25, 2005.

and acetochlor and atrazine were being detected in high enough concentrations in surface water, to merit best management practices.[54]

Second, the department determined that most best management practices were needed based primarily on the frequency of pesticide detections rather than the concentration levels of the pesticides detected. As discussed earlier, the concentration levels of pesticides in groundwater rarely approached health standards.

Third, the department based its determinations on water samples collected primarily from the most vulnerable areas of the state. Yet, the department determined that best management practices were needed statewide.

In early 2004, the department adopted best management practices for five agricultural pesticides.

Working with the University of Minnesota Extension Service and the U.S. Department of Agriculture's Natural Resources Conservation Service, the department developed groundwater best management practices for five pesticides, surface water best management practices for two pesticides, and one set of general herbicide best management practices.[55] After a series of public hearings, the department issued the voluntary practices in February 2004.[56] Specific activities include: preventing surface water run off, rotating use of certain pesticides, adopting tillage practices that control soil erosion, and reducing pesticide application rates.

In deciding when best management practices are warranted, the department follows different processes for surface water and groundwater. We noted that:

- **The Department of Agriculture's major criterion for determining the need for surface water best management practices is more difficult to meet than its major criterion for groundwater.**

According to the *Minnesota Pesticide Management Plan* and staff, the department considers best management practices for surface water primarily when the concentrations of specific pesticides reach at least 10 to 50 percent of the appropriate water standard set by the Pollution Control Agency.[57] In contrast, the department considers best management practices for groundwater based primarily on monitoring results that show a high frequency of pesticide detections, as required by statute.[58]

There are at least two reasons for having different criteria for groundwater and surface water when developing best management practices. First, groundwater

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[54] Minnesota Department of Agriculture, *Pesticide Management Plan Status Report* (St. Paul, 2004), 5.

[55] The groundwater best management practices cover the use of acetochlor, alachlor, atrazine, metolachlor, and metribuzin. The surface water best management practices cover the use of acetochlor and atrazine.

[56] In 1998, the Department of Agriculture released a series of eight generic best management practices related to pesticide distribution, storage, handling, use, and disposal.

[57] Department of Agriculture, *Pesticide Management Plan,* 62. Note that the department may take a variety of other factors into consideration.

[58] *Minnesota Statutes* 2004, 103H.251, subd. 1(b).

criteria are dictated by statute, while surface water criteria are not. Second, the mechanisms by which pesticides move into groundwater and surface water differ. Pesticides generally become more diffuse (or less concentrated) as they slowly pass through various layers of earth and rock before entering groundwater. In contrast, depending on a number of factors such as the chemistry of a pesticide and the intensity of a rainfall, pesticides can quickly enter surface water in a concentrated form. The concentration of pesticides in surface water is then mitigated by a variety of environmental factors, such as surface water volume.

The department is establishing a new process to help recommend when to develop additional best management practices.

Although the department reviews the results of its water monitoring activities annually, it has not proposed any additional best management practices since 2003, despite increased pesticide detections in surface water. For example, as shown earlier in Tables 4.5 and 4.6, the percentage of surface water samples testing positive for metolachlor has increased considerably since 2000, and the maximum concentration levels of metolachlor at several of its automated monitoring stations has exceeded 10 percent of Pollution Control Agency standards. In July 2005, the department determined that developing surface water best management practices for metolachlor was not necessary immediately for two reasons. The department was concerned that the water standard for metolachlor was an advisory one, which is less rigorous than a standard adopted by rule, and the Pollution Control Agency is working on developing such a rule. Also, according to the *Minnesota Pesticide Management Plan,* the department is establishing a process whereby a Pesticide Management Plan Committee and members of the public are invited to provide individual comments and concerns to the commissioner regarding the development of best management practices. As of January 2006, however, the committee had not been appointed.[59]

Promotion and Evaluation

Minnesota statutes require that the Department of Agriculture promote its best management practices and provide education on how their use will protect groundwater from pesticide degradation. We found that:

Various techniques are used to encourage farmers to adopt the department's best management practices.

- **The Minnesota Department of Agriculture has widely promoted its best management practices for groundwater and surface water since their adoption in 2004.**

In addition to various e-mail announcements and mass mailings, department staff have attended 22 meetings, training sessions, and conferences to promote its best management practices since February 2004.[60] Audiences have included government agencies, crop consultants, wildlife reserve managers, applicators, dealers, farmers, and pesticide sales representatives. In May and June 2005, staff visited with 42 pesticide dealers in 10 counties in southeastern Minnesota.[61] In

[59] According to the Department of Agriculture, the first meeting of the Pesticide Management Plan Committee will not take place until the department releases its 2006 water monitoring report sometime in March 2006.

[60] Minnesota Department of Agriculture, *Pesticide BMP Promotion and Education* (St. Paul, undated).

[61] Minnesota Department of Agriculture, *Pesticide Dealers Visited in 10 Southeast Counties* (St. Paul, undated).

addition, the department has taken part in demonstration projects as required by statute, most notably Red Top Farms in south central Minnesota, to demonstrate its best management practices.[62] The department is exploring the establishment of another demonstration project in cooperation with the University of Minnesota.

At the same time, we found that:

- **The Department of Agriculture has been slow to plan for and evaluate the implementation and effectiveness of its best management practices for groundwater and surface water.**

Minnesota statutes require that the department evaluate the implementation and effectiveness of its best management practices for groundwater, but they do not require it for surface water.[63] According to its pesticide management plan, the department will begin evaluating its best management practices for surface water practices starting in late 2006 and those for groundwater starting in late 2007.[64] According to the department, this delay is to ensure that an adequate amount of time has passed between adopting the practices and allowing them to make an impact.

RECOMMENDATION

The Department of Agriculture should immediately develop and carry out a plan for evaluating the implementation and effectiveness of its best management practices.

The department has been trying to hire additional staff to evaluate its best management practices.

Although the *Minnesota Pesticide Management Plan* discusses various alternatives for how the department could proceed to evaluate its best management practices, the department has not adopted a specific evaluation strategy. Part of the reason why the department has not done so is because it wants to use two groups created under the plan to help evaluate its best management practices: the Education and Promotion Team and the Pesticide Management Plan Committee. However, as of January 2006, members had not been appointed to either group. In addition, the department has had problems hiring staff to help direct the evaluation effort.

Furthermore, the plan suggests that the department should first evaluate the extent to which various groups are aware of the department's practices before evaluating the extent to which they have been adopted. Given the department's limited resources for evaluation as noted in the management plan, it would be better to focus on the practices' implementation and effectiveness. As it is, the department has only limited baseline data against which to compare any changes resulting from the use of its best management practices.

[62] *Minnesota Statutes* 2004, 103H.151, subd. 3.

[63] *Minnesota Statutes* 2004, 103H.151, subd. 4.

[64] Department of Agriculture, *Pesticide Management Plan*, 73.

List of Recommendations

- The Department of Agriculture should develop criteria for when it will review pesticide product information in more detail before registering products (p. 28).

- The Department of Agriculture should ensure that state supplemental labels for pesticide products are complete and contain language that complies with state and federal requirements (p. 30).

- The Department of Agriculture should evaluate the consistency and effectiveness of all of its enforcement actions (p. 54).

- The Legislature should require land managers to provide advance notice about pesticide applications toxic to bees when nearby beekeepers request notification, and it should require the Department of Agriculture to evaluate whether similar requirements should extend to comparably risky applications (p. 59).

- When investigating allegations of pesticide misuse, the Department of Agriculture should change its procedures for collecting application records by specifying when to require inspectors to examine records in person (p. 65).

- The Department of Agriculture should improve its written communications with complainants (p. 66).

- The Department of Agriculture should ensure that waste-pesticide disposal options exist in areas of the state now lacking them (p. 71).

- The Department of Agriculture should develop and implement a consistent approach to monitor urban pesticide use biennially, as required by state statute (p. 77).

- The Department of Agriculture should revise the *Minnesota Pesticide Management Plan* to better address issues of urban pesticide use, aquatic pesticides, and product registration (p. 79).

- The Department of Agriculture should increase its water monitoring activities to include surface water sites in sensitive urban areas and, at a minimum, test the samples taken from these areas for nonagricultural pesticides (p. 88).

- The Department of Agriculture should immediately develop and carry out a plan for evaluating the implementation and effectiveness of its best management practices (p. 99).

February 15, 2006

James Nobles, Legislative Auditor
Office of the Legislative Auditor
658 Cedar Street
Centennial Building, Room 140
St. Paul, Minnesota 55155

Dear Mr. Nobles:

The Minnesota Department of Agriculture (MDA) has reviewed the Office of the Legislative Auditor's report on pesticide regulation. Pesticide regulation is a complex and highly technical field, and we want to acknowledge the effort and diligence of your staff in conducting this evaluation.

Pesticides are used in all parts of the state as tools for controlling pests and protecting crops, landscape plants and public health. However, pesticide use, monitoring, management, regulation and enforcement can be controversial. The MDA takes its responsibilities in these areas very seriously, and while the report determined that several changes were needed to further strengthen pesticide management in Minnesota, we are gratified that the audit found "[o]verall, the MDA does a good job regulating and monitoring pesticides." We agree that there are opportunities for improvement as noted in the report. We are also pleased to see an acknowledgement that in most program areas the MDA does well when compared to 10 similar states.

The audit report makes 11 recommendations, of which 10 are directed to the MDA. We accept these recommendations to the MDA and already have taken steps to implement several of them. Some of the other recommendations will take more time to implement.

One recommendation - addressing advance notice about pesticide application - is directed to the state legislature. This issue is likely to be controversial, as some stakeholders will question the need for and value of such a requirement. However, the MDA will work with the legislature to provide information and resources to support informed debate.

Thank you for the opportunity to comment on the report.

Sincerely,

Gene Hugoson
Commissioner

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