Background

CHAPTER 1

Since the 1960s, Minnesota has made concerted efforts to reduce environmental pollution from a variety of "point sources" including municipal and industrial waste, solid waste from landfills and dumps, air pollution from automobiles and factories, and hazardous wastes from a variety of sources. As wastewater treatment plants and other pollution controls have reduced the environmental hazards from point sources, concern has shifted to "nonpoint source" pollution from agricultural runoff, such as pesticides, commercial fertilizers, and animal feedlots.

Livestock farms may raise thousands of animals and generate enormous quantities of waste. Animal waste from feedlots, if not managed properly, has the potential of polluting Minnesota's lakes, streams, and ground water. In addition, high concentrations of animal wastes may emit unpleasant odors and gases such as hydrogen sulfide. The Minnesota Pollution Control Agency (MPCA) administers and enforces state environmental laws and rules to protect the environment from pollution, including the threat of water and air pollution from animal feedlots.[1] Under Minnesota law, MPCA may delegate some of its feedlot regulation responsibilities to counties.[2]

In this chapter, we review trends in livestock production in Minnesota, examine the potential impact of animal feedlots on the environment, and present an overview of MPCA and county regulation of animal feedlots. We ask:

- **How many and what types of animals are raised in Minnesota? Where are they located? What is their role in Minnesota's economy?**
- **Why is it important from an environmental perspective to regulate feedlots?**
- **How does MPCA regulate feedlots? How many staff does MPCA assign to feedlot regulation and what are their responsibilities? Which feedlots must obtain permits and what are the requirements of these permits?**

1 *Minn. Stat.* §§115.03 and 116.07.

2 *Minn. Stat.* §116.07, subd. 7.

- **Which counties have authority to run feedlot programs? What are the responsibilities of these counties?**

- **What government financial assistance is available to livestock producers wishing to correct pollution problems?**

To answer these questions, we reviewed Minnesota statutes and rules, interviewed MPCA staff, examined data from the Census of Agriculture and the Minnesota and National Agricultural Statistics Services, surveyed county feedlot officers from the 47 counties with feedlot delegation agreements, and reviewed research studies and reports on the environmental impacts of animal feedlots.

MINNESOTA FEEDLOTS

Animal feedlots emerged as an important environmental issue in the 1990s. As recently as 1990, MPCA had only 2 full-time staff working on feedlot issues, but by 1998, the agency had 24 full-time positions in feedlot regulation. To help us understand the growing environmental concerns with feedlots, we examined the role of livestock production in Minnesota's economy, reviewed trends in the livestock industry, and examined the potential impact of animal feedlots on the state's water and air quality.

Minnesota's Livestock Industry

Overall, agricultural production and services account for about 3 percent of Minnesota's gross state product. Agriculture's impact on the state's economy is greater if one considers the effect of agricultural activity on other economic sectors such as retail businesses.

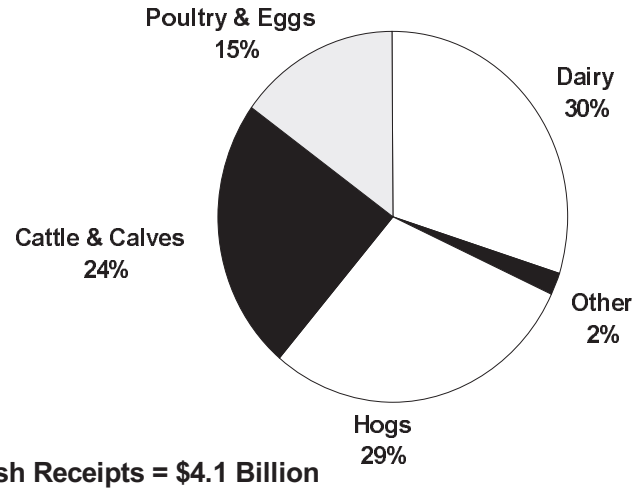
In 1997, cash receipts from livestock production exceeded $4 billion in Minnesota.

The livestock industry is a significant component of the state's agricultural economy. Livestock and related products bring in almost as much cash revenue as crop production in Minnesota. In 1997, cash receipts from farm marketings totaled $8.155 billion. Crop production accounted for $4.101 billion in receipts, while livestock and related products accounted for $4.054 billion, or 49.7 percent of the total.[3] One key difference between livestock and crop production is that livestock production tends to be much less dependent on exports. The estimated value of crop exports are five to six times the value of livestock exports.

The largest revenue producer within Minnesota's livestock industry is the dairy sector. As Figure 1.1 shows, dairy products accounted for 30 percent of cash revenue generated in the livestock industry in 1997. Other large components of the industry include hogs (29 percent), cattle and calves (24 percent), and poultry

3 Minnesota Agricultural Statistics Service, "Agri-View: Minnesota Farm Income," September 29, 1998, WWW document, URL http://www.nass.usda.gov/mn/agvw1898.htm (October 16, 1998). The $8.155 billion total does not include $417 million in government payments or $495 million in other farm income such as income from custom work, machine hire, and recreation.

Figure 1.1: Source of Cash Receipts in Minnesota's Livestock Industry, 1997



Total Cash Receipts = $4.1 Billion

SOURCE: Minnesota Agricultural Statistics Service.

and eggs (15 percent). Turkeys dominate the poultry and egg sector, accounting for more than 60 percent of poultry and egg cash receipts.

Minnesota ranks high nationally in turkey, hog, dairy, and egg production.

Minnesota ranks high nationally in a number of livestock categories. Minnesota is the second highest among the 50 states in turkey production after North Carolina. Minnesota trails only Iowa and North Carolina in the number of hogs and pigs. In terms of the number of milk cows and milk production, Minnesota ranks fifth among the 50 states. Minnesota is also third in cheese production, fifth in butter production, fifth in ice cream production, and ninth in egg production. Table 1.1 shows how Minnesota ranks in these and other categories.

Minnesota's share of national livestock inventories and production has not changed much over the last ten years except in the dairy sector. The number of hogs and pigs grew 17 percent in Minnesota from 1988 to 1997 compared with 10 percent nationally. Turkey production in pounds grew 46 percent in Minnesota and 43 percent across the nation. Egg production grew 31 percent compared with 11 percent nationally, and broiler production rose 55 percent in Minnesota and 67 percent nationwide. The number of cattle in Minnesota did not change between January 1989 and January 1998 but grew 3 percent nationally.

In the dairy sector, milk production fell 12 percent in Minnesota between 1988 and 1997, while national milk production increased 8 percent. The difference in trends is due to a greater reduction in the number of milk cows in Minnesota. Productivity, measured as the amount of milk produced per milk cow, grew 19 percent both in Minnesota and across the nation. However, the number of milk cows decreased 26 percent in Minnesota compared with a 9 percent decline nationwide.

Table 1.1: Top Ranking States in the Livestock Industry

MEAT ANIMALS

Number of Hogs and Pigs, December 1, 1997 (in Millions)		Number of Cattle and Calves, January 1, 1998 (in Millions)		Number of Beef Cows, January 1, 1998 (in Millions)		Number of Sheep and Lambs, January 1, 1998 (in Millions)	
1. Iowa	14.50	1. Texas	14.3	1. Texas	5.52	1. Texas	1.50
2. North Carolina	9.80	2. Nebraska	6.6	2. Missouri	1.99	2. California	0.87
3. **Minnesota**	**5.50**	3. Kansas	6.6	3. Oklahoma	1.96	3. Wyoming	0.68
4. Illinois	4.80	4. Oklahoma	5.4	4. Nebraska	1.93	4. Colorado	0.58
5. Indiana	3.90	5. California	4.6	5. South Dakota	1.56	5. Montana	0.41
		11. (Tie) **Minnesota**	**2.6**	27. **Minnesota**	**0.40**	12. **Minnesota**	**0.17**
US Total	60.91	US Total	99.5	US Total	33.7	US Total	7.62

DAIRY ANIMALS AND PRODUCTS

Number of Milk Cows January 1, 1998 (in Millions)		Production of Milk, 1997 (in Millions of Pounds)		Factory Production of Cheese, 1996 (in Millions of Pounds)		Factory Production of Butter, 1996 (in Millions of Pounds)		Factory Production of Ice Cream, 1996 (in Millions of Gallons)	
1. Wisconsin	1.38	1. California	27,628	1. Wisconsin	2,096	1. California	306	1. California	109
2. California	1.35	2. Wisconsin	22,368	2. California	1,054	2. Wisconsin	295	2. Texas	48
3. New York	0.70	3. New York	11,547	3. **Minnesota**	**682**	3. Washington	95	3. Indiana	45
4. Pennsylvania	0.64	4. Pennsylvania	10,742	4. New York	584	4. Pennsylvania	79	4. Ohio	41
5. **Minnesota**	**0.57**	5. **Minnesota**	**9,210**	5. Idaho	433	5. **Minnesota**	**59**	5. **Minnesota**	**41**
US Total	9.19	US Total	156,602	US Total	7,218	US Total	1,174	US Total	879

POULTRY, EGGS, AND OTHER

Turkeys Produced, 1997 (in Millions of Pounds)		Production of Eggs, 1997 (in Millions)		Production of Broilers, 1997 (in Millions of Pounds)		Chickens Sold, 1997 (in Millions of Pounds)		Production of Mink Pelts, 1997 (in Millions)	
1. North Carolina	1,354	1. Ohio	6,976	1. Georgia	5,914	1. Georgia	107	1. Wisconsin	0.70
2. **Minnesota**	1,026	2. California	6,663	2. Arkansas	5,590	2. Arkansas	79	2. Utah	0.67
3. Missouri	590	3. Pennsylvania	5,788	3. Alabama	4,350	3. North Carolina	69	3. **Minnesota**	**0.31**
4. Arkansas	525	4. Indiana	5,652	4. North Carolina	3,658	4. Alabama	66	4. Oregon	0.24
5. Virginia	485	5. Iowa	5,528	5. Mississippi	3,313	5. Pennsylvania	58	5. Idaho	0.19
		9. **Minnesota**	**2,957**	19. **Minnesota**	**241**	13. **Minnesota**	**19**		
US Total	7,216	US Total	77,401	US Total	37,523	US Total	935	US Total	2.84

SOURCE: National Agricultural Statistics Service.

Hog prices declined dramatically at the end of 1998.

Recent price trends in the livestock industry have been favorable for dairies but very unfavorable for hog producers. October 1998 milk prices were up more than 20 percent from their 1997 levels both in Minnesota and nationally. However, hog prices have declined significantly. Nationally, hog producers received $28.50 per hundred pounds in October 1998, compared to $47.30 in October 1997, a 40 percent decline.[4] In December 1998, hog prices dropped to below $10 per hundred pounds, a level not seen for 25 to 30 years and well below the average

4 Minnesota Agricultural Statistics Service, "Minnesota Ag News: Price Report," October 30, 1998, WWW document, URL http://www.nass.usda.gov/mn/pric1098.htm (November 25, 1998).

cost of raising hogs.[5] Prices recovered in mid-January 1999 to about $30. The decline has come despite increasing exports and domestic consumption. Rather, it has been attributed to increasing supplies resulting from the expansion of U.S. and Canadian hog production and a decrease in processing capacity resulting from the closure of several packing plants.

Beef prices have declined less dramatically, with the nationwide average price for cattle declining 9 percent from $63.30 per hundred pounds in October 1997 to $57.90 in October 1998. Minnesota beef cattle prices were $54.80 in October 1998. Turkey prices have remained fairly constant during the 1990s.

Characteristics of Feedlots

A "feedlot" is a confined area where animals are housed.

In its rules, MPCA defines an animal feedlot as "a lot or building...intended for the confined feeding, breeding, raising, or holding of animals and specifically designed as a confinement area in which manure may accumulate, or where the concentration of animals is such that a vegetative cover cannot be maintained within the enclosure."[6] There are three basic types of feedlots: total confinement feedlots, partial confinement facilities, and open lots.

Most newer feedlots are total confinement facilities, in which the livestock are completely confined within a building. Waste from such a facility may fall through a slatted floor and be stored in a concrete pit beneath the structure, or pumped to an earthen basin outside the structure before being applied to farm land. For some types of animals, the waste may be scraped from the floor of the facility and transported for land application or temporary storage outdoors.

Many older feedlots are open lots, in which livestock are generally outdoors. The area in which a vegetative cover cannot be maintained, but not pasture land on which some types of animals may occasionally graze, is considered a feedlot for regulatory purposes. To avoid manure runoff into lakes and streams, the manure on an open lot may be scraped and transported elsewhere for either storage or land application. Alternatively, a collection system may be used to collect the runoff, or vegetative strips may serve to filter out nutrients and contamination. A partial confinement feedlot combines some features of both an open lot and a total confinement facility. Animals are kept in buildings at certain times but allowed outside in an enclosed area or on pasture land at other times.

State officials do not know exactly how many feedlots there are in Minnesota, but MPCA has estimated that Minnesota has about 45,000 farms with animal feedlots.[7] According to the Census of Agriculture, there were 75,079 farms in

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5 Lien, Dennis, "Legislator Panels Hear Hog Farmers' Woes," *St. Paul Pioneer Press*, January 8, 1999, Sec. B, p. 1 and Burgdorfer, Bob, "Hog Prices Decline to 30-Year Low," *Minneapolis Star Tribune*, December 14, 1998, sec. D, p.1. These market prices do not apply to all hog sales. Some livestock producers have contracts with packing plants that insulate them from market price swings to some extent.

6 *Minn. Rules*, 7020.0300, subp. 3. Pastures are not feedlots.

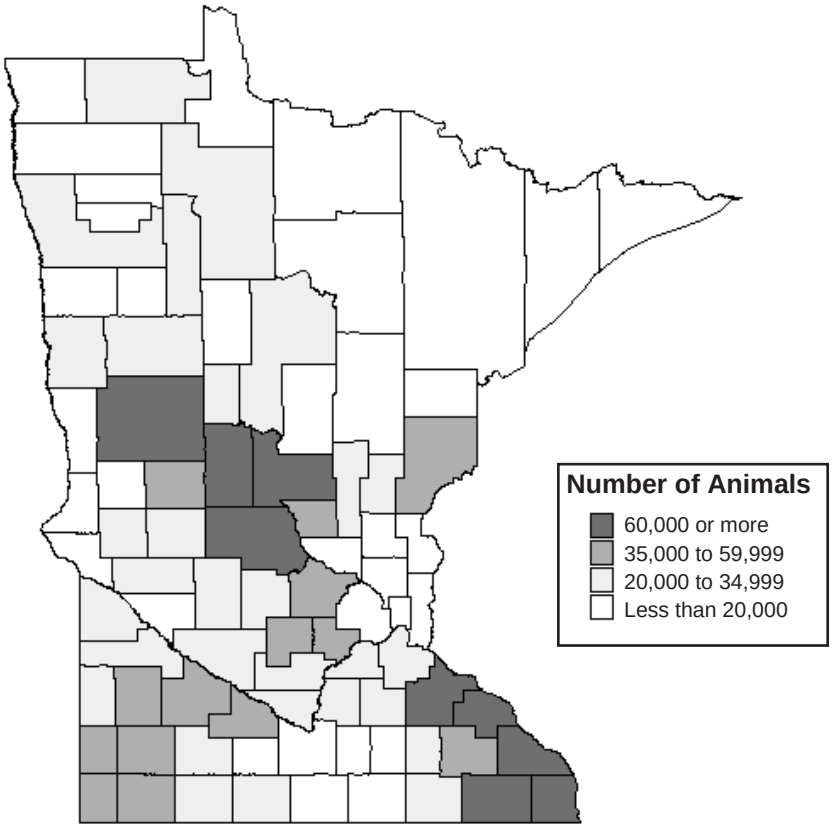
7 Minnesota Pollution Control Agency, *General Feedlot Program Information* (St. Paul, July 1997), 1.

Minnesota in 1992. About half of them were primarily crop farms, and about half were primarily livestock farms.[8] However, the census does not indicate how many of the crop farms also had livestock. In addition, the 1997 Census of Agriculture (due to be released in 1999) will probably indicate a reduction in the number of farms.

According to the Minnesota Agricultural Statistics Service, the majority of livestock in Minnesota is raised in the southern half of the state, as shown in Figures 1.2 and 1.3. Figure 1.2 shows the distribution of cattle by county.[9] Cattle populations are highest in the counties northwest and southeast of the Twin Cities. Figure 1.3 shows that swine populations are highest in south central and

Cattle and calf populations are highest in central and southeast Minnesota.

Figure 1.2: Cattle and Calf Population by County, January 1998



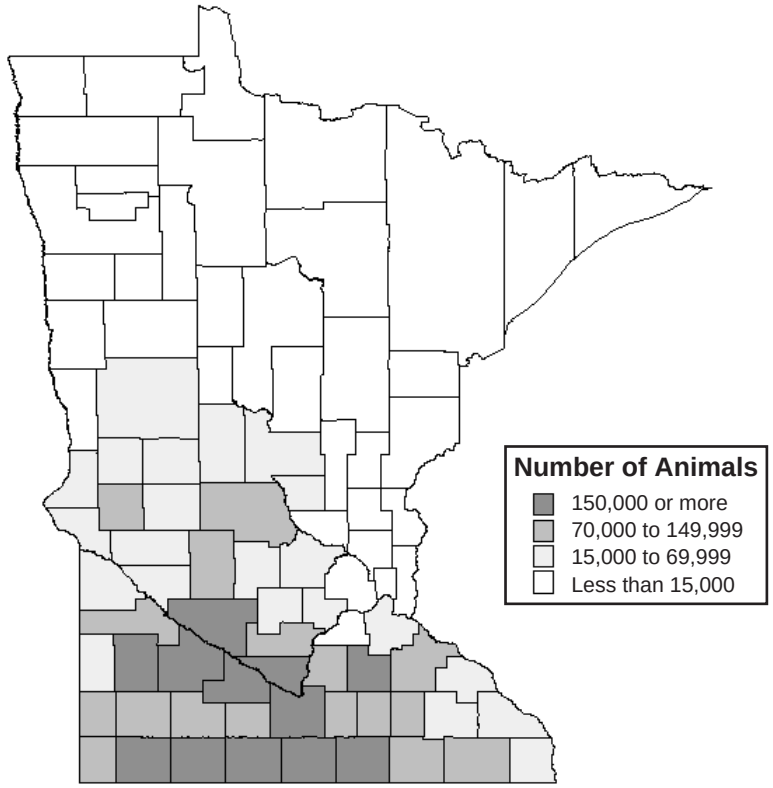
SOURCE: Minnesota Agricultural Statistics Service.

8 U.S. Department of Commerce, Bureau of the Census, *1992 Census of Agriculture*, July 15, 1994, WWW document, URL http://www.nass.usda.gov/census/census92/volume1/mn-23/92_mn.htm (June 30, 1998).

9 The term "cattle" includes beef cows, milk cows, heifers, steers, bulls, and calves.

Most hog production occurs in southern Minnesota.

Figure 1.3: Swine Population by County, December 1997



SOURCE: Minnesota Agricultural Statistics Service.

southwest Minnesota. Table 1.2 lists the counties with the highest numbers of beef cows, dairy cows, and hogs. Fillmore County in southeastern Minnesota has the most beef cows. Stearns County in the central part of the state has the most dairy cows, and Martin County in south central Minnesota has the most hogs. The Minnesota Agricultural Statistics Service does not provide county populations of poultry, but it does show that 52 percent of Minnesota's layer chickens in 1996 were in the central region, and 23 percent were in the south central region.[10]

Agricultural census data reveal how livestock production has changed over the last few decades. For example:

10 Minnesota Agricultural Statistics Service, "Poultry: Chicken Inventory, Egg Production and Value, Minnesota, 1992-96," June 29, 1998, WWW document, URL http://www.nass.usda.gov/mn (July 13, 1998).

Table 1.2: Top Minnesota Livestock Counties

	County	Number of Animals
Beef Cows	Fillmore	20,200
	Otter Tail	14,500
	Houston	12,300
	Cass	12,200
	Olmsted	11,000
Dairy Cows	Stearns	64,000
	Otter Tail	31,300
	Morrison	27,000
	Winona	26,700
	Goodhue	25,400
Hogs	Martin	524,000
	Blue Earth	302,000
	Brown	235,000
	Nicollet	217,000
	Renville	210,100

NOTE: Cow populations as of January 1, 1998. Hog populations as of December 1, 1997.

SOURCE: Minnesota Agricultural Statistics Service, *Minnesota Ag News*, May 27, 1998 and July 31, 1998 (St. Paul, 1998).

- **With the exception of dairy cows, the number of animals raised in Minnesota has remained fairly stable since 1964, but the number of farms with livestock has decreased dramatically. As a result, the number of animals per farm has increased.**

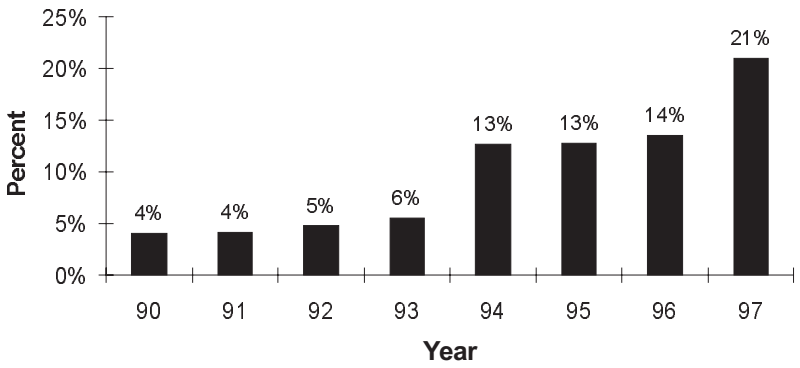
The number of livestock farms has decreased, but the number of animals per farm has increased.

This is part of a long-term national trend in agriculture, where smaller farms have gone out of business or been purchased by larger farms. The number of farms in Minnesota declined by 43 percent between 1964 and 1992, from about 131,000 to 75,000. On the other hand, the average size of farms increased by 46 percent, from 235 acres in 1964 to 342 acres in 1992.[11] This trend is also evident in livestock production. For example, there were about 3.4 million hogs and pigs on 55,000 farms in 1964, for an average of 61 animals per farm. By 1997, the number of hogs and pigs increased to 5.5 million, but there were only about 10,800 swine farms for an average of 509 animals per farm. The number of dairy farms decreased by about 85 percent between 1964 and 1997, from over 70,000 farms to about 10,000. The number of dairy cows per farm increased, however, from 18 cows per farm in 1964 to 58 in 1997.[12]

11 U.S. Department of Commerce, *1992 Census of Agriculture*.

12 1964 data are from Bureau of the Census, *1992 Census of Agriculture*; 1997 data are from Minnesota Agricultural Statistics Service.

Figure 1.4: Percent of Feedlot Permits with 1,000 or More Animal Units, 1990-97



SOURCE: Minnesota Pollution Control Agency.

The number of large feedlots has grown in the 1990s.

This movement towards greater concentration of animals per farm is also apparent from a review of MPCA feedlot permits. Through 1990, MPCA had issued a total of 90 permits for feedlots with 1,000 or more animal units. By 1997, the number of permits for feedlots with 1,000 or more animal units had grown to 662. Moreover, as Figure 1.4 shows:

- **The percentage of all permits issued by MPCA for feedlots with 1,000 or more animal units increased from 4 percent in 1990 to 21 percent in 1997.**

A majority of the large feedlots issued permits by MPCA between 1990 and 1997 were swine feedlots. About 59 percent of the permits for feedlots with 1,000 or more animal units were swine feedlots, 22 percent were beef cattle operations, 11 percent were turkey feedlots, 5 percent were chicken feedlots, and 4 percent were dairy feedlots.

The growth of large livestock farms with greater concentrations of animal waste has resulted in increased volumes of complaints about feedlot odor and has raised new issues of potential air pollution, in addition to heightening traditional concerns about the effect of feedlots on water quality. As a result, the regulation of animal feedlots has become a major environmental issue in the 1990s.

Environmental Concerns

According to MPCA, Minnesota's estimated 45,000 feedlots produce animal wastes that would exceed the amount of human waste produced by a population of over 40 million people.[13] Animal manure can be a valuable resource when properly applied as a fertilizer, but improper storage, application, or disposal of manure can cause serious water pollution problems.

Manure contains many nutrients valuable for crop production, including nitrogen, phosphorus, and potassium. But these same nutrients may contribute to both ground water and surface water contamination if manure leaks from improperly constructed storage systems, is applied to cropland in excess of agronomic rates, or is carried by precipitation runoff to drainage ditches and waterways.[14] For example, if nitrogen is applied to cropland in excess of agronomic rates, it can be converted into nitrates and leach into ground water and be carried to drinking water sources. Water contaminated by nitrates can cause methemoglobinemia, or "blue baby syndrome," a potentially fatal disease. Other microorganisms found in manure such as E-coli, salmonella, and cryptosporidium may also contaminate surface water and drinking water supplies and cause disease in humans.

Improper storage, application, or disposal of manure may pollute ground or surface water.

Increased levels of phosphorus, as well as other nutrients and organic materials in manure, can accelerate eutrophication of lakes and lead to excessive plant and algae growth, causing a deterioration of water clarity. One particularly harmful plant species is blue-green algae, which may be toxic to wildlife and domestic animals and has been associated with human health problems such as respiratory allergies, skin rashes, and gastric disorders. Manure can also reduce levels of dissolved oxygen in lakes and streams and can result in fish kills. Sport fish such as trout, walleye, and bass are especially sensitive to oxygen depletion. Various production-related materials such as antiseptics, antibiotics and footwash materials can cause water quality problems if they leak from manure storage systems or are discharged into surface water. Finally, concerns have been raised about the high concentration of hormones in chicken manure and their potential impact on animal and human reproductive systems.

MPCA has administered several Clean Water Partnership projects that have attempted to study the impacts of agricultural practices on specific Minnesota watersheds.[15] These studies have found that animal feedlots were a significant source of phosphorous in the watersheds, although it was not possible to isolate feedlots from other agricultural practices and land uses that contribute to nutrients and sediments in streams and lakes.[16]

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13 Minnesota Pollution Control Agency, *General Feedlot Program Information*, 1.

14 Applying at agronomic rates means that manure is applied to crop land at rates and times of the year that are compatible with the nutrient requirements and growing characteristics of the crops, taking into account soil characteristics, drainage, and the slope of the land.

15 The Clean Water Partnership Program was created in 1987 to address pollution associated with runoff from agricultural and urban areas. See *Minn. Stat.* §§103F.701-103F.761.

16 Schuler, David J., *Lake Shaokatan Restoration Project: Final Report* (Yellow Medicine River Watershed District, 1996); Minnesota Pollution Control Agency, *Minnesota River Assessment Project Report* (St. Paul, 1994); Barr Engineering Company, *Final Report: Big Birch Lake Diagnostic/Feasibility Study* (Minneapolis, 1994).

The degree to which feedlots contribute to water pollution depends on their size, location, and manure management practices. We surveyed county feedlot officers and asked them to rate the significance of water pollution problems from several types of feedlots. They indicated that smaller feedlots tend to have more pollution problems than larger feedlots and that feedlots with open lots were more of a problem than total confinement feedlots. For example, 18 percent of county feedlot officers rated water pollution problems from feedlots with over 1,000 animal units as "severe" or "significant," but 33 percent rated water pollution problems from feedlots with less than 300 animal units as severe or significant.[17] Fifty-one percent of the county feedlot officers said that water pollution problems from open lots were severe or significant, but only 5 percent of the feedlot officers rated problems from total confinement facilities as severe or significant.[18] Finally, county feedlot officers believe that manure runoff from feedlots and cropland was a bigger problem than leaking earthen basins or concrete pits.

Complaints about feedlot odors have increased in recent years.

In addition to concerns about water pollution, feedlots with high concentrations of manure may produce unpleasant odors and emit gases such as hydrogen sulfide, ammonia, and various volatile organic compounds that may affect air quality. With the trend to larger feedlots and bigger manure storage facilities, complaints about feedlot odors and concerns about air quality have increased in recent years. Other environmental concerns raised include the health and nuisance impacts of flies, the effects of endotoxins in the air at certain facilities, and the contribution of manure emissions to greenhouse gas effects and acid rain.[19]

MPCA'S ROLE

The Minnesota Pollution Control Agency is the state agency responsible for protecting the state's environment from pollution, including pollution from animal feedlots.[20] MPCA does this by adopting rules that govern feedlot regulation, conducting environmental reviews for large feedlots or those with a potential to create pollution hazards, issuing feedlot permits, overseeing compliance with feedlot rules and permit conditions, investigating complaints about feedlots, and taking enforcement action against feedlot owners who violate state pollution laws, agency rules, or permit conditions.

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17 Eight percent of the feedlot officers rated the water pollution problem from large feedlots as "modest" and 75 percent said the problems are "minor" or "none." In contrast, 40 percent said problems from small feedlots are modest and 26 percent said minor or none.

18 Fifteen percent of the county feedlot officers said water pollution problems from total confinement feedlots were modest and 80 percent said problems were minor or none. For open lots, 23 percent said water pollution problems were modest and 23 percent said minor or none. However, MPCA staff and staff from several counties pointed out to us that although the risks of a major manure spill from large total confinement feedlots was very small, the potential environmental impact if a leak or spill did occur was much greater from a large feedlot than from a small feedlot.

19 An endotoxin is a portion of the outer cell wall of certain types of bacteria called Gram-negative bacteria and includes E-coli bacteria.

20 *Minn. Stat.* §§115.03, 116.01, and 116.07.

MPCA is governed by a nine-member citizens' board appointed by the Governor.[21] The board adopts agency rules and, upon request, may make final decisions on environmental reviews, permit applications, and variances from agency rules.[22] MPCA's commissioner, also appointed by the Governor, serves as chairman of the MPCA board. The commissioner is responsible for administering the day-to-day operations of the department and for making all decisions that are not required to be made by the agency board. [23]

Permit Process

MPCA is responsible for issuing permits to feedlots in the state. Most of the permits MPCA issues are either certificates of compliance or interim permits. Certificates of compliance are issued to feedlots that meet agency standards, and they have no expiration date. Interim permits are issued for new construction and for feedlots that pose a potential pollution hazard to the environment, and they expire after ten months. Interim permits should be replaced with a certificate of compliance once construction has been completed satisfactorily or corrective action has been taken to eliminate the pollution hazard. MPCA also issues National Pollution Discharge Elimination System (NPDES) permits to certain large feedlots (over 1,000 animal units) that have the potential to discharge to waters of the state.[24] Currently, MPCA has permit fees only for NPDES permits.[25]

New or expanding feedlots with 50 or more animal units must apply for a permit from MPCA.

According to Minnesota Rules, an owner of a proposed or existing feedlot with 50 or more animal units must apply for a feedlot permit when: 1) a new animal feedlot is proposed; 2) a change in operation of an existing animal feedlot is proposed; 3) ownership of an existing animal feedlot changes; or 4) an inspection of the facility by MPCA reveals that the feedlot creates or maintains a potential pollution hazard.[26] To apply for an MPCA permit, the feedlot owner must complete a four-page application which asks for information on the proposed or existing feedlot. Information required includes the soils and hydrology of the site, the number and types of animals, the types of facilities used to house the animals, and proposed manure management practices. Applicants must also submit a

21 Minn. Stat. §116.02, subd. 1. One board member must be knowledgeable in the field of agriculture and one must represent organized labor.

22 Minn. Stat. §116.02, subd. 6.

23 Minn. Stat. §§116.02, subd. 4 and 116.03.

24 Congress established the National Pollution Discharge Elimination System in the 1972 Clean Water Act. The system is administered by the states and requires all dischargers of municipal and industrial waste (including large feedlots) to obtain NPDES permits. These permits require certain environmental safeguards and place limits on the amount of pollutants that may be discharged to surface waters.

25 For individual NPDES permits, MPCA charges an $85 application fee and a $1,230 annual fee. MPCA has not issued any general NPDES permits for feedlots. Under current regulations, however, these would require an $85 application fee and a $260 annual fee. See *Minn. Rules,* 7002.0310, subp. 2(B) and subp. 3.

26 Within shoreland areas, a permit is required under similar circumstances for feedlots with more than ten animal units. See *Minn. Stat.* §116.07, subd. 7(g) and *Minn. Rules,* 7020.0500, subp 1.

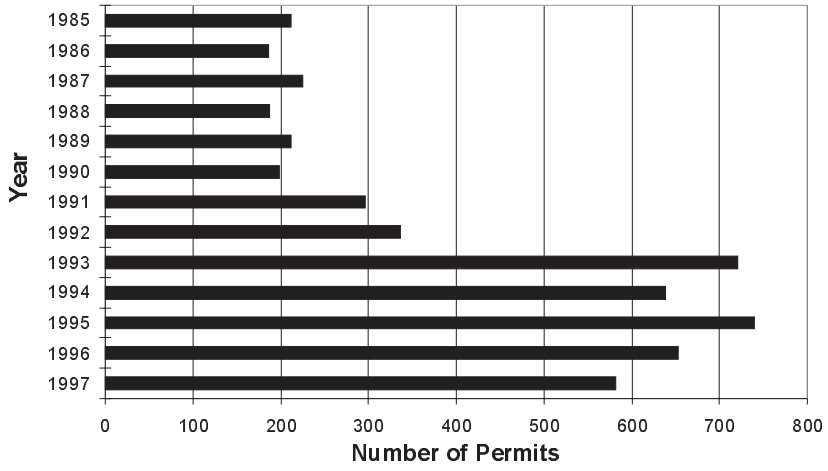
sketch of the proposed or existing feedlot, aerial photographs of the farmstead and all fields on which manure will be spread, and a soils map. Additionally, applicants planning to construct manure storage facilities must include plans and specifications prepared by a professional engineer or the Natural Resources Conservation Service, and applications for feedlots with 500 or more animal units must include proof of public notification.[27]

After receiving a feedlot application, MPCA staff conduct an initial completeness review to determine whether the applicant has provided the required information. Based on this review, MPCA sends a letter informing the applicant that the application is under review or instructing the applicant of additional information necessary before review of the application can commence. After the application is complete, an engineer completes a more thorough review, evaluating the engineering plans submitted for new construction and the site's potential for pollution. Based upon the engineering review, MPCA issues a certificate of compliance, interim permit, or NPDES permit.[28]

About 16,000 of the state's 45,000 feedlots have MPCA permits.

MPCA estimates that about 16,000 of the approximately 45,000 feedlots in the state have MPCA permits. The number of permits issued by MPCA has varied over the years, as illustrated by Figure 1.5. However, the number issued annually

Figure 1.5: Number of Feedlot Permits Issued, 1985-97



SOURCE: Minnesota Pollution Control Agency.

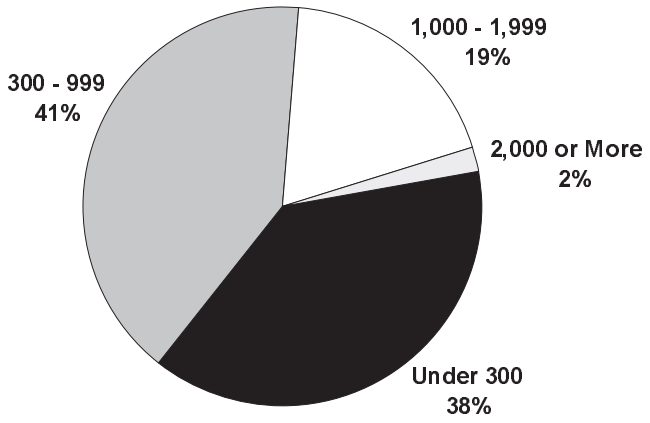
27 *Minn. Stat.* §116.07, subd. 7a requires feedlot owners proposing to construct or expand a feedlot with a capacity of 500 animal units or more to notify, not more than ten days after submitting an application, each resident and owner of property within 5,000 feet of the feedlot. The notification may be sent by mail, delivered in person, or published in a newspaper and must include information on the type of livestock and the proposed capacity of the feedlot.

28 Before issuing an NPDES permit, MPCA must post a public notice and allow for a 30-day public comment period. *Minn. Rules*, 7001.0100, subp. 4 and 7001.1070.

in recent years has been about three times the number issued in the mid- to late-1980s.

About two-thirds of the feedlot permits issued in 1997 were certificates of compliance and one-third were interim permits. Only 1 percent were NPDES permits.[29] Thirty-nine percent of the permits issued were for swine feedlots, followed by beef cows (35 percent), dairy cows (23 percent), chickens (2 percent), and turkeys (1 percent). Figure 1.6 shows that 38 percent of the permits issued in 1997 were for feedlots with fewer than 300 animal units, and 21 percent were for feedlots with 1,000 or more animal units.

Figure 1.6: Percentage of Feedlot Permits Issued by Number of Animal Units, 1997



SOURCE: Minnesota Pollution Control Agency.

Organization and Staffing

As Table 1.3 indicates, the funding for feedlot regulation by MPCA staff was $1.37 million in FY 1998 and $1.87 million in FY 1999. These figures include salaries, fringe benefits, supplies, and expenses for MPCA staff directly involved in feedlot regulation. The figures do not include funding for related spending such as the cost of management and environmental review staff, MPCA's indirect costs, and attorney general fees.

About 77 percent of MPCA's $3.2 million biennial budget for feedlot regulation comes from the state's General Fund, with 12 percent coming from federal sources and 11 percent from water quality permit fees. Of the $2.5 million from

29 As of October 1998, MPCA had issued a total of 23 NPDES permits.

Table 1.3: State Feedlot Regulation Funding, 1998-99 Biennium

MPCA	1998	1999	Total
Main appropriation	$ 811,843	$ 830,814	$1,642,657
Supplemental appropriation	N/A	300,000	300,000
Hydrogen sulfide appropriation	163,000	92,000	255,000
Other general fund	130,500	166,749	297,249
Fee revenue[a]	72,500	284,725	357,225
Federal funds	190,900	197,839	388,739
Subtotal: MPCA[b]	$1,368,743	$1,872,127	$3,240,870
Counties			
Main appropriation	$ 855,000	$ 855,000	$1,710,000
Supplemental appropriation	N/A	350,000	350,000
Subtotal: Counties	$ 855,000	$1,205,000	$2,060,000
Total	$2,223,743	$3,077,127	$5,300,870

N/A = Not applicable.

[a]Fee revenue comes from a variety of water quality permits. Revenue from feedlot permits was about $23,000 in 1998 and is expected to be about $31,000 in 1999.

[b]The subtotal includes funding for only those staff directly involved in feedlot regulation. It does not include management, legal, environmental review, and indirect costs.

SOURCE: Minnesota Pollution Control Agency.

the General Fund, $555,000 is earmarked for particular purposes. The 1997 Legislature designated $255,000 for hydrogen sulfide monitoring and compliance activities, and the 1998 Legislature appropriated $300,000 for the expansion of permitting activities affecting feedlots in excess of 1,000 animal units. An additional $55,000 from the General Fund represents a pass-through of funds to the University of Minnesota for feedlot-related research.

Only about one-fourth of MPCA's feedlot staff are located outside of St. Paul.

The base level staffing for feedlot regulation includes 24 full-time equivalent (FTE) positions. Most of the staff involved in feedlot regulation are housed in MPCA's main office in St. Paul. However, five staff are permanently stationed in MPCA offices around the state, and one engineer spends half of his time in St. Paul and half in an outstate office. There is one staff person in each of the following cities: Brainerd, Detroit Lakes, Mankato, Marshall, and Rochester. An additional seven to eight FTE are involved in feedlot-related functions, including staff assigned to do environmental assessment worksheets and other environmental review work, staff involved in air quality monitoring at feedlots, and the attorney general's staff assigned to work on enforcement, environmental review, and litigation activities related to feedlots. From time to time, other agency staff have temporarily worked on feedlot issues.

MPCA's two largest feedlot regulation activities are permitting and enforcement. MPCA estimates that permitting consumes about 27 percent of its current staff resources, when all staff in the various feedlot regulatory activities are considered. Enforcement, including complaint handling and inspections, takes up about 38 percent of staff time. Other significant uses of staff time include environmental review (13 percent), policy and program development (9 percent), and communication and education (7 percent). Information management and county programs each take up between 2 and 3 percent of staff time.

Two recent changes within MPCA have affected feedlot regulation. First, MPCA underwent a major reorganization at the end of July 1998. Prior to the reorganization, MPCA was organized around major activities such as the regulation of water quality, air quality, hazardous waste, and ground water and solid waste. Most staff involved in feedlot regulation were within two feedlot units in the Nonpoint Source Compliance Section of the Water Quality Division. Staff monitoring feedlot air emissions were in the Air Quality Division, and environmental review staff were in the Environmental Planning and Review Office within the Administrative Services Division. Now MPCA is primarily organized around geographic boundaries, with most feedlot staff in the South District and North District of the reorganized agency. Additional staff resources for feedlot regulation are located in the Metro District, the Policy and Planning Division, and the Environmental Outcomes Division. In September 1998, MPCA assigned a new manager to bring some focus and direction to feedlot regulatory activities now conducted throughout the agency. Although MPCA has reorganized around geographic boundaries, the reorganization has not yet had a major effect on the location of feedlot staff. Of the staff directly involved in feedlot regulation, there are still only five to six staff permanently located outside of the St. Paul office.

MPCA has temporarily reassigned staff from other activities to feedlot regulation.

A second development affecting feedlot regulation is the temporary reassignment of staff to feedlot activities from other activities during fiscal year 1999. Effective October 1, 1998, MPCA reassigned 18 staff to feedlot related activities such as permitting, enforcement, environmental review, air quality policy development, rule preparation, and public information. Most of these 18 staff are assigned part-time to feedlot activities and will work on feedlots for less than a full year. They represent about eight FTEs in terms of the total time they will spend on feedlot activities.

About 53 percent of the costs of reassigning staff, or $241,000, is funded with general fund appropriations available to MPCA for feedlot regulation and does not represent a shifting of funds from non-feedlot related activities. In part, these funds are available because MPCA has not yet filled four vacancies for permanent feedlot staff positions. The remaining 47 percent of the costs, or about $211,000, is funded by water quality permit fees raised from non-feedlot permits. Prior to the reallocation of funds, feedlot regulation was already scheduled to utilize about $73,000 in permit fee revenue in 1999 even though feedlot permits are expected to raise only $31,000 in revenues.

COUNTY FEEDLOT PROGRAMS

In 1998, 47 counties had authority to issue permits for smaller feedlots.

Minnesota law allows MPCA to delegate some of its feedlot permitting responsibilities to counties.[30] To become a "delegated county," the county board must pass a resolution stating that it assumes responsibility for processing permit applications, accompanied by a statement describing permitting procedures. It must also receive written approval from MPCA and appoint a county feedlot officer who is responsible for distributing feedlot permit application forms, helping farmers complete the applications, inspecting feedlots to ensure that they comply with agency rules and local feedlot ordinances, and maintaining feedlot permit records.[31] Figure 1.7 shows the 47 counties that had 1998 feedlot delegation agreements with MPCA and four additional counties that accepted delegation agreements for 1999.

Delegated counties are responsible for issuing certificates of compliance for feedlots with less than 300 animal units if all potential pollution hazards have been corrected, and for feedlots between 300 and 1,000 animal units that do not have a potential pollution hazard.[32] The county must forward all other feedlot permit applications to MPCA. According to MPCA records, counties have issued a total of 4,620 feedlot permits since 1980 when MPCA began keeping records. However, some counties have not provided MPCA with copies of all the permits they issued, so the actual number of county permits is higher. For example, MPCA has records of 506 feedlot permits issued by counties in 1997. According to county feedlot officer reports, however, counties issued a total of 560 new certificates of compliance, 842 revised certificates of compliance, and 109 interim permits, for a total of 1,511 permits in 1997.[33]

The 1997 Legislature appropriated $855,000 per year to counties for feedlot regulation in the 1998-99 biennium.[34] The 1998 Legislature supplemented the FY 1999 appropriation with an additional $350,000.[35] Priority is given to delegated counties, who receive state funding for their feedlot programs based roughly on the number of feedlots in the county.[36] In 1999, counties that have a Level 2 or 3 feedlot inventory will receive $50 per feedlot, and counties with a Level 1 or no feedlot inventory receive $40 per feedlot.[37] Counties must match the state funds with locally generated cash or in-kind contributions. MPCA uses the funds left

30 *Minn. Stat.* §116.07, subd. 7.

31 *Minn. Rules*, 7020.1600, subp. 1.

32 *Minn. Rules*, 7020.1600, subp. 2. Counties may issue interim permits for feedlots under 300 animal units that have a potential pollution hazard that can be corrected within ten months.

33 County feedlot officers file annual reports with MPCA summarizing their permitting, site inspection, complaint investigation, and other activities.

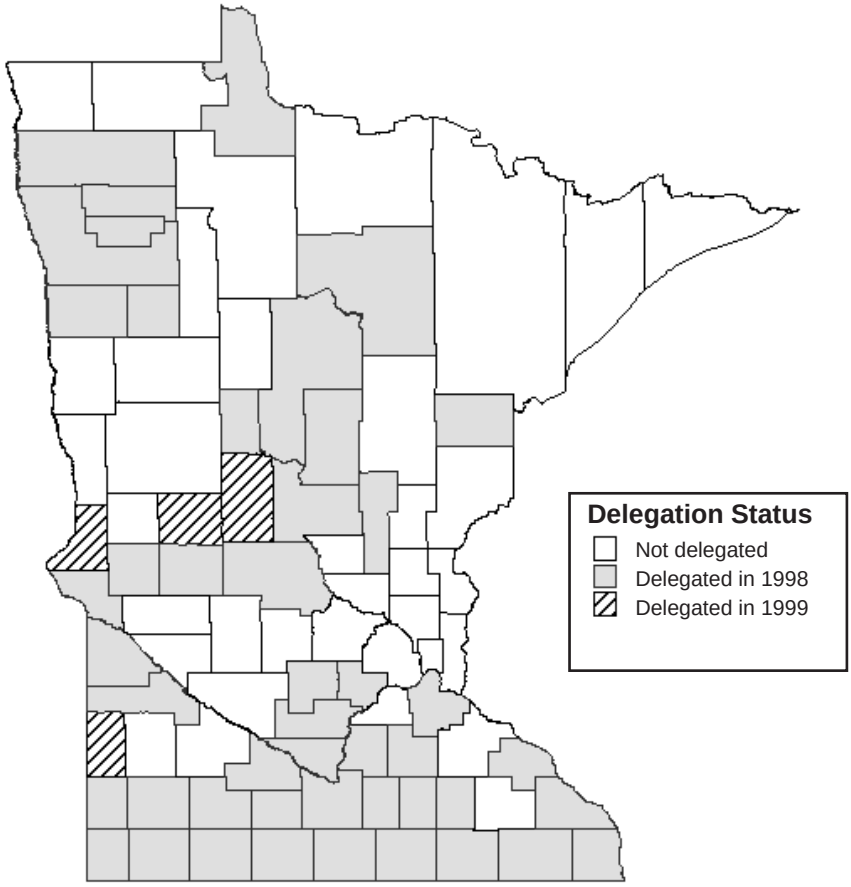
34 *Minn. Laws* (1997), ch. 216, sec. 2, subd. 2.

35 *Minn. Laws* (1998), ch. 401, sec. 2.

36 The funding is appropriated to MPCA and transferred to the Board of Water and Soil Resources which distributes the funds to counties. MPCA determines the amount of funds allocated to each county.

37 A Level 1 feedlot inventory merely lists the location of all feedlots. A Level 2 inventory provides additional information relating to potential pollution problems and a Level 3 inventory provides detailed information on actual pollution problems.

Figure 1.7: Counties With Feedlot Delegation Agreements



SOURCE: Minnesota Pollution Control Agency.

over from the basic grant program to provide additional funding in the form of challenge grants to both delegated and non-delegated counties. These grants are awarded every other year for special projects, such as conducting a feedlot inventory. MPCA awarded $622,565 in base grants to counties for calendar year 1998, and it awarded $382,475 in challenge grants for the year beginning October 1, 1998.[38]

According to our survey of county feedlot officers, delegated counties spent, on average, about $30,000 on feedlot regulation in calendar year 1998.[39] About 56 percent of their feedlot budgets came from state funds, 38 percent from county general funds, and 4 percent from county permit and zoning fees.

38 Although Itasca County is a delegated county, it did not apply for a basic grant in 1998.

39 Forty-one counties answered the question on 1998 feedlot budgets.

Many counties, both delegated and non-delegated, supplement state requirements with requirements in county feedlot ordinances. For example, 45 counties require conditional use or zoning permits for certain feedlots, usually large ones or those with a greater potential for pollution. County ordinances may have restrictions on feedlot size and location, such as requiring setbacks from residences or public buildings. County ordinances may also have requirements on manure storage and land application that are more restrictive than current MPCA rules. A few counties require county feedlot permits in addition to MPCA permits and charge fees for operating feedlots. In addition, some townships have enacted feedlot ordinances or moratoriums on new feedlot construction or expansion.

FINANCIAL ASSISTANCE FOR FEEDLOT OWNERS

There are several grant and loan programs to help feedlot owners install pollution abatement systems.

Constructing pollution abatement systems can be expensive, especially for small livestock producers. The state and federal governments have appropriated funds that provide some financial assistance to farmers to install pollution abatement systems. The state cost share program provides grants to farmers for erosion control and water quality management projects. The 1997 Legislature appropriated $2.12 million per year for the 1998-99 biennium to the Board of Water and Soil Resources for the cost share program.[40] While this appropriation was not specific to feedlot improvements, the 1998 Legislature appropriated an additional $1 million in FY 1999 for cost sharing contracts for water quality management on feedlots.[41] The state cost share funds are distributed to soil and water conservation districts that award grants to local farmers for up to 75 percent of project costs.

In addition, farmers may apply to the Natural Resources Conservation Service's Environmental Quality Incentives Program for federal cost-sharing grants that pay 75 percent (up to a maximum of $50,000) of the cost of waste management control projects. In the year ending September 30, 1998, 250 farmers (out of about 500 applicants) received grants totaling $4.5 million. About 70 percent of the funds was distributed in areas designated as "high priority" and 30 percent was distributed in the remainder of the state. Federal law requires that at least 50 percent of the funds be distributed to farmers to reduce pollution from feedlots.

Finally, the Minnesota Department of Agriculture's Best Management Practices Loan Program provides low-interest loans to farmers for waste management improvements.[42] The maximum loan is $50,000 and farmers have ten years to

40 *Minn. Laws* (1997), ch. 216, sec. 6.

41 *Minn. Laws* (1998), ch. 401, sec. 5.

42 *Minn. Stat.* §17.117. Since its creation in 1994, the program has received about $27 million in federal funds formerly used for municipal wastewater treatment plants. The 1997 Legislature added $4 million to be used exclusively for improvements to individual septic systems, and the 1998 Legislature appropriated another $9 million for this program for any water quality improvements except conservation tillage equipment. About half of the combined state and federal funds have been used for feedlot improvements. See *Minn. Laws* (1997), ch. 246, sec. 6 and *Minn. Laws* (1998), ch. 404, sec. 9, subd. 8.

repay it at an interest rate of 3 percent. Farmers may use the loan to pay the 25 percent share required under the state and federal grant programs described above. So far, 775 loans averaging $19,336 each have been awarded.

These grants and loans have helped some farmers reduce the potential for water pollution from their feedlots. However, the Minnesota Department of Agriculture has estimated that it would take about $615 million for all Minnesota farms to make sufficient improvements to eliminate the threat of water pollution entirely.[43]

SUMMARY

The livestock industry plays an important role in Minnesota's economy. In recent years, changes in the livestock industry have resulted in larger farms with more animals. This has heightened concerns about potential air and water pollution from animal feedlots.

The Minnesota Pollution Control Agency is responsible for regulating feedlots. It does this primarily by issuing permits to feedlots, investigating complaints about feedlots, and taking enforcement action when feedlots violate permit requirements, agency rules, or state laws. MPCA has delegated some of the responsibilities for issuing feedlot permits to counties that have passed resolutions to run feedlot programs.

In Chapter 2, we examine how well MPCA and counties have performed their feedlot regulatory responsibilities, including adopting feedlot rules, conducting environmental reviews, issuing feedlot permits, investigating complaints, and enforcing permit conditions and agency rules.

43 Minnesota Department of Agriculture, *Agricultural Best Management Practices Loan Program* (St. Paul, 1998), 43. This estimate is based on the assumption that there are 22,000 unpermitted feedlots in Minnesota and that the average cost of upgrading their agricultural waste systems is about $28,000.