

Final Committee Report, Vol. 10, No. 2
**Nebraska Department of Environmental Quality:
Administering the Livestock Waste Management Act**

May 2003

**Program
Evaluation
Unit**

*Legislative Research Division
Nebraska Legislature*

Legislative Program Evaluation

As a result of the passage, during the 1992 regular legislative session, of the Legislative Program Evaluation Act (LB 988), the Legislative Research Division (LRD) has been assigned the responsibility of doing program evaluation. Program evaluation is defined as a systematic review of any aspect of a given state agency and any programs it administers for the purpose of assessing 1) compliance with legislative intent and 2) the overall effectiveness and/or efficiency of the program(s).

Program evaluation is carried out under the general supervision of the Legislative Program Evaluation Committee, a special committee of the Legislature. Day-to-day supervision of the program evaluation staff is provided by the Director of LRD.

Membership on the Legislative Program Evaluation Committee includes the chairpersons of the Executive Board and the Appropriations Committee and three other members of the Legislature chosen by the Executive Board. The committee's responsibilities include selecting state agency programs for evaluation, approving evaluation plans, reviewing and releasing completed evaluation reports, and monitoring agency compliance with evaluation report recommendations.

For a more detailed description of the concept of program evaluation, see LRD Report #91-10 (November 1991) entitled *Legislative Program Evaluation*. Statutes governing the program evaluation process in Nebraska are found in Chapter 50, article 12, of the Nebraska Revised Statutes.

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Senator Marian Price, Vice Chairperson
Senator Pam Brown
Senator Pat Engel
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Part I

Executive Summary

EXECUTIVE SUMMARY

The evaluation described in this report was undertaken at the request of the Legislative Program Evaluation Committee (committee). The committee asked us (the Legislative Program Evaluation Unit) to evaluate the Department of Environmental Quality's (department's) administration of the Livestock Waste Management Act (act). The act was enacted in 1998 to protect the state's groundwater and surface water from contamination resulting from improper livestock-waste disposal. The purpose of the evaluation was to assess the adequacy of the act and its accompanying regulations as well as the department's compliance with them.

The History and Purpose of the Act

Today's livestock operations often feed and otherwise manage tens of thousands of animals that generate vast amounts of livestock waste. Such operations generally build facilities to collect the waste, and then they spread it over farmland as a fertilizer. If waste-control facilities fail to contain the waste, or if it is applied to land imprudently, it can pose a serious threat to groundwater and surface water. That is, waste may seep into underground water sources or may run off into lakes, rivers, and streams.

Because of this pollutive threat, the department has regulated the operation and construction of livestock-waste-control facilities since the early 1970s, generally by issuing permits. However, until recently the department's regulatory program was loosely structured, understaffed, underfunded, and it often emphasized the protection of surface water rather than groundwater. Furthermore, the program was hit-or-miss in terms of which livestock operations were brought under its regulatory umbrella because the department

had no way of knowing where all the livestock operations in the state were located. Operations were unlikely to be required to have a permit unless problems were reported.

During the 1990s, changes in the livestock industry exposed these weaknesses in the department's program. Livestock operations were increasing in size, and very large operations were becoming more numerous. Thus, the need for *systematic* regulation increased. In response, the Legislature passed the Livestock Waste Management Act in 1998.

The act made several changes to the existing program. For example, it required all livestock operations that did not have a permit under the old program to request an inspection.¹ The purpose of the inspection was to determine if an operation had a waste-control facility, and, if not, whether it needed one. (Need is determined by the operation's size, location, and soil characteristics.) If an operation already had a facility, the owner was required to apply for an operating permit; if an operation needed a facility, the owner was required to apply for a construction permit. The act also provided the program with supplemental funding by imposing inspection and permit-application fees on livestock producers and expanded the scope of the program to address groundwater concerns.

The Administration of the Program

The department's primary responsibilities under the act are to conduct inspections and to

¹ The act was later amended to exempt small operations (those with less than 300 animal units) from this and other requirements of the act. However, small operations may still be inspected and required to build permitted waste-control facilities if they pose a threat to water because of their location or if they have a history of disposal problems.

issue operating and construction permits for livestock-waste-control facilities. The permit-application process requires producers to supply the department with detailed information about their operations and existing or proposed waste-control facilities. Applications must also contain a “comprehensive nutrient-management plan” that describes how collected waste will be land-applied. All but the smallest operations are required to have a professional engineer prepare the permit application.

The department’s engineers review applications to make sure they contain the required information in adequate detail. When a reviewing engineer deems an application to be adequate, the department issues a permit to the producer and construction or operation of the facility may begin. In the case of new construction, an operating permit is granted after the facility passes a postconstruction inspection conducted by the department.

To ensure that producers comply with the terms of their permits, the department conducts both routine and complaint-driven inspections. Routine inspections are conducted on a schedule based on facility size, with large facilities being inspected more frequently. During a routine inspection, staff members check both the waste-control facility and the producer’s land-application records. Complaint-driven inspections are conducted when a citizen complaint is received by the department. If a facility has allowed livestock waste to pollute surface water or groundwater, or is otherwise out of compliance with the act or the department’s regulations, the department attempts to bring the facility into compliance.

The Adequacy of the Act

We measured the adequacy of the act and its accompanying regulations in two ways. To determine whether they are adequate on their face, we compared them to the laws and regulations in effect in other states. In addition, we

attempted to measure their capacity to protect water quality.

On the whole, we found that the requirements of the act and regulations are comparable to those in other states and can therefore be presumed adequate on their face. Unfortunately, the more significant question—whether the act and the department’s administration of it adequately serve to protect the state’s water—cannot be answered due to the dearth of water-quality monitoring data.

However, progress is being made toward the end of collecting such data; the department is working to set up monitoring networks that will provide reliable statewide data based on consistent sampling and testing methods. It is also developing databases to track the data gathered from the networks. The committee recommended that the department continue to improve its water-quality monitoring and that policymakers revisit water-protection issues as needed.

The Department’s Compliance with the Act

Overall, we found that the permit-granting, routine-inspection, and complaint-inspection processes defined by statute, regulation, and departmental policy are adequate. However, the committee made several recommendations to improve the processes. The committee recommended that the department adjust its inspection schedule to ensure maximum efficiency by reducing the frequency of inspections at facilities that have not had previous problems with permit compliance. It also recommended that the department continue its efforts to refine its complaint process by using a web-based complaint-tracking system.

We also found that the department generally complies with the laws that govern the timely review of applications. While we noted delays in the processing of some applications, those

delays were usually due to ongoing communication between the department and the producer. To the department's credit, our review of permit-application files revealed that the department's recordkeeping is outstanding.

Not surprisingly, producers are not always happy with the act's requirements and the department's policies which give them effect. Two aspects of the permit-granting process are particularly unpopular with producers. The first is the increase in the number of facilities required to conduct groundwater monitoring, which is expensive for producers because they must pay for the installation of monitoring wells. The second is the department's increased regulation of the land application of waste. Some producers feel the department is not realistic in its requirements relative to how much land is required for safe disposal.

Nevertheless, we found no fault with the department's policies, and the committee agreed. The committee affirmed the importance of groundwater monitoring and suggested a few improvements in the department's regulatory activity relative to land application, such as improving the way the department tracks land-application sites and using an experienced agronomist to calculate the acreage needed for land-application of waste.

The final issue we addressed is how the department responds to producers who fail to comply with the conditions of their permits. The department (through the Attorney General's office) may impose fines or revoke permits if facilities discharge waste or if producers otherwise violate their permit conditions. However, the department generally attempts to bring producers back into compliance voluntarily, without legal action to impose fines or revoke permits. Instead, the department informs producers of violations and works with them to solve the problems.

Environmental groups have complained that violators are not pursued by the department aggressively enough. However, the department has not had problems with repeat offenders and believes its voluntary-compliance approach is effective. With no evidence of enforcement problems, the committee simply cautioned the department to vigorously pursue violators.

Conclusion

On the whole, we found the statutes and regulations governing livestock-waste management to be adequate. Furthermore, the department complies with them and does an acceptable job of compelling the livestock industry to do the same. Unfortunately, the more significant determination—whether the act and regulations actually protect water quality—cannot be made because there is not enough consistent monitoring of water quality to enable officials to detect statewide trends.

In closing, we would like to remind readers that the issue of livestock-waste management is broad and multifaceted. This report focuses only on the act and its administration by the department. It notes but does not address in any detail the very important roles of local zoning and federal regulation. Changes in both areas can have a significant impact on Nebraska's livestock-waste management and, potentially, the quality of the state's water.

Part II

Program Evaluation Unit Report

Final Report

**Nebraska Department of Environmental Quality:
Administering the Livestock Waste Management Act**

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The unit also acknowledges and thanks representatives of the Nebraska Association of County Officials, Nebraska Farm Bureau, Center for Rural Affairs, Women Involved in Farm Economics, Nebraska State Grange, Nebraska Dairymen's Association, Nebraska Farmers Union, Nebraska Cattlemen, Nebraska Pork Producers Association, Cornhusker Fly Fishers, Nebraska Chapter of the Sierra Club, Nebraska—Worth Fighting For, Settje Agri-Services and Engineering, JES Environmental Services, and Environmental Services, Inc. for their time and invaluable input.

SECTION I

INTRODUCTION

Pursuant to Neb. Rev. Stat. sec. 50-1205(1), the Legislative Program Evaluation Committee (committee) directed the Legislative Program Evaluation Unit (unit) to evaluate the Livestock Waste Management Act (act).¹ The act was created in 1998 to protect the state's groundwater and surface water from pollution resulting from improper livestock-waste disposal. The act is enforced by the Nebraska Department of Environmental Quality (department). The department attempts to ensure proper livestock-waste disposal by requiring livestock producers to build and operate livestock-waste-control facilities that safely collect the waste. Producers are then required to dispose of the waste in an environmentally responsible manner.

The committee directed the unit to conduct a preevaluation inquiry of the act on 9 April 2002. The unit did so and issued a memorandum to the committee on 10 May 2002. Based on the preevaluation inquiry, the committee decided to pursue a full evaluation of the act; it adopted a scope statement on 12 June 2002. The evaluation got underway that same day with a letter from Cynthia Johnson, Director of the Legislative Research Division, to Michael Linder, Director of the Department of Environmental Quality.

Scope of the Evaluation

The scope statement adopted by the committee instructed the unit to answer the following questions.

- Are the provisions of the Livestock Waste Management Act and the department's regulations adequate to protect the

groundwater and surface water of the state?²

- Is the department fully complying with all provisions of law?
- Are there adequate rules and procedures in place to ensure ongoing compliance with the act and the department's regulations? (For example, does the department engage in enough routine inspections and complaint-driven inspections to ensure compliance?)
- If and when the department uncovers a problem, are there adequate rules and procedures in place to ensure that the pollution is cleaned up and that the violator is punished effectively and efficiently?

Contents of the Report

Section II of this report describes the pollutive threat of livestock waste as well as the history and purpose of the act. Section III describes the act's requirements and the department's permit-granting and inspection processes. Section IV specifically addresses the evaluation questions posed in the committee's scope statement, and Section V anticipates some of the future trends in the area of livestock-waste management.

Methodology

The unit took a standard qualitative approach to this evaluation. We interviewed the departmental personnel responsible for enforcing the act, we looked at the department's records, we reviewed permit applications submitted by livestock producers, and we observed the inspection of several livestock-

¹ The Livestock Waste Management Act is codified at Neb. Rev. Stat. secs. 54-2401 to 54-2413.

² The department's regulations relative to livestock-waste management are codified in Title 130 of the Nebraska Administrative Code. The requirements of Title 130, as well as those of the act, are discussed in Section III of this report.

waste-control facilities. We also conducted phone interviews with personnel from environmental agencies in surrounding states to assess how typical Nebraska's processes are. Finally, we contacted several livestock-producer groups, environmental groups, and agricultural-engineering consultants to get their suggestions for improvement.

SECTION II

THE HISTORY AND PURPOSE OF THE ACT

The Livestock Waste Management Act was passed in 1998; thus, the department's livestock-waste-management program, at least as it is currently structured, has been in existence only a short time. However, governmental regulation of livestock-waste disposal has a much longer history. As we will discuss, the department has been regulating livestock-waste disposal in some manner for approximately thirty years.

The need to regulate waste disposal has grown with the livestock industry. In small amounts, livestock waste poses little danger to the environment, but today's large livestock operations produce copious amounts of waste. In fact, it is not unfair to compare the waste-management challenges of a large livestock operation to those of a city.³ These operations are populated by tens of thousands of large animals, bred and fed to grow as quickly as possible. In a confined environment, disposing of their waste is a significant concern. And when waste is improperly collected or spread, it poses a serious pollutive threat.⁴

³ According to the department's records, the largest hog-confinement facility in the state contains approximately 64,000 hogs; the largest cattle feedlot contains approximately 85,000 head of cattle.

A 135-pound hog can be expected to void approximately 11 pounds of feces and urine a day. An 800-pound beef cow will void nearly 50 pounds, and a 1,400-pound dairy cow more than 120 pounds. *See* Barker and Walls, "Livestock Manure Production Rates and Nutrient Content," *North Carolina Agricultural Chemicals Manual* (2002). Humans produce much less waste by comparison, however, they generate significantly more waste water due to their preferred means of disposal.

⁴ Another effect of collecting and spreading large amounts of waste is odor produced during its decomposition. While a nuisance, odor is not a water-quality issue. Nevertheless, the department has developed a set of suggested best-management practices for producers to employ to reduce the impact of odor. Counties are also allowed some control over the problem through zoning. For example, they are allowed to dictate setback distances and proximity to towns and residences. *See* Neb. Rev. Stat. secs. 23-114 to 23-115.02.

Understanding the nature of that threat is central to understanding the regulations that govern this area. Thus, before discussing the history of the department's program, we will begin with a summary of the environmental risks posed by livestock waste.

The Environmental Risks Posed by Livestock Waste

The traditional method of livestock-waste disposal is to collect it and then spread it over cropland. Livestock waste is a beneficial crop fertilizer because it decomposes into plant nutrients such as nitrogen (mostly in the form of nitrate), phosphorous, and potassium. Livestock waste is an attractive fertilizer for many farmers because of its ready availability.

However, like other fertilizers, livestock waste can also pollute the environment under certain conditions. Nitrate is highly water soluble and can seep into the groundwater beneath collection areas. In sufficient concentration, nitrate in drinking water threatens the health of both humans and livestock.⁵ Phosphorous, which is less water soluble, is dangerous as well. Excess phosphorous from waste deposited on the soil can run off into nearby lakes or streams and promote algae growth. If there is too much algae in the water, it can deplete the supply of oxygen—a process called eutrophication—and kill fish. Livestock waste may also contain undigested feed additives such as copper sulfate, antibiotics, and hormones; the significance of the threat from these substances is unknown.

⁵ Specifically, infants and newborn animals do not have the digestive enzymes to properly process nitrate. The nitrate therefore enters the blood stream in a form which binds to oxygen and prevents it from being used—the result is the so-called "blue-baby" syndrome.

There are a number of ways that livestock waste can contaminate groundwater and surface water, and they fall into two categories. “Point-source” pollution occurs at the site of the livestock operation itself. For example, waste stored in lagoons or holding ponds can seep into the ground and eventually pollute local groundwater. Another example of point-source pollution occurs in cattle feedlots where rain can cause waste that is deposited on the ground to run off into surface waters. Surface waters can also be polluted when rainfall causes a lagoon or holding pond to overflow or if the facility fails structurally. When waste is released into surface waters because of runoff, overflow, or structural failure, it is generally referred to as a “discharge.”

“Nonpoint-source” pollution occurs away from the livestock operation when waste is spread on farmland. As noted above, overapplication of waste causes excess nutrients to be deposited on the soil. Rainfall can then cause the nutrients to run off and pollute surface waters. The runoff problem is exacerbated if the waste is applied to frozen land. Overapplication to land can also pose a threat to groundwater under some circumstances. Rainfall can sometimes push nutrients past the root zone before they can be taken up by crops. Over time, especially in areas with a high water table and sandy soils, this low-level seepage can add up and affect the groundwater.⁶

It is worth noting that neither point-source nor nonpoint-source pollution is irreversible or necessarily catastrophic. Livestock-waste pollution is moderated as the waste dilutes itself in increasingly larger quantities of water. A polluted stream might flow into a small river which in turn flows into a larger river and so forth until the waste is undetectable. Groundwater will also “clean” itself as pollutants bind to soil and become diluted by addi-

tional water seeping into the ground.⁷ Groundwater also flows very slowly, generally moving less than a foot per year, so contamination is usually contained in a reasonably small hydrogeologic area.⁸ In any event, if the source of contamination is eliminated, the surface water and groundwater that was effected will eventually recover.

Thus, the department’s response to contamination has always been geared toward bringing noncompliant producers into compliance.⁹ This was the program’s goal prior to 1998, and it remains the program’s goal now. As we discuss below, the biggest difference between the current program, as contemplated by the act, and the former program is that the former program focused almost exclusively on point-source surface water pollution.

The Department’s Program Prior to 1998

Prior to the act’s passage in 1998, the department administered a loosely structured livestock-waste-management program with just a few full-time staff members. The program began in 1972 following the passage of the National Environmental Policy Act, the Nebraska Environmental Protection Act, and the federal Clean Water Act.¹⁰ To comply with these environmental laws, the department began conducting inspections of livestock-waste-management facilities and requiring permits for producers to build and operate

⁶ E-mail from Marty Link, Groundwater Unit Supervisor, 5 September 2002.

⁷ Conversation with Marty Link, 19 August 2002.

⁸ *Id.*

⁹ This assumes, of course, that compliance with statutory and regulatory policies means that a producer will generate little or no pollution. Our conclusions about that subject are contained in Section IV.

¹⁰ The National Environmental Policy Act was passed in 1969 and is codified at 42 U.S.C. 4321-4347. The Nebraska Environmental Protection Act was passed in 1971 and is codified at Neb. Rev. Stat. secs. 81-1501 to 81-1532. The federal Clean Water Act was originally enacted as the Federal Water Pollution Control Act in 1972. It became commonly known as the Clean Water Act after it was amended in 1977. It went through another round of significant amendments in 1987. The act, as amended, is codified at 33 U.S.C 1251 et seq.

them.¹¹ Then, as now, construction and operating permits were issued separately. A producer needed a construction permit to build a livestock-waste-control facility and then an operating permit to use it.¹²

In 1974, the U.S. Environmental Protection Agency (EPA) gave the department additional authority to conduct inspections and issue permits relative to the National Pollutant Discharge Elimination System (NPDES). NPDES is an EPA program that focuses on eliminating point-source pollution resulting from, among other things, the discharge of livestock waste from open lots and their collection facilities.¹³ NPDES permits are essentially discharge permits and are not required to operate a facility. Producers only need NPDES permits if they have discharged livestock waste or are at risk of doing so.¹⁴ The purpose of requiring a permit to discharge is to assure that regulators (both state and federal) know of the discharge and can dictate the circumstances under which it occurs.¹⁵

As indicated above, the state's program as it existed prior to 1998 was "loosely structured;" there was little statutory guidance provided

and groundwater concerns were secondary.¹⁶ Surface water was the primary focus of the program; discharges and point-source runoff were the big concerns.¹⁷ And staffing of the program was minimal. Four or five people were responsible for issuing three different permits, conducting inspections, and responding to complaints. It should come as no surprise that, under such circumstances, the program took on an ad hoc quality. But, by the late 1990s, that was no longer enough—the livestock industry had changed significantly, and the program was forced to change as well.

Passage of the Act

In the late 1990s, environmental concerns and workload issues pushed the department, and subsequently the Legislature, to consider changing how the program was run. During the early part of the decade, there was an unprecedented increase in the number of large hog operations in the state. The increase in the size of hog operations was part of a nationwide trend. Nebraska was especially affected because it offered large-scale hog producers abundant resources of land, water, and grain.¹⁸

Large hog operations pose a special threat to the environment. Sizable populations of confined hogs generate considerable quantities of liquid waste. Collecting and storing such waste poses a risk of seepage that threatens groundwater, which, as noted above, was not a primary concern of the earlier program. Furthermore, the risk of seepage increases in porous soils, and in certain areas of the state, the

¹¹ Neb. Rev. Stat. sec. 81-1503 (4) designates the department as the state pollution-control agency for purposes of the Clean Water Act and all other federal environmental-protection legislation.

¹² Postconstruction inspections were not a part of the department's permit-granting process as they are now, however. E-mail from Dennis Heitmann, Agriculture Section Supervisor, 16 September 2002.

¹³ The NPDES program covers all kinds of discharges including industrial discharges, municipal waste-water discharges, storm-water discharges, and, of course, livestock-waste discharges.

¹⁴ According to the department's 2001 annual report, there are currently 213 open-lot operations across the state with NPDES permits.

¹⁵ Discharges are allowed only if there has been an abnormally significant rain event (a 25-year 24-hour storm) or a chronic wet period. Otherwise, all facilities are expected to be zero-discharge facilities. When a discharge is allowed, the department generally limits the producer to a certain rate of discharge to keep the waste diluted. The producer has to be able to document the dilution with water samples and report back to the department. NPDES permits are only issued for a five-year period. After that, a producer must reapply.

¹⁶ The only reference to livestock waste control and related groundwater concerns is found at Neb. Rev. Stat. sec. 81-1505(10), which was added to the Nebraska Environmental Protection Act by LB 1029 in 1974.

¹⁷ Several of the staff members who were employed by the program at that time told us that their mantra was "keep the poop out of the creek."

¹⁸ For an excellent report on the growth of hog facilities in Nebraska, see *Transcript of Nebraska Public Radio's Hog-Confinement Series: 30 November 1998 to 11 December 1998*, on file in the Legislative Research Division Library.

soil is sandy. The fact that the state is located above the Ogallala Aquifer magnifies all of these concerns.

Beyond hog confinement, the pollutive threat posed by all kinds of livestock waste was increasing with the size of livestock operations. The economic realities of the livestock industry—low prices, economies of scale, and demand for a standardized product—were forcing livestock operations to grow or perish. Feedlots, dairies, and poultry farms were all growing larger, and larger operations produce more waste.

Management practices in the livestock industry were not always what they should have been given the volume of waste that any large livestock operation generates. In the mid-1990s, damaging discharges from hog operations in North Carolina caught the media's attention and pushed livestock-waste disposal to the forefront of a national pollution debate.¹⁹ Nebraska followed the trend toward large-scale production and had to follow the trend toward regulation as well.

The need for more regulation was practical, too. For the reasons noted above, public awareness of livestock-waste disposal was growing, and the number of complaints made to the department grew with it. The public was becoming increasingly vigilant about the environmental risks posed by large-scale animal confinement. The department's inspectors were busier than ever.

The emotional realities of the situation also increased the department's workload. The

trend toward larger livestock operations was squeezing many smaller producers out of the market. As a result, tensions were often high among neighboring producers, some of whom had seen their small operations disappear while larger livestock producers expanded. Complaints to a regulatory agency can be a convenient tool to strike back, a way to express dissatisfaction without admitting jealousy or defeat.

Lack of county zoning restrictions at the time exacerbated these problems because there were few, if any, rules about local land use. Until recently, counties were often silent on the issue of agricultural zoning, and the public turned to the department for information, guidance, and redress.²⁰ Despite the fact that land use and zoning are outside the department's authority, the department still had to expend resources to respond to inquiries.

By 1998, the department was unable to effectively deal with the increased workload caused by these developments. The program was compelled to change. The Legislature, in cooperation with the department, passed LB 1209—the Livestock Waste Management Act—which was intended to provide structure and funding for the state's ailing livestock-waste-control program.

As a result of the act, the department was able to add staff members and expand the scope of the program. Ironically, the act at first caused the already overloaded program to be swamped with inspection work. But a modification in 1999, LB 870, helped to reduce the inspection load and smooth the process.²¹ De-

¹⁹ The *Raleigh News & Observer* in North Carolina ran a series of newspaper articles entitled "Boss Hog: North Carolina's Pork Revolution" in February of 1995. A catastrophic hog-waste spill in North Carolina on 21 June 1995, and several smaller discharges shortly thereafter, prompted the newspaper to follow up with a second series called "Boss Hog 2: The Sequel" later that summer. The original series won a Pulitzer Prize in 1996. The North Carolina discharges received national attention and highlighted a general concern with "factory farms," including large cattle and poultry operations.

²⁰ Those counties that had zoning regulations in place were (and continue to be) specifically protected under the act. Neb. Rev. Stat. sec. 54-2404.01 states that the act shall not be construed to change any county zoning authority that existed prior to 25 May 1999.

²¹ The department had nearly 4,500 requests for inspection in FY1998-99. LB 870 exempted approximately 3,000 of the operations that triggered those requests, leaving a backlog of 1,500 inspections to be conducted. Department of Environ-

spite this, the department was still saddled with a backlog of inspections. The department is still working through that backlog, but the worst of it has been dealt with. Since 1999, only minor changes have been made to the act. Its requirements and the department's administration of them are addressed in the next section.

mental Quality, Annual Report to the Legislature (2001), p. 40.

SECTION III

THE ADMINISTRATION OF THE PROGRAM

The Department of Environmental Quality (department) has 209 full-time employees and an annual budget of more than \$98 million.²² Most of the department's employees work in the department's Lincoln office, but the department also has six field offices located throughout the state. The department is organized into six divisions that fall into two general groups.²³ There are administrative divisions, which include the:

- Management Services Division,
- Legal Services Division, and
- Environmental Assistance Division;

and there are program divisions, which include the:

- Waste Management Division,
- Air Quality Division, and
- Water Quality Division.

Each of the divisions is subdivided into a number of sections. The responsibility of enforcing the Livestock Waste Management Act (act) falls to the Water Quality Division's Agriculture Section (section). The section employs 13 people in Lincoln and uses four more people in field offices across the state.²⁴ It has a section supervisor, one engineering supervisor, three engineers, nine program specialists (including the four field-office employees), an administrative assistant, a staff assistant, and a secretary.

²² Nebraska Department of Environmental Quality, Annual Report to the Legislature (2001), p. 1.

²³ The department manages the Low-level Radioactive Waste Program as a stand-alone program so it is not included here.

²⁴ Of the four field-office staff members that work for the agriculture section, only two are close to being full-time employees. They spend approximately 90 percent of their time doing work for the section. The other two spend approximately 50 percent and 20 percent of their time on the section's tasks. Conversations with field staff members, 8-15 August 2002.

Implementation of the act comprises its own program within the section. The total cost of administering the program since its inception in 1998 has been approximately \$4.8 million. Table A shows the revenue and expenditures for the program for each fiscal year that the program has been administered. Revenue is generated from inspection and application fees paid by producers, but fees do not cover the costs of the program.²⁵ The difference between revenue and expenditures each year is made up by money from the General Fund.

Table A: Livestock-Waste-Management Program Revenue and Expenditures FY1997-98 to FY2001-02

Fiscal Year	Revenue	Expenditures
1997-98	\$ 2,932	\$ 362,640
1998-99	\$ 60,723	\$ 1,031,332
1999-00	\$ 116,245	\$ 1,075,868
2000-01	\$ 77,160	\$ 1,165,274
2001-02	\$ 333,510	\$ 1,147,873
Total	\$ 590,570	\$ 4,782,987

Note: FY2001-02 revenue includes a \$250,000 transfer from the Department of Agriculture, so the revenue total for that year is rather inflated and is not due to fees.

Source: DAS Program Summaries for the Department of Environmental Quality. Table prepared by the Legislative Program Evaluation Unit.

The Department's Permit-Granting Process

As noted in Section II, there are three kinds of permits that the department issues: construction permits, operating permits, and NPDES permits. This section will discuss only the state construction and operating permits and not the federal NPDES permits.²⁶

²⁵ Even in the best year for fees, FY1999-00, they covered less than 11 percent of program costs.

²⁶ It is important to keep in mind that an NPDES permit is a discharge permit and therefore has a completely different purpose than a state operating permit. The application process for NPDES permits is also different from the process

The process for granting construction and operating permits is set forth by the department in Title 130 of the Nebraska Administrative Code.²⁷ We will describe the permit-granting process after first discussing the facility-classification structure contemplated in the act.

Classes of Facilities

The permit-granting process as contemplated by the act is not all that different from the process that was in place prior to 1998. The biggest difference is that the current process is sensitive to the size of the waste-control facility involved. Fees, notice requirements, application time frames, location restrictions, and the department's vigilance all differ according to the classification of an operation's waste-control facility.

It is important to note that not all operations have or need a facility. Small livestock operations that do not threaten the waters of the state are exempt from the requirements of the act.²⁸ An operation is considered small if it has less than 300 animal units.²⁹ Calving operations that confine cattle for less than 90 days are also exempt.³⁰

All nonexempt operations are subject to the act's requirements, but the specific requirements which apply to them are determined by the classification of their livestock-waste-control facility. Facilities are grouped into classes (I, II, III, or IV) according to the number of animal units they are designed to accommodate. The class breakdown is as follows:

- Class I: 0 – 1,000 animal units
- Class II: 1,001 – 5,000 animal units
- Class III: 5,001 – 20,000 animal units
- Class IV: 20,001 or more animal units.

The size of an operation does not guarantee that it will or will not have to build a waste-control facility. If an exempt operation (one with less than 300 animal units) has a confirmed discharge of animal waste or poses a threat because of its proximity to water, the slope of the land, or the soil type, the department will require the operation to build a facility.³¹ Similarly, if a larger operation is inspected and the department determines that it is not a threat, the department may issue a letter of exemption stating that the operation does not need a facility.³²

We noted above that the classification of a facility determines the applicable fees and other requirements that will be imposed by the department. The class structure also helps the department set its priorities when enforcing the act. The act specifically directs the department to prioritize the regulation of larger facilities.³³

used for construction or operating permits. If an NPDES permit is required in addition to an operating permit, the producer must apply for the NPDES permit separately by following the regulations set forth in Title 119 of the Nebraska Administrative Code.

²⁷ Neb. Rev. Stat. sec. 54-2413 requires the department to promulgate regulations to implement the act, including a permit-granting process.

²⁸ Neb. Rev. Stat. sec. 54-2403.

²⁹ *Id.* The definition of animal unit acknowledges that not all animals are created equal in terms of waste—some produce more than others. Thus, the definition of an animal unit is based on size and weight. For example, a beef cow is equal to one animal unit, a dairy cow is equal to 1.4 animal units, and a hog weighing more than 55 pounds is 0.4 animal units. The multipliers for other animals can be found at Neb. Rev. Stat. sec. 54-2402(1).

³⁰ The exemption for calving operations is not a specific exemption like that for small operations. Rather, calving operations are left out of the definition of "livestock operation" found at Neb. Rev. Stat. sec. 54-2402(9).

³¹ See Neb. Rev. Stat. sec. 54-2403.

³² See Neb. Admin. Code Title 130, Ch. 2, sec. 003. Section 003 does not specifically mention the letter of exemption, but it says that the department will provide the applicant with written notification of the inspection determination.

³³ See Neb. Rev. Stat. sec. 54-2414.

The Initial Inspection and Permit Application

The permit-granting process, as set forth in the department's regulations, begins with an initial inspection that enables the department to determine whether an operation needs to build a waste-control facility or if an adequate facility already exists. The initial inspection is usually conducted by a program specialist, either from the central office or one of the field offices.³⁴ There is a \$50 inspection fee for operations that have or will require a Class I or II facility and a \$500 inspection fee for operations that have or will require a Class III or IV facility.³⁵ The department conducts an average of 400 initial inspections each year.³⁶

If the department determines that a waste-control facility is necessary for an operation, the producer is required to obtain a construction permit. Correspondingly, if an adequate facility already exists, the producer is required to obtain an operating permit. Shortly after the initial inspection, the producer is informed in writing of the department's decision and given an application deadline. The decision and the deadline are a matter of discretion for the department.³⁷

The application process is essentially the same for both construction and operating permits. The producer must submit a detailed permit application to the department that contains information relative to the pollutive risk posed by the proposed or existing facility. For example, an application must contain topographical maps of the surrounding area, hydraulic information about the location (prox-

imity to surface water, depth and flow of groundwater, etc.), the engineering specifications of the facility, and a detailed plan for waste application to cropland (a "comprehensive nutrient-management plan").³⁸ For Class II, III, and IV facilities, the application must have the stamp of a professional engineer.³⁹

There is a \$300 application fee for Class I facilities, an \$800 fee for Class II facilities, a \$1,500 fee for Class III facilities, and a \$5,000 fee for Class IV facilities.⁴⁰ The application fee is a one-time fee—there is no additional fee to get an operating permit after a construction permit has been issued. There are also no additional inspection fees beyond the initial inspection. Thus, Class IV facilities, which have the highest fees, pay the department \$5,500 to get through the process from inspection to permit. The greater expense is associated with hiring a professional engineer to design the facility and prepare the application.⁴¹

Departmental Review and Granting of Permits

After receiving the application, the department has five days to notify the county in which the operation is located and the relevant Natural Resources District (NRDs have 20 days to comment if they wish).⁴² A program specialist, generally the same one that conducted the initial inspection (unless the initial inspection was done by field staff), then reviews the application for missing components. If the application appears to be in order, it is forwarded for engineering review.

³⁴ Neb. Rev. Stat. sec. 54-2411(1) authorizes the department to contract with natural resources districts to do inspections, but the department has not formalized any such relationships.

³⁵ Neb. Rev. Stat. sec. 54-2406(1).

³⁶ The average number of inspections was calculated from data provided by the department.

³⁷ Producers are generally given six months after the initial inspection to make their application to the department. However, this deadline can be adjusted depending on the situation. E-mail from Patrick Rice, Water Quality Division Administrator, 18 September 2002.

³⁸ See Neb. Admin. Code Title 130, Ch. 3. for a complete catalog of application requirements. Those noted here are only a sample of the information required.

³⁹ Neb. Admin. Code Title 130, Ch. 3, sec. 001.01. The department is allowed to require an engineer's stamp pursuant to Neb. Rev. Stat. secs. 81-3453(12) and 54-2412(2).

⁴⁰ Neb. Rev. Stat. sec. 54-2408(1).

⁴¹ This is probably the single greatest producer complaint about the program. In our conversations with producer groups, the issue of cost, especially the cost of hiring a professional engineer, came up repeatedly.

⁴² Neb. Rev. Stat. sec. 54-2411(2) and (3).

Engineering Requirements

The engineering review is a formal review of the application and ensures that all the application criteria contained in Title 130 are met,⁴³ including the minimum permit requirements, design criteria, location requirements, a comprehensive nutrient management plan,⁴⁴ and best management practices. The engineering review generally determines whether a permit will be issued or denied; the director or his designee makes the ultimate decision based on the review. However, the director is almost never forced to deny a permit.⁴⁵ If an application is unacceptable, the section's engineers either work with the producer and the producer's engineer until appropriate modifications are made, or the producer decides not to pursue the contemplated project.

The threshold question posed in conjunction with an engineering review is whether the application is complete. The department has 30 days from the receipt of an application to notify the producer if the application addresses all of the criteria noted above. An application can be returned to a producer as incomplete or the reviewing engineer can request an addendum. After verifying that an application is complete, the department has 60 days to issue or deny a permit for Class I and II facilities and 90 days for Class III and IV facilities.⁴⁶ During the 60- or 90-day review period, the department determines whether the application is adequate (as opposed to complete).

⁴³ See Neb. Admin. Code Title 130, Chs. 3 and 7-11.

⁴⁴ Comprehensive nutrient management plans set forth producers' plans for applying manure to cropland. The producer must apply manure at rates that minimize the possibility of runoff or seepage. For more information about comprehensive nutrient-management plans, see the discussion *infra* page 27.

⁴⁵ The documentation that we reviewed indicated that the department denied one permit in 1998 and two in 2000.

⁴⁶ Neb. Rev. Stat. sec. 54-2411(4) and Neb. Admin. Code Title 130, Ch. 3, secs. 007 and 008.

Location Requirements

Facilities have to meet certain location requirements to obtain a construction permit.⁴⁷ A facility cannot be located within 100 feet of a domestic well or 1,000 feet of a public drinking-water well.⁴⁸ The facility must also be more than four feet above the seasonal high groundwater level.⁴⁹ The department may also, at its discretion, refuse to allow a facility to be constructed in an area where it may threaten surface water or groundwater.

There are also special provisions for facilities located in a watershed that feeds into a cold-water class-A stream.⁵⁰ Cold-water class-A streams are streams capable of maintaining year-round populations of trout that have done so within the past five years.⁵¹ No new Class II, III, or IV facility can be built in such a watershed. However, existing facilities are still allowed to operate there and Class I facilities, presumably, are still allowed to build there.

Other Review Requirements

The engineers in the section are not the only individuals who have an opportunity to review an application. Under certain circumstances, other departmental personnel or even other agencies may become involved. Those circumstances are as follows:

- if the application involves a Class II, III, or IV facility, the application is reviewed

⁴⁷ See Neb. Admin. Code Title 130, Ch. 9.

⁴⁸ The department may grant a permit to an *existing* facility that is within 100 feet of a domestic well, but only if the well is owned by the operation and is not used primarily for human consumption. See Neb. Rev. Stat. sec. 54-2403 and Neb. Admin. Code Title 130, Ch. 9, sec. 002.

⁴⁹ The regulations contain an exception for existing operations. An existing operation may build a facility less than four feet above the seasonal high ground water level if it is built at a maximum depth of six feet and has a foot-thick liner with a maximum permeability of one-sixteenth inch per day. See Neb. Admin. Code Title 130, Ch. 9, sec. 001.05.

⁵⁰ See Neb. Rev. Stat. sec. 53-2404.02 and Neb. Admin. Code Title 130, Ch. 9, secs. 004 and 005.

⁵¹ Neb. Rev. Stat. sec. 54-2404.02.

by groundwater geologists within the department to determine if groundwater monitoring is necessary (a cursory review may also be requested for Class I facilities);

- if the site for the facility consists of native grass or unbroken land, the department will forward the application to the Game and Parks Commission for a threatened-and-endangered-species review;
- if building the facility involves building a dam more than 25 feet above grade, a storage area more than 50 acre-feet above grade, or some other potentially hazardous structure, the design will have to pass muster with the Department of Natural Resources and receive a permit from it as well,⁵² and
- if applicants indicate on their applicant-disclosure form that they have operated in another state (or states), the department may contact that state (or states) to make sure that the applicant does not fall under the statutory “bad-actor” provisions.⁵³

Public-Comment Period

At the same time that a complete application is forwarded for its engineering review, it is also opened for public review if it involves a Class II, III, or IV facility. Any interested person can submit written comments during a thirty-day public-response period.⁵⁴ If there are any citizen comments, the department considers them during the application review and responds to them in writing after issuing the permit. According to the department, there are rarely any public comments filed.⁵⁵

⁵² Neb. Rev. Stat. sec. 54-2412.

⁵³ Neb. Rev. Stat. sec. 54-2409. The bad-actor provisions require applicants to disclose any history of environmental violations that they may have and gives the department the right to deny a permit for that reason.

⁵⁴ Neb. Rev. Stat. sec. 54-241(4). Under section 54-241(4), as well as Neb. Admin. Code Title 130, Ch. 3, sec. 005, the department must publish notice of the written-comment period in a daily or weekly newspaper with general circulation in the area.

⁵⁵ Members of environmental groups we spoke to indicated that the notice requirement was not enough to invite public

Construction and Post-Construction Requirements

If a construction-permit application passes all the required levels of review, the department notifies the applicant and issues the permit. Construction can then proceed.^{56,57} The department occasionally issues phased-construction permits that allow producers to build their facilities in stages.⁵⁸ The department’s justification for this practice is Nebraska’s short construction season.⁵⁹ It can be difficult at times for producers to build an entire operation in one season. Under the phased-construction process, some parts of an operation’s waste-management system can be built before others if they can be operated independently.⁶⁰

The simplest example of when a phased-construction permit would be issued is the case of an operation that has multiple independent waste-control facilities. For example, a hog operation might submit an application

comment. However, we are not sure what else the department can do to inform the public without incurring significant costs. In any event, the department is complying with statute.

On a related note, a defamation lawsuit was recently filed by a producer based on comments submitted by citizens during a public comment period. The plaintiff in that suit alleges that the comments were libelous; the defendants allege that the lawsuit is a strategic lawsuit against public participation (SLAPP) and is intended to intimidate citizens and chill public comment. The defendants are seeking protection under the so-called “anti-SLAPP” statutes, Neb. Rev. Stat. secs. 25-21,241 through 25-21,246. The case—Sand Livestock v. Svoboda—is currently pending before the Keith County District Court (case no. CI01-132).

⁵⁶ For new livestock operations, Neb. Admin. Code Title 130, Ch. 3, sec. 009.04 requires construction of the facility to begin within twenty-four months of the issuance of the construction permit. For existing livestock operations, the department sets a completion date in the construction permit.

⁵⁷ Neb. Rev. Stat. sec. 54-2405 and Neb. Admin. Code Title 130, Ch. 2, sec. 006 allow a producer to begin construction of a livestock *operation* prior to the approval of the permit for the operation’s waste-control facility. However, producers must first acknowledge, in writing, that they are aware that the construction permit for the *facility* could be denied.

⁵⁸ Conversation with Patrick Rice; Gary Buttermore, Environmental Engineer IV; and Patricia Dinslage, Administrative Assistant, 24 June 2002.

⁵⁹ *Id.*

⁶⁰ E-mail from Gary Buttermore, 12 September 2002.

that contemplates adding two buildings, both with under-floor pits. Although there is only one application, the department can issue a construction permit that contemplates separate construction phases for each building. That way, when the first building is done, the producer can go ahead and apply for an operating permit for that building. Otherwise, the producer would have to wait to apply for an operating permit until both buildings were finished, and that might take over a year.

Similar situations can occur in dairies, which often have multiple buildings, and in feedlots with more than one holding pond. As long as the facilities can operate independently, the department is willing to allow some components of the system to operate while others are being built. The only caveat that the department is quick to point out is that phased construction does not mean phased application. At the time it is submitted, the application must be complete and contain the comprehensive nutrient management plan and best management practices for the whole operation.⁶¹

The department's willingness to accommodate producers by allowing phased construction is just one example of the department's general policy of flexibility relative to construction. The department has intentionally avoided any specific construction standards in its regulations and will entertain any reasonable ideas that are proposed. If producers and their engineers can convince the department that what they are planning is safe for the environment, the department may allow it.⁶² The department believes that such flexibility is in everyone's best interest and encourages innovation and active problem solving.⁶³

⁶¹ *Id.*

⁶² Conversation with Mike Linder, Director of the Department; Jay Ringenberg, Deputy Director of Programs; and Patrick Rice, 15 August 2002.

⁶³ *Id.*

The only nonnegotiable construction standard imposed by the department has to do with the compaction of soil below a lagoon or holding pond. Nebraska allows a seepage rate of 0.25 inches (one-quarter of an inch) per day for Class I facilities and 0.13 inches (approximately one-eighth of an inch) per day for Class II, III, and IV facilities.⁶⁴ To prove that they have achieved the proper compaction, producers must take core samples of the facility's floor, have them analyzed, and submit the test results to the department. Most liners are constructed from clay that is compacted to meet the standards. To meet the seepage requirements, most clay liners are approximately a foot thick. Artificial liners are available but are not required by the department.⁶⁵

After construction is completed, the producer and the engineer must sign a completion form certifying that the construction complied with the application that was approved by the department.⁶⁶ A post-construction inspection is then conducted and, if the facility passes the inspection, an operating permit is issued.⁶⁷ As noted previously, there is no additional fee for the operating permit.

⁶⁴ At first blush, it may appear that allowing any seepage is a guarantee of contamination. However, there is evidence that lagoon floors seal themselves with solid waste and seep far less than allowed. Furthermore, even if seepage does occur at the maximum rate, there is no guarantee that the pollutants themselves are seeping. Bacterial activity is believed to break down many contaminants. Telephone conversation with Marty Link, 17 September 2002.

⁶⁵ Artificial liners are an attractive option from an environmental viewpoint. They offer the possibility of zero seepage if installed properly and as long as they maintain their integrity. However, they are generally more expensive than clay liners.

⁶⁶ Neb. Admin. Code Title 130, Ch. 3, sec. 009.02.

⁶⁷ Neb. Rev. Stat. sec. 54-2410 requires the post-construction inspection to occur within 30 days of the notice of completion. If the department does not inspect the facility within that time, the producer can begin operation of the facility. The department gets to most of the facilities in that time frame, however. The department's records indicate that it has conducted 439 post-construction inspections since FY1997-98. There were 515 construction permits issued during that time, and construction has not been completed on some of those facilities.

The operating permit is valid for the life of the facility and can be transferred between owners if the department does not object.⁶⁸ The permit can also be modified if the operation expands and therefore has to make changes to its waste-control facility. If a change causes a facility to fall in a higher class, the producer has to pay the difference between the application fees for the classes. Note, however, that once a Class IV facility has paid its fee, it can expand indefinitely with no additional charges. Table B shows the number of construction and operating permits issued by the department since FY1997-98.

Table B: Construction and Operating Permits Issued by the Department FY1997-98 to FY2001-02		
Fiscal Year	Construction Permits	Operating Permits
1997-98	139	70
1998-99	123	85
1999-00	60	97
2000-01	87	61
2001-02	106	57
Total	515	370

Note: The operating permit numbers shown here do not include modifications or transfers.

Source: Department of Environmental Quality 2001 Annual Report, supplemented with 2002 totals provided by the department. Table prepared by the Legislative Program Evaluation Unit.

Routine and Complaint Inspections to Ensure Ongoing Compliance

After a new or existing facility is granted an operating permit, the department conducts routine and complaint-driven inspections to ensure ongoing compliance with the act and the department's regulations. The details of each kind of inspection are provided below, along with a description of the department's groundwater-monitoring efforts.

⁶⁸ See Neb. Rev. Stat. sec. 54-2407 and Neb. Admin. Code Title 130, Ch. 6, sec. 003.

Routine Inspections

Routine inspections are periodic checks on facilities that are done by the section's program specialists. Producers are generally informed of upcoming inspections so that they can have records ready for the inspectors and also because of biosecurity concerns.⁶⁹ Inspectors have to carefully plan their trips to avoid visiting similar kinds of operations one after another. Failure to do so increases the risk of livestock disease being inadvertently spread by the inspector.

The frequency of routine inspections is a matter of internal departmental policy and depends on the size of the facility. The larger the facility, the more frequently it is inspected. The rule of thumb is that Class IV facilities are inspected on a quarterly basis, Class III facilities semi-annually, Class II facilities annually, and Class I facilities every four to five years.⁷⁰ The department's records indicate that it has conducted over 1,600 routine inspections since 1998.⁷¹

A routine inspection includes both an inspection of the facility and a review of the producer's records relative to land application of manure. Producers are expected to conform their land-application practices to the comprehensive nutrient-management plan they submitted with their applications. The department relies solely on record reviews to ensure that producers follow through with their comprehensive nutrient-management plan. If the plan contemplates the participation of nearby landowners that are not affiliated with the operation, the department requires proof that an easement agreement has

⁶⁹ Conversation with Patrick Rice and Dennis Heitmann, 3 September 2002.

⁷⁰ Conversation with Patrick Rice, Dennis Heitmann, Gary Buttermore, and Patricia Dinslage, 11 July 2002.

⁷¹ The department averages approximately 400 routine inspections per year, but there is great variability from year to year. For example, there were 305 inspections in FY1998-99 and 562 inspections in FY1999-00.

been reached between the parties.⁷² The documentation review by the program specialist includes an analysis of the manure, soil analysis, records of application areas, and amount of application.⁷³

Right now, the department cannot guarantee that producers are acting appropriately. Producers could be overapplying manure to certain plots of ground, falsifying records, or improperly conducting soil tests. The only check the department has is its field staff, who often know the area, and citizen complaints. However, at least two of the natural resources districts are also serious about keeping tabs on land application and inform the department of any problems they see.⁷⁴

The department hopes that its ability to track land application will improve when it implements a new integrated-information system that it has been developing. The system should allow the department to track when and where manure is being applied. Of course, there will still be no guarantee that a producer cannot cheat, but at least the department will be able to verify that the comprehensive nutrient-management plan is adequate and that the proper easement agreements are in place.

The integrated-information system will also show all of the inspections conducted and permits granted for each operation from any program in the department.⁷⁵ It is anticipated to be a powerful informational tool and early experience with it has been promising. The department already has an excellent records-

management unit, and the information system should supplement it well.

It should be noted that the department's routine inspection schedule makes it difficult for it to deal with the backlog of initial inspections mentioned in Section II. The routine inspection schedule requires a commitment of staff, and, with every facility that is granted a permit, that commitment grows. The department is still managing to reduce the backlog, but progress is slow. To its credit, the department has been moving through the backlog correctly, with its priorities in mind. All of the Class IV and III facilities and most of the Class II facilities have been inspected. Most of those facilities have also been granted permits if necessary. There are still a number of Class I facilities that have yet to be inspected.

Complaint Inspections

Complaint inspections are initiated by citizen complaints to the department. Citizen complaints are important because they compensate, to some extent, for the department's staff constraints—when you have a limited number of eyes, it helps to know where to look. Complaints are also the means by which the department finds out about the exempt facilities that should not be allowed to maintain that status. Exempt facilities are not only exempt from inspection, they don't even have to register with the department. A complaint might mark the first time the department is informed that an operation even exists.

Complaints are currently handled on a somewhat informal basis.⁷⁶ When a call comes into the department, the call is simply routed until the person filing the complaint speaks to a staff member who can help them. This process is usually adequate, but it is occasionally problematic and frustrating. A complaint form is filled out by the staff member who

⁷² Conversation with Patrick Rice and Dennis Heitmann, 3 September 2002.

⁷³ *Id.*

⁷⁴ The Lower Elkhorn NRD and the Tri-Basin NRD both do extensive inspections of land application sites. Conversation with Patrick Rice and Dennis Heitmann, 3 September 2002.

⁷⁵ The integrated-information system is also retroactive. At the time this report was written, the department had entered almost all of its old files into the system. Only some operations with Class I facilities remained to be entered. The comprehensiveness of the system was impressive.

⁷⁶ Conversation with Julie Powers, Field Office Section Supervisor, 16 August 2002.

ultimately takes the call. The department attempts to begin all complaint investigations within five days of receipt.⁷⁷ The department responds to over 100 complaints each year and meets its five-day goal more than half the time.⁷⁸

The department is modifying the process described above to make it more efficient and to increase accountability. Under the new system, the complaint form will be web-based and available to both staff members and the public.⁷⁹ A citizen will be able to file a complaint by calling the department or filling out the form online. The Environmental Assistance Division will then act as a clearinghouse for complaints and assign them to the proper section within the department. The department received a grant from the EPA to develop this system, and it is expected to be online in the fall of 2002.⁸⁰

The department currently allows anonymous complaints, but this has generated some problems. Not all complaints are legitimate, but the department still has to expend time and resources investigating them.⁸¹ The new system will still allow for anonymous complaints, but the department will strongly encourage people to leave information so that it can follow up if the complaint form is incomplete or the program specialist needs more information.

Groundwater Monitoring

The department has been increasing its use of groundwater-monitoring wells in an attempt

to detect groundwater pollution before it becomes too severe. Monitoring wells are being included as a condition of many of the department's new permits. As noted previously, groundwater flows over time, albeit slowly, and that flow can be determined by geological surveys. Once the flow is determined, a monitoring well is placed upstream from a facility to provide a baseline measure of water quality, and then two or more downstream wells are placed to detect any problems.⁸²

Groundwater monitoring is generally not required for Class I facilities unless the department believes they pose some special risk. If monitoring is required for a facility, there are special regulations with which a producer must comply.⁸³ Samples are taken twice a year, once in the spring and once in the fall, and then sent to a laboratory for analysis. The analysis must determine the water's level of nitrate, chloride, and ammonia.⁸⁴ The results must then be forwarded to the department within 45 days. If the results indicate a negative impact on groundwater, a site-specific remedy is developed.

⁷⁷ *Id.* This policy was also noted in a conversation with Mike Linder, Jay Ringenberg, and Patrick Rice, 15 August 2002.

⁷⁸ The response time for complaints was calculated from data provided by the department. The vast majority of complaints that are not addressed within five days are completed within a month.

⁷⁹ Conversation with Julie Powers, 16 August 2002.

⁸⁰ *Id.*

⁸¹ This was a major complaint of the department's program specialists, but there is not much the department can do about it. The occasional spurious complaint is going to occur in any regulatory setting.

⁸² We use the term "stream" very loosely here, only to indicate the groundwater's direction of flow; we are not referring to underground streams or quickly moving water. "Upstream" wells are generally referred to as up-gradient wells. Similarly, "downstream" wells are generally referred to as down-gradient wells.

⁸³ See Neb. Admin. Code Title 130, Ch. 13.

⁸⁴ We have already noted the harmful effects of nitrate, *supra* note 5. Ammonia is a danger because the natural process of nitrification breaks it down and converts it to nitrate. Chloride is not a danger in and of itself, though one can taste it. Rather, chloride levels are a measure of filtration. When chloride levels are high, it generally means that whatever water is on the surface is not being properly filtered before it reaches groundwater. E-mails from Gary Buttermore and Marty Link, 25 September 2002.

SECTION IV

ANALYSIS OF THE PROGRAM

As noted in Section I, the committee instructed the unit to answer four questions about the act and the department's administration of it. In its scope statement, the committee asked:

- Are the provisions of the Livestock Waste Management Act and the department's regulations adequate to protect the groundwater and surface water of the state?
- Is the department fully complying with all provisions of law?
- Are there adequate rules and procedures in place to ensure ongoing compliance with the act and the department's regulations? (For example, does the department engage in enough routine inspections and complaint-driven inspections to ensure compliance?)
- If and when the department uncovers a problem, are there adequate rules and procedures in place to ensure that the pollution is cleaned up and that the violator is punished effectively and efficiently?

In this section, we address each of those questions.

The Adequacy of the Act and the Department's Regulations

There are really two issues implicit in the first question posed in the scope statement.⁸⁵ The first relates to the adequacy of the act and related regulations on their face. The second involves the question of whether the waters of the state are being adequately protected by the

⁸⁵ In its initial draft report, the unit failed to address both facets of the question. This became apparent during a public hearing held to discuss the draft report. At the request of the committee, the unit did further research and added text to the report.

act and regulations. We deal with these issues separately below.

Are the Act and Regulations Adequate on Their Face?

The adequacy of a statute or regulation is often in the eye of the beholder because there is generally no objective standard by which to judge it. Such is the case with the act and the regulations in Title 130. Nevertheless, we gathered information that can be used to evaluate Nebraska's regulatory framework subjectively. We contacted state environmental agencies in seven nearby states to compare their regulatory practices with Nebraska's. We spoke to environmental-agency personnel in Iowa, Minnesota, South Dakota, Wyoming, Colorado, Kansas, and Missouri. Overall, Nebraska's livestock-waste-management laws are comparable in scope to those of surrounding states. We describe some of the similarities and differences below.

Similarities Between States

During our survey, we noted several similarities among the eight state programs (including Nebraska). First, the growth in the size of livestock operations during the 1990s caused all of the states to change their regulatory frameworks. Nebraska, Iowa, Missouri, and Minnesota instituted or strengthened regulations for all livestock-waste-control facilities, regardless of the livestock species housed. Taking a slightly different approach, Colorado, Kansas, Wyoming, and South Dakota added provisions to their general livestock-waste-management laws that apply only to large hog operations. Regardless of the approach taken, states have focused their changes on the permit-application process, construction standards, and site inspections.

The second similarity we noted is that all the states use some sort of classification scheme to differentiate between large livestock-waste-control facilities, which are presumed to pose the greatest environmental risk, and small facilities, which are presumed to pose the least risk. Some states only use the classifications to determine the appropriate fees, but others are like Nebraska and use them to set priorities. All the states use animal units as the basis for their classification structures.⁸⁶ Nebraska's classification scheme is the most specific, but all states at least draw a distinction between facilities designed to serve 1,000 or more animal units and those designed to serve less than 1,000 animal units.⁸⁷

A third similarity among the state programs is a fundamental reliance on the occupational standards, and ultimate liability, of professional engineers who design and oversee the construction of livestock-waste-control facilities. Most of the state agencies we spoke with require professional engineers to prepare the construction plans for large facilities (many, in fact, require this of all facilities). After construction is completed, the engineer must certify, in writing, that the facility was built according to the plans submitted to the agency for approval. Some agencies have decided to dispense with postconstruction inspections and rely entirely on engineers' professionalism to ensure compliance with construction permits.

The final similarity that emerged from our survey is that all states require some kind of nutrient-management plan to guide land application of waste, at least for operations with large waste-control facilities. There is a lot of variability in plan requirements and in which

operations are expected to comply, but generally speaking operations are required to apply collected waste at agronomic rates. All of the surveyed states currently determine agronomic rates based on nitrogen-uptake calculations, but many also consider phosphorous levels if soil tests indicate there is a problem with that nutrient or if location makes runoff a particular concern.⁸⁸ The states we spoke with are anticipating changes in initial rate calculations because of phosphorous concerns; the federal EPA is moving in that direction and the states will have to follow suit.

Differences Between States

Among the differences we noted in the state programs, one of the biggest is the way the states have decided to handle inspections. Each agency we spoke to inspects facilities in some manner, but the type of inspection and the number of times a facility is inspected varies greatly from state to state. For example, Colorado conducts complaint inspections and nothing else.⁸⁹ Kansas and Minnesota inspect during construction, on a routine basis, and, of course, after complaints. Nebraska falls among the frequent-inspecting states by conducting initial (preconstruction) inspections, postconstruction inspections, routine inspections, and complaint inspections.

For those states that conduct routine inspections, the frequency of those inspections varies. Iowa, for example, inspects all permitted facilities annually. Kansas inspects large swine facilities every two years and all other facilities every five years. As noted in Section III, Nebraska currently uses a variable inspection schedule based on the size of the operation—larger facilities are inspected more frequently. Like Nebraska, all the states we surveyed make producers comply with comprehensive nutrient-management plans, at least for large

⁸⁶ This is not surprising because animal units are also used in the administration of the federal NPDES program, in which all the states participate.

⁸⁷ The 1,000-animal-unit cutoff is the same used by the EPA in the NPDES program. Kansas, Colorado, and South Dakota issue joint permits that encompass both state and federal programs.

⁸⁸ Two states, Minnesota and Colorado, do not allow any land application at all if phosphorous levels get too high.

⁸⁹ Colorado was the only state we surveyed that does not do some kind of routine inspection.

facilities. A review of land-application records is thus part of any routine inspection.

A second difference we noted among states is the maximum seepage rate for lagoon or holding-pond liners.⁹⁰ The maximum seepage rates for each of the states we surveyed, including Nebraska, are shown in Table C. Nebraska allows its Class I facilities to seep at the greatest rate allowed by any state (only Kansas allows as much). Its rate for larger facilities is the same as that allowed in Kansas and Missouri, but higher than the remaining five states.

Table C: Comparison of Seepage Rates In Nebraska and Nearby States	
State	Seepage Rates (in approximate inches per day)
NE	1/8" (Class II – IV) to 1/4" (Class I)
KS	1/8" (if over 10,000 hogs) to 1/4"
MO	1/16" to 1/8" at agency's discretion
SD	1/16"
IA	1/16"
WY	1/16"
CO	1/32"
MN	1/56"

Source: Telephone conversations with water-quality personnel from environmental agencies in nearby states. Table prepared by the Legislative Program Evaluation Unit.

The third difference we noted is that there is a wide range of staffing from state to state. Staff sizes for the programs range from two in Colorado to 23 in Kansas. Nebraska falls in the middle of that range with a total of 15 staff members that are at least part time. Staff limitations force all agencies to set priorities for their programs. Most of the inspection-schedule differences we noted can be traced to such decisions. Nebraska asks a lot of its

⁹⁰ Synthetic liners are made to prevent any seepage into surrounding soil, but engineering standards still require some compaction of the soil beneath the synthetic liner in case the liner fails or is damaged. However, these compaction standards are not as strict as those used for clay-lined facilities.

staff given that it is one of the states that conducts frequent inspections and yet has only an average-sized staff.

The final two differences we noted have to do with fiscal concerns—how programs are funded and whether producers are required to offer financial assurance in the event that their operations go bankrupt or are abandoned. Relative to funding their livestock-waste programs, the states we surveyed all take different approaches. Some programs are funded entirely through the state's General Fund; others are like Nebraska and use primarily general funds with some costs deferred by permit fees. Only Missouri and Colorado reported being primarily cash-funded.

In terms of financial assurance that would guarantee that any necessary cleanup costs are covered, only Iowa and Missouri have special indemnity funds that producers contribute to through fees. Kansas and Colorado require certain producers to be bonded. The remaining four states (including Nebraska) have no special fund and require no private form of financial assurance.

Conclusion as to the Facial Adequacy of the Act and Regulations

Based on our conversations with environmental-agency personnel in other states, we conclude that the statutes and regulations governing Nebraska's program are adequate in terms of how they compare to states that are similarly situated. Nebraska's regulatory framework is comparable to those in effect in surrounding states and, in many cases, it is slightly more rigorous. The only requirement that seems somewhat more liberal in Nebraska is the allowed-seepage rate, which, as previously noted, is comparable to that used in Kansas.

But we must end as we began and note that regulatory adequacy is in the eye of the beholder. The state's challenge lies in finding an

acceptable level of protection for its waters, and what is acceptable is a matter of perspective. Is Nebraska's regulatory framework protecting the state's surface water and groundwater? Yes—the waters of the state are no doubt better off than they would be with no regulatory framework in place. Could changes be made to strengthen the regulations and provide more protection? Absolutely. Nebraska could, for example, be more conservative and lower its allowed-seepage rate or require artificial liners. Such changes would lower the risk of environmental damage further than the current laws do.

However, such changes come with costs, both to individual producers and, ultimately, the state. Better liners cost more money. Requiring them would almost certainly drive some producers out of business. For some observers, that is acceptable, for others, it is not. The unit does not presume to know how to strike the proper balance between environmental concerns and economics. All that we can say is that the choices Nebraska has made are similar to those made by other states; so, by that standard, Nebraska's laws are adequate.

Are the State's Waters Being Adequately Protected?

The question of whether the state's waters are being adequately protected by the act and related regulations is daunting because there is a lack of comprehensive water-quality data. In response to this, the Legislature passed LB 1234 (2000), which commissioned a water-quality-monitoring study to be undertaken by the department. That study, released in two phases, indicated that water-quality monitoring in Nebraska was indeed inadequate (Phase I) and suggested specific actions to remedy the problem (Phase II).⁹¹ (A copy of the Phase II report, which includes a summary of the

Phase I report, is included as an appendix to this report.)

The Phase II report included seven recommendations designed to improve both groundwater and surface-water monitoring in Nebraska. First, it recommended creating a groundwater fixed-site monitoring network to provide reliable statewide data based on consistent sampling and testing methods. Two related recommendations focused on using more fixed sites for surface-water monitoring—one dealt with establishing lake fixed sites and one with expanding the number of stream fixed sites. The report also recommended surface-water monitoring specifically designed to provide total maximum daily load (TMDL) information.⁹²

The remaining recommendations dealt with the coordination of monitoring information. The fifth suggested the development of a centralized database for all water-quality information, including data gathered from samples drawn at the fixed sites and samples taken for other reasons.⁹³ The sixth recommendation was that the department fulfill the above recommendations while meeting local and regional monitoring objectives. Finally, the report recommended that the department make periodic reports to the Legislature of both groundwater and surface-water quality.

Despite funding limitations, the department has begun to implement the Phase II recommendations.⁹⁴ The department has not yet cre-

⁹¹ The Phase I report was presented to the Natural Resources Committee on 1 December 2000; the Phase II report was presented on 13 August 2001.

⁹² The total maximum daily load (TMDL) of a pollutant for a given body of water is the amount of the pollutant that the body of water can assimilate and still meet pollution standards. TMDL sampling is intensive and is used to monitor bodies of water that have already been identified as impaired. Conversation with Steve Walker, Water Quality Assessment Section, 7 January 2003.

⁹³ The report recommended using an existing groundwater database as a starting point and expanding it with more groundwater data. Eventually, the department hopes to develop a similar surface-water database.

⁹⁴ The department's progress relative to water-quality monitoring can be gleaned from three recently issued reports: the department's 2002 Annual Report to the Legislature, its 2002

created a groundwater fixed-site network, but it is working with NRDs to do so. The department is currently training NRD staff in proper sampling techniques and will eventually identify 1,000 wells for sampling. With regard to surface-water monitoring, the department has expanded the number of fixed sites from 42 to 94, and it expects to increase this total to 98 sites soon. In addition, 25 lake fixed sites have been established. TMDL monitoring of impaired water bodies has also begun.

Coordination of information is also starting to improve. The department, along with the Nebraska Department of Agriculture, has provided funds for a centralized database (called the Quality-Assured Agrichemical Contaminant Database) to compile all of the groundwater data collected by NRDs and various other entities; the university provides quality control and quality assurance of the data. Finally, the department has kept the Legislature apprised of this progress with yearly reports.⁹⁵

At this point, no one can say with certainty whether water quality is improving. The networks have not been in existence long enough for reliable trend analyses to be completed. However, based on our review of the department's reports, there seem to be particular areas of concern. Broadly speaking, groundwater quality is worst in areas of Holt County and along the Platte River in the vicinity of Platte, Polk, Merrick, Hamilton, and Hall Counties.⁹⁶

Surface-water quality is harder to characterize because there are so many different contaminants that have an impact. However, using the number of impaired streams within a river basin as a guide, the Loup River Basin, the Niobrara River Basin, and the Lower Platte

River Basin are poorest. A number of streams in each of those basins are listed as impaired because of high bacteria levels. There are streams and lakes statewide, however, that have less bacteria concentrations but higher concentrations of other contaminants. Thus, generalized statements about surface-water quality are inherently suspect.

The department's reports conclude that both groundwater and surface-water pollution are likely due to nonpoint-source pollution as opposed to point-source pollution. That is, if livestock waste is to blame, the pollution is more likely to be caused by runoff from land application or livestock access to streams than by discharges of waste from facilities.⁹⁷

It should be noted that, even when better data are forthcoming, there will still be no easy answer as to whether water quality is improving statewide. There is tremendous variability in water quality across the state; there is even variability within smaller regions such as natural resource districts or river basins. Thus, whatever the data shows, it will have to be reported in ways that do not misrepresent or overstate what can legitimately be said about water quality in the state as a whole. There will also be no easy way to determine the cause of pollution. In rural areas, where agricultural practices are likely to blame, it is an open question whether the culprit is runoff from overapplication of livestock waste or commercial fertilizers.

The Department's Compliance with Provisions of Law

The act and the regulations in Title 130 govern the actions of both the department and livestock producers. Thus, there are two evaluation issues wrapped up in the question

Nebraska Water Quality Report, and its 2002 Nebraska Groundwater Monitoring Report.

⁹⁵ *Id.*

⁹⁶ This general statement is made based on levels of nitrates and atrazine reported in these areas.

⁹⁷ This is not to say that point-source discharges are not a concern, only that they are a less-prevalent problem. Point-source discharges occasionally result in significant localized water-quality problems and fish kills.

of the department's compliance with law. The first is whether the department complies with the statutes and regulations that govern *its own* actions. The second is whether the department compels producers to comply with the statutes and regulations that govern *their* actions. Note that we are restricting ourselves to the permit-granting process at this point because the statutes and regulations focus on it. Ongoing compliance is addressed in the next subsection.

Is the Department Complying With the Act and Regulations?

The provisions of law that govern the actions of the department are concerned mainly with timeliness, so the issue of compliance revolves around whether the department meets its statutory and regulatory timelines. To evaluate if it does so, we reviewed a sample of permit applications that were submitted to the department in recent years. Our sample included 50 applications representing all classes of facilities and types of livestock. We looked at approximately ten applications within each class, plus ten applications from exempt operations that were required to build facilities.⁹⁸ We were also careful to select applications from all areas of the state so that we had a good geographic sample as well.

The first observation we must make regarding our application reviews is that the department's records-management system is outstanding. It is clear that the department has committed itself to good recordkeeping, and it should be commended for that.⁹⁹ The staff

⁹⁸ Recall that operations with less than 300 animal units are normally exempt from regulation, but in some instances they pose a threat to the environment and are therefore regulated.

⁹⁹ Ironically, the department's documentation process, which we so highly praise, is somewhat frustrating to producers and engineers. From their perspective, that level of documentation is another example of state government's overweening bureaucracy. However, from the perspective of an outside observer, that documentation has to be there. Citizens and environmental groups have every right to expect a transparent application process, and it was invaluable to us as well.

members in the Records Management Unit are responsive and thorough. And, amazingly, improvements are still being made.¹⁰⁰ We do not hesitate to suggest that other agencies should use the department's system as a model.

As for the substance of our review, the department complied with all of the major statutory and regulatory timelines for the applications in our sample. When the department received an application, notification within the five-day statutory timeframe was regularly sent to the relevant natural resources district and the county in which the operation is located. When a public-comment period was required, notification was sent to newspapers and those notices appeared in the file. Producers were routinely notified whether their applications were complete within 30 days of receipt. Engineering reviews were also generally conducted in a timely fashion.¹⁰¹ Despite the fact that the department met its timelines, however, some applications took a long time from start to finish because the applications as originally submitted were judged to be incomplete.

As noted in Section III, when an application is determined to be incomplete, the department informs the producer in writing and describes the deficiency, and either returns the application to the producer or requests an addendum. If the application is returned to the producer, the producer has 180 days to fix the problem and resubmit the application. Resubmitting the application generally means that the department has another 30 days to review it for completeness, and, of course, it still has 60 or 90 days after that to issue or

¹⁰⁰ While conducting our application reviews, we noticed bar codes on individual documents with the files. When we asked about them, we were informed that the Records Management Unit is planning on electronically tracking every document, not just files.

¹⁰¹ Recall that the department has 60 days to issue or deny a permit for Class I and II facilities and 90 days for Class III or IV facilities. The 60- or 90-day clock begins to run when producers are notified that their applications are complete.

deny the permit. If an addendum is requested, and the producer acts promptly, it doesn't generally upset the timeliness of review.

In our discussions with the section's engineers, we were told that the completeness problems are frustrating. Apparently, less than half of the applications are entirely adequate as submitted. The majority are returned to producers as incomplete, or they are judged as complete but still require a number of changes during the 60- or 90-day review period.¹⁰² Our application reviews supported these observations.¹⁰³

Is the Department Compelling Producers to Comply with the Act and Regulations?

After reviewing our sample of permit applications, we believe that there is no question that the department is compelling producers and their engineers to comply with the application standards set forth in the act and the regulations in Title 130. In fact, based on the correspondence we read in the files and the conversations we had with producer groups and professional engineers, it appears that the department is often perceived as a nuisance.¹⁰⁴ While we understand that viewpoint, the situation strikes us, as objective evaluators, as exactly how it ought to be. If there was no tension whatsoever between the regulators

¹⁰² In general, the section's engineers believe that they spend too much time doing quality-control work for engineering firms. When we spoke to some of those firms, they obviously had a different perspective. They believe that the department's standards are often a moving target and that the department micromanages design plans. Furthermore, they claimed that the regulations are applied inconsistently by the section's engineers and that it makes a big difference who reviews your application. We return to this issue, *infra* page 25.

¹⁰³ That is, our reviews supported the fact that many applications are returned or modified. We have no basis to judge the appropriateness of those decisions from an engineering standpoint.

¹⁰⁴ The producers' view of the department as a nuisance is in stark contrast to the view taken by environmental groups who see the department as an advocate for producers that intentionally turns a blind eye to violations.

and the regulated, we would be concerned that something was amiss.

Almost every criticism that producer groups and engineers made of the department boiled down to cost, in terms of both time and money.¹⁰⁵ As we noted in Section III, the department appears to be flexible and willing to work with producers on design issues. But the department requires a lot of documentation when it does so, and that is frustrating to producers and professional engineers who believe it wastes time.¹⁰⁶ The department's requirements for comprehensive nutrient-management plans and groundwater monitoring are also frustrating to producers. They believe that the department's standards are a moving target and that the department insists on more than is required by the act or the regulations.

Our response to the producers' and engineers' comments is equivocal. Again, as objective evaluators, we aren't sure that there is anything wrong. The Legislature has made a policy decision to regulate livestock-waste management in order to protect the waters of the state. Regulation always increases the costs of the regulated industry. Whether the cost is reasonable is all a matter of perspective. Producers say it is too great; environmentalists argue it is not enough.

We are also unsure how to respond to complaints that the department's standards are a moving target. It seems to us that the target is moving for a reason. If the department were using the same standards now as it was years ago, water quality would be getting worse, not

¹⁰⁵ We should note that not all of the producers' and engineers' comments were negative, or at least were not intended to be so. Keep in mind that, when we spoke to them, we were asking for "what is wrong?" because we were interested in suggestions for improvement. Most of the people we spoke to pointed out that much is right, and that things have gotten much better over the years. We were left with the impression that the program is still young, but that it has matured and that process is continuing.

¹⁰⁶ See *supra* note 98.

better. Standards must evolve and so must the department. The fact that the department is placing increased emphasis on comprehensive nutrient management and groundwater monitoring seems natural now that construction regulations and experience have reduced the risk of catastrophic discharges.

The flip side is that the department cannot and must not make matters worse by being inconsistent or capricious. For example, it should not make a difference which section engineer reviews an application or which program specialist conducts an inspection; the response should be the same. Personalities are always going to play a role in regulatory work, but they should never determine regulatory outcomes. Furthermore, the department's engineers and program specialists should be familiar with each others' jobs so that internal communication is seamless.

Regardless of how well the department regulates the livestock industry, it will reduce its effectiveness if it ignores the industry's perceptions.¹⁰⁷ The department should make a greater effort to acknowledge the cooperation of producers who make good-faith efforts to comply with the laws. As we see it, communication is key. There can be no ivory tower in a regulatory setting. All of the department's personnel should spend enough time each year on construction sites to fully understand the realities of the construction process. Producers incur costs and setbacks as a result of regulation, and the department has to find a way to assure producers that it is aware of their concerns and appreciates cooperation.

Our suggestions for developing better regulatory relationships do not stop with the department, however. Producers and engineers have to be good stewards of the land. Produc-

ers and engineers also have to appreciate that the department is working with limited staff and resources. The department therefore relies heavily on the professionalism of engineers and the producers themselves.¹⁰⁸ Engineers and producers have to ensure, to the best of their knowledge and ability, that their permit applications are complete and adequate. If the department's faith in engineers or producers is misplaced, it will only lead to more regulation and cost.

Ongoing Compliance with the Act

We now turn from compliance with the permit-granting standards to the issue of ongoing compliance; that is, whether there are adequate rules and procedures in place to ensure that producers comply with the terms of their operating permits. There are indeed rules and procedures in place, as described at the end of Section III, and they are adequate as far as they go, but we believe there is room for improvement. Toward that end, we suggest that the department modify its routine-inspection schedule, improve its enforcement of land-application regulations, and continue its groundwater-monitoring efforts. To help fund these improvements, we suggest that the Legislature increase the fees paid by producers.

The Routine-Inspection Schedule

We noted in Section III that the department conducts routine inspections on a schedule determined by a facility's size. Class IV facilities are inspected quarterly, Class III facilities are inspected semi-annually, Class II facilities are inspected annually, and Class I facilities are inspected every few years. We also noted that the routine-inspection schedule limits how quickly the department can move through the backlog of initial inspections created by the act. We suggest that the depart-

¹⁰⁷ This is of course true relative to private citizens and environmental groups as well. Any agency that has as much public contact as the department needs to be aware of how it is perceived and attempt, as far as possible, not to reinforce any negative perceptions.

¹⁰⁸ As noted previously, engineers must sign a post-construction form and swear that the facility was built within specifications. This is a common practice in nearby states. Producers are expected to act in good faith as well.

ment curtail its inspection schedule for large facilities. This will free up additional resources to reduce the backlog and allow the department to broaden its focus to include smaller operations and facilities.

Our suggestion is not a criticism of the department or the program. The act clearly directs the department to focus its efforts on large operations, and the department has complied with that directive in setting up its inspection schedule. However, we believe the program has matured to the point that this policy should be revisited. Focusing on large operations was necessary in the program's infancy because they posed the greatest environmental threat. But that threat has been reduced by bringing them into compliance. Large operations have been forced to invest in adequate waste-control facilities, and now they are less of a threat than smaller operations without adequate facilities.

We understand that small operations do not pose the same threat of catastrophic pollution that large operations do, but they may in fact pose a greater threat of persistent contamination over time.¹⁰⁹ Unfortunately, the department has no way of monitoring this because there is so little emphasis placed on regulating small operations. We also understand that the department hesitates to heavily regulate smaller producers, especially at a time when the agricultural sector is struggling, because it doesn't want to put them out of business. But the fact remains that, four years after the advent of the act, the department still has not completely defined the universe of regulated operations. Many operations that have or require Class I facilities have not been inspected, and those that have received a permit have not yet had a follow-up routine inspection. It seems to us that, if the state is serious

¹⁰⁹ Many small operations are located on hills near surface water. This was once a matter of convenience, but such locations are particularly likely to contribute to surface water pollution.

about protecting the environment, small operations must be dealt with.

A more liberal routine-inspection schedule for large producers might also free up more time for complaint-driven inspections. As noted in Section III, the department's documentation indicates that it does a fair job of meeting its goal of responding to complaints within five days.¹¹⁰ However, the department acknowledges that it is difficult to investigate quickly enough when rainfall is causing contamination to surface water. The evidence is usually gone unless staff members can get there while the event is occurring.¹¹¹ A few less routine inspections over time might allow them to be more responsive in such situations.

Comprehensive Nutrient Management/ Land Application

As noted in Section III, producers have to submit comprehensive nutrient-management plans as part of their permit applications. A comprehensive nutrient-management plan is an operation's plan for disposing of livestock waste; it generally contemplates applying the waste to cropland in liquid or solid form. The purpose of requiring such plans is to ensure that producers apply only as much manure as can be taken up by crops, therefore reducing any possible contamination due to runoff, or, in extreme cases, seepage.

Comprehensive nutrient-management plans must address the disposal needs of whole operations, not just facilities.¹¹² Plans must include details about the land to which waste will be applied, including a legal description, the number of usable acres, slopes, and soil

¹¹⁰ See *supra* note 78 and accompanying text.

¹¹¹ This was a major point of contention for environmental groups and concerned citizens we spoke to. They believe that the department intentionally ignores violations, and they are not sympathetic to the department's staffing limitations.

¹¹² There is some tension in the statutes here because it is the facility that is granted a permit, not the operation. Yet one of the conditions of that permit is a comprehensive nutrient-management plan that encompasses the entire operation.

types.¹¹³ Land to which waste is applied may be owned by the producer or another landowner with whom the producer has an easement agreement. Proof of any agreements must be provided to the department in the application. However, under current regulations, producers must only provide agreements for one year, even though operating permits are good for a facility's life.¹¹⁴

The department's regulation of land application was a topic in almost every conversation we had with various stakeholders. Some producers and engineers believe that the plans required by the department are unrealistic. They told us that the department's land-application rates, which are based on a model developed at the University of Nebraska–Lincoln, are “laughable”; they indicated that few producers go along with them. Environmentalists claimed that producers violate their comprehensive nutrient-management plans at every opportunity and that the department does nothing to stop them.

We are not in a position to evaluate the veracity of these claims. We are not agronomists, nor have we inquired into each complaint investigation the department has conducted (or has failed to conduct). However, we do have some suggestions for improvement. The first step towards better regulation in this area is simply knowing that comprehensive nutrient-management plans are adequate.¹¹⁵ The department has to be able to detect situations in which producers don't have access to the land they are purporting to use, or situations in which different producers are planning to apply to the same area of land. The department should also be able to anticipate when and where producers will be applying waste to en-

sure, for example, that it is not applied to frozen land. To that end, the first thing we suggest is that the department make every effort to make the promise of its integrated-information system a reality.

The second thing we suggest is that the department find ways to supplement the record reviews that currently make up the whole of its enforcement efforts relative to land application. We understand that staff members have other inspection duties that restrict what they can do. Nevertheless, the department does virtually nothing to guarantee compliance at this point. If producers wanted to violate the act by falsifying records and soil samples, there is little to stop them. Perhaps the department could implement a policy of spot checking producers by having inspectors take soil samples during routine inspections. It could also make producers submit new proof of easement agreements each year. These changes wouldn't eliminate cheating, but they would make it more risky.

We do not hold out much hope for our third suggestion given the state's financial situation. However, producers, engineers, and the department itself have indicated that dealing with the complexities of comprehensive nutrient management is a task for professionals. The model land-application rates that the department uses could, and probably should, be adapted to individual situations. We suggest that the department hire an agronomist with adequate agricultural experience to review comprehensive nutrient-management plans, much like the department's geologists review the groundwater monitoring plans. We know that its budget is tight, but if the department could find room for an agronomist, it would be a good idea.¹¹⁶

¹¹³ See Neb. Admin. Code Title 130, Ch. 3, sec. 001.04H.

¹¹⁴ Conversation with Patrick Rice and Dennis Heitmann, 3 September 2002.

¹¹⁵ Adequate, that is, in the sense that producers have access to as much land as they need for safe application. How much land is reasonable is a matter of debate, as we noted, but we have to believe that what is reasonable will become apparent over time.

¹¹⁶ The same suggestion was made in a white paper published by the University of Nebraska–Lincoln for the Nebraska Board of Engineers and Architects. See Koelsch and Schulte, *Competency Requirements for Technical Advisors Developing Environmental and Compliance Plans for Animal Feeding Operations* (21 January 2000).

Groundwater Monitoring

The last ongoing compliance issue for the department is how to evaluate the effect that livestock-waste-control facilities are having on groundwater. Unlike runoff contamination, groundwater contamination cannot be seen and reported by concerned citizens. In an effort to detect problems before they get too serious, the department is increasingly requiring groundwater monitoring as a condition of obtaining an operating permit.

As noted in Section III, groundwater monitoring is not a simple matter. To properly monitor groundwater, geologists must determine the depth to water, the direction and rate of flow, and the kind of soil the water is flowing through. And with or without a facility nearby, the quality of groundwater varies across the state. There are areas that have elevated levels of nitrate, chloride, and ammonia that are either naturally occurring or due to years of improper farming practices. In short, livestock waste-control facilities are not always the culprit when elevated levels of contaminants are detected. That's why up-gradient wells are required, and facilities are only implicated when down-gradient wells show levels of contaminants different from up-gradient wells.¹¹⁷

There is reason to believe that waste-control facilities are not doing widespread irreparable harm to groundwater. A recent study conducted by the University of Nebraska's Water Sciences Laboratory indicated that most facilities have not had an adverse impact on groundwater.¹¹⁸ The study analyzed groundwater-monitoring results from 12 active facilities and one facility that was decommissioned in 1997 and returned to farmland. (Small

sample size is the study's greatest weakness.) Groundwater under two of the twelve active facilities showed signs of contamination, as did the inactive facility.¹¹⁹

The study concluded that livestock-waste-control facilities can have an adverse effect on groundwater, but that by making intelligent case-by-case determinations of the risk at each location, the department should be able to protect the state's groundwater from contamination. We agree with that conclusion and see no reason to recommend that the department change its policy in this area. Groundwater monitoring is costly for producers, but we think the cost is justified given the valuable resource at risk.

Producers and engineers that spoke to us indicated that they are concerned that groundwater monitoring will result in enforcement actions against producers that have fully complied with the act and the regulations in Title 130. As noted previously, under Title 130, facilities are allowed to seep at certain rates.¹²⁰ Producers are afraid that facilities that are seeping at or below those rates may nevertheless have a negative impact on groundwater, and that test results will be used as the basis for enforcement actions. They fear that despite the seepage rate spelled out in the regulations, the department is, in fact, enforcing a zero-seepage standard.

According to the department, there are only three active facilities, including the two in the study, that have shown any contamination.¹²¹ Those producers have or will be asked to ad-

¹¹⁷ Up-gradient and down-gradient wells are defined in *supra* note 82.

¹¹⁸ The University of Nebraska's Water Sciences Laboratory undertook the study under contract with the department. For a summary of the study and its results, see the department's booklet entitled *Ground Water Monitoring at Selected Livestock Waste Control Facilities* (May 2002).

¹¹⁹ The study also noted that nitrate levels under three facilities actually decreased. According to the study, this is likely due to a process known as biodegradation. Facility seepage can cause an increase in bacterial activity below the facility that breaks down nitrate. Depending on other indicators, a decrease in the level of nitrate can be a good thing or it could indicate that a facility is leaking as opposed to seeping.

¹²⁰ Recall that Class I facilities are allowed to seep at a rate of 1/4 inch per day and all other facilities are allowed to seep at a rate of 1/8 inch per day.

¹²¹ E-mail from Gary Buttermore, 23 September 2002.

dress the department's concerns about their liners. But the department notes that those facilities were built before the current regulations were in place.¹²² The department stands by both its allowed-seepage rate and its groundwater monitoring. According to the department, the seepage rate does not guarantee pollution because it is not necessarily contaminants that are seeping.¹²³ If a lagoon is properly managed, bacterial activity should eliminate harmful contaminants.¹²⁴ The department does not expect to see any negative impact from facilities built under current standards. However, it is taking a better-safe-than-sorry approach in case it is wrong, and we agree with that approach.

Generating Resources to Fund Compliance Efforts

We are aware that some of the recommendations we made previously will cost the state money; however, we have some suggestions about how those funds could be generated. The first suggestion is to make the program fund itself. The legislative history of LB 1209 indicates that this was the Legislature's intent when it imposed inspection and permit fees on producers. However, as noted in Section III, those fees are not sufficient, and the program is supported almost entirely by the General Fund.

The Legislature could revisit this issue and raise fees, perhaps basing them on the actual number of animal units rather than a classification scheme that treats operations within a range of animal units the same. In addition to generating higher fees, such an approach would resolve a couple of inequities that occur under the current system. As we stated previously, operations with Class IV facilities can expand indefinitely without ever paying the state additional fees. Other operations do

not have that luxury. Similarly, the current Class III definition (5,001-20,000 animal units) is extremely broad, and treats operations alike that, in fact, have little in common.

A second way to generate revenue, perhaps in conjunction with increased fees, is to place expiration dates on operating permits. Right now the permits are good for the life of a facility. If they had to be renewed every few years, for a fee, the program would generate more money. A renewal process might also provide the department with an opportunity to review each facility's compliance with regulations.

One or both of the ideas above would help the program become more self-sufficient, and, we hope, improve the department's ability to enforce the act and its regulations. Obviously, livestock producers will be unhappy with both of the above suggestions because they will increase the costs of compliance even further.

Handling Violations of the Act

The last question that the committee asked us to address is whether there are rules in place to punish violators. The answer is yes, but it should be qualified. The question is better framed as: Are there rules in place to bring violators into compliance? Framing the question in terms of punishment misrepresents the department's goals. As noted previously, the department is mainly interested in bringing producers into compliance. Once a violator complies, that is the end of the matter—punishment is not an issue. The department views legal action as a last resort and rarely pursues it.

When producers discharge waste into waters of the state or otherwise fail to comply with the act or the department's regulations, the department tries to bring them into compli-

¹²² Telephone conversation with Marty Link, 17 September 2002.

¹²³ *Id.*

¹²⁴ *Id.*

ance voluntarily.¹²⁵ A letter of warning is sent that notifies the producer of the problem and asks him or her to address it. If no action is taken, the department sends the producer a formal notice of violation. A notice of violation generally includes a description of the actions the producer is to take, a deadline by which to take them, and often a requirement to report back to the department.

If the producer does not comply after the notice of violation, the agriculture section notifies the department's legal division so that legal action can be taken.¹²⁶ The legal division develops an enforcement strategy in conjunction with the section and the Deputy Director of Programs. While the legal department helps to build the case, it is ultimately up to the Attorney General's office to pursue it in court. The first step in a departmental legal action is usually a settlement negotiation. A letter is sent to the producer proposing a settlement and offering to negotiate. The settlement offer usually contemplates both a fine and specific actions the producer must take to comply with the act and regulations.

If the producer agrees to negotiate and the negotiation succeeds, the department will draft a consent decree and a petition that is forwarded to the Attorney General's office, which will then file it with the relevant court.¹²⁷ If the producer declines to negotiate or negotiation fails, the department prepares a litigation packet and a draft petition for the Attorney General's office. The Attorney General can then pursue the prosecution.

The number of complaints, notices of violation, and referrals to the legal section for the past three years are summarized in Table D. As shown in the table, legal actions are rare.¹²⁸ Only five percent of all complaints results in legal action. When those actions are undertaken, the fines generally range from \$3,000 to \$5,000 and have never been more than \$10,000.¹²⁹

Table D: Complaints, Notices of Violations, and Legal Actions Calendar Year 2000 to Date			
Calendar Year	Complaints	Notices of Violation	Legal Actions
2000	100	24	6
2001	130	22	3
2002-date	54	6	6
Total	284	52	15

Note: Data only available since 2000.

Source: Data provided by the Department of Environmental Quality. Table prepared by the Legislative Program Evaluation Unit.

According to the department, the voluntary process works well in most cases. Producers would rather settle, get themselves into compliance, and avoid further problems. Fines, it would seem, are usually enough to get a producer's attention; the department sees few, if any, repeat offenders.¹³⁰ If the department was to pursue a producer more than once, heavier fines would be levied. For chronic offenders, the department's ultimate penalties would be to revoke their operating permits and possibly pursue criminal sanctions.

Our only suggestion relative to the department's process for pursuing violators and demanding compliance is that it be vigorous.

¹²⁵ The voluntary portion of the enforcement process was described to us in a telephone conversation with Dennis Heitmann, 26 July 2002.

¹²⁶ The legal portion of the enforcement process was described to us in a telephone conversation with Steve Moeller of the department's Legal Division, 29 July 2002.

¹²⁷ The department greatly appreciates the Attorney General's willingness to allow it to pursue negotiations on its own. Conversation with Mike Linder, Jay Ringenberg, and Patrick Rice, 15 August 2002.

¹²⁸ Environmental groups and concerned citizens we spoke with were outraged that the department does not do more to pursue and fine producers that violate the act or regulations. But, as noted in the text, compliance is the department's goal, not punishment.

¹²⁹ The range of fines was gleaned from Department of Environmental Quality press releases from the past few years. Neither Steve Moeller nor Patrick Rice could recall a fine greater than \$10,000.

¹³⁰ Telephone conversation with Steve Moeller, 25 September 2002. Mr. Moeller could not recall any repeat offenders during his four-year tenure.

Environmental groups were displeased with what they perceived as lackluster enforcement efforts on the part of the department. Even the department's own program specialists thought the process could move more quickly and be more firm. Our impression is that the process is in place and works well enough, the department has only to use it more intensely.

A related issue that came up repeatedly in conversations with environmental groups is the department's authority under the bad-actor statute.¹³¹ They believe that the department insufficiently investigates producers during the permit-granting process and that the department should use the bad-actor provision as an enforcement tool.

The department does not deny that it does little background investigation of producers.¹³² Rather, it relies on the disclosure form that producers must file with their application. The department believes that the statute is too subjective and general to be effective.¹³³ We are of the opinion that the statute may be constitutionally suspect in that it fails to describe adequately what constitutes a "bad actor," thereby raising due process concerns.¹³⁴ This inadequacy probably cannot legally be remedied by departmental regulation; rather, it is a matter that should be addressed by the Legislature.

As for using the bad actor provision as an enforcement tool, the department does not believe that it has that authority. The bad actor provision pertains to the permit-granting and permit-transfer authority only; it does not pertain to the authority to revoke a permit.

We suggest that the bad-actor statute be amended to make it useful for the department. The department should submit language to the Program Evaluation Committee that will make the statute specific enough to enforce.

¹³¹ Neb. Rev. Stat. sec. 54-2409. The statute gives the department the authority to deny a permit or transfer to any producer that the department finds unsuitable or unqualified.

¹³² Conversation with Mike Linder, Jay Ringenberg, and Patrick Rice, 15 August 2002.

¹³³ For example, the statute does not specify what kind of violation must be disclosed by producers or investigated by the department. The department is not sure if that means a confirmed complaint, a notice of violation, or a formal enforcement action.

¹³⁴ Our opinion on this matter is influenced by the fact that denial of a permit is an extremely serious action by the department. As noted by Mike Linder, it is the most severe penalty the department can impose (telephone conversation, 25 September 2002). Denial of a permit may restrict the livelihood of an applicant, which, in our opinion, makes the due process concerns even more significant.

SECTION V

FUTURE TRENDS

The regulation of livestock-waste disposal has evolved significantly since the passage of the federal Clean Water Act thirty years ago. In Nebraska, the passage of the Livestock Waste Management Act in 1998 pushed that evolution forward. More changes are on the way, and in this section, we discuss a few of the likely developments. This discussion is speculative and should be taken as such. Our intention is only to inform policymakers that times are changing.

There are two trends that we believe will influence the department's livestock-waste-management program in the near future. The first trend is toward greater regulation of livestock-waste disposal by governmental entities other than the department. Both the federal government and counties could change the face of livestock-waste-management by imposing additional regulatory requirements on the livestock industry. The second trend is toward greater use of technology. Technological developments are increasing the flow of information for the department and environmental activists and decreasing the cost of compliance for producers.

Policy Changes by Other Governmental Entities

The Environmental Protection Agency (EPA) recently proposed changes to its NPDES program that could dramatically affect the department's workload. The changes are currently in draft form and have twice been circulated to state environmental agencies for comment. The department has responded and submitted comments each time. The EPA will release its final rules in January.

There are two especially dramatic proposed changes to the NPDES program. One would

make all livestock operations over 1,000 animal units subject to NPDES permit requirements. Currently, only open-lot operations are regulated under the program. If this change were made, the department estimates that it would have to grant NPDES permits to approximately 700 additional operations statewide, many of which it had previously declared exempt from federal permit requirements.¹³⁵ If the department is forced to issue these permits, it will, in essence, have to start the livestock-waste-management program over again. The current backlog will increase dramatically and program staff will have even less time to grant and enforce state permits.

The second proposed change would alter the way that land-application rates are calculated in the NPDES version of a comprehensive nutrient-management plan. Currently, the number of acres required for land application of manure depends on a calculation that estimates the amount of nitrogen that an acre of soil can handle without the risk of seepage or runoff. The EPA is proposing to calculate the land-application area based on the amount of phosphorous that an acre of land can handle. The level of phosphorous that can be applied is lower than that of nitrogen, so it takes more acres of land—as many as double—to spread out the nutrients at an acceptable level.

Livestock-waste-management regulation could also be affected by changes in county zoning ordinances. Many counties have already changed their zoning ordinances, and further changes may occur. Much of this local activity was stimulated by and directed at odor concerns. However, there is nothing to prevent county zoning boards from also imposing en-

¹³⁵ Letter from Jay Ringenberg to EPA regarding the Concentrated Animal Feeding Operation Proposed Rule, 30 July 2001.

vironmental standards that are more restrictive than those used by the department. While county actions do not directly affect departmental permits, counties are essentially in charge of determining the number of new facilities that are built. Through zoning, they restrict the livestock industry and therefore affect the department's regulatory reach.

The Role of Technology

Like all areas of modern life, agriculture benefits from technological advances; livestock-waste-disposal is no different. We feel compelled to mention the role of technology because these developments are already starting to take shape, and we believe they will have an important influence in this area. All of the stakeholders in the area of livestock-waste management will benefit from the access to information and improved management practices that technology can provide.

Throughout the report, we have noted the department's efforts to improve the flow of information, both within and outside of the department, by implementing an integrated information system and a new complaint system. Such changes will improve the department's ability to regulate livestock-waste-disposal. The integrated information system will change how the department tracks permits, inspections, and land application. Changes in the complaint system should make the complaint process more efficient and more transparent. Both staff members and the public will benefit from this access to information.

In addition to practical benefits, technology also helps to advance our understanding of the environment and how to protect it. For example, techniques for monitoring groundwater will improve as will the available data about groundwater depth, direction and rate of flow, and soil types. Groundwater studies like that conducted by the university help the department learn which construction stan-

dards are effectively protecting groundwater and which are not. In short, technology provides the department with more accurate and up-to-date information, and that means better decision-making.

Technological advances will also affect how business is conducted by producers, especially large producers with the resources to take advantage of them. Even now, artificial liners capable of eliminating seepage altogether are being used more frequently. If such liners are properly installed and maintained, collecting livestock waste has almost no environmental impact. Materials used to cover lagoons, thereby eliminating odors, are also being developed and becoming cheaper. As these technological improvements are made, costs become more reasonable and best management practices evolve. What is now cutting-edge will one day be the standard.

Environmental groups and concerned citizens will benefit from technological advances as well. They will share the benefits resulting from departmental advances such as the online complaint system, especially when the department gets the complaint-tracking component of that system developed. Digital photography and recording have already made a big difference in the public's ability to report problems. The department is more responsive to complaints that are accompanied by evidence and documentation.

Appendix

**Comprehensive Study Of
Water Quality Monitoring
In Nebraska**

**LB 1234
PHASE II REPORT**

Prepared For:

**Natural Resources Committee
Nebraska Legislature**

Prepared By:

**Nebraska Department Of Environmental Quality
Michael J. Linder, Director**

Foreword And Acknowledgements

This Phase II report was prepared for the Natural Resources Committee of the Nebraska Legislature pursuant to Legislative Bill 1234 (LB1234), passed in 2000. LB1234 required the Nebraska Department of Environmental Quality (NDEQ) to conduct a comprehensive study of ground and surface water quality monitoring in Nebraska and prepare a report for each of the two study phases. The applicable sections of LB1234 pertaining to the comprehensive monitoring study are shown in Appendix A. The Phase I report of this study was submitted to the Natural Resources Committee on December 1, 2000, and consisted of an assessment of Nebraska's current ground and surface water quality monitoring efforts and an analysis of what the existing system does well and what it fails to do or does inadequately. A summary of the Phase I report is presented in Appendix B.

The purpose of this Phase II report is to provide the Natural Resources Committee with a detailed description of the changes required to establish a comprehensive, integrated statewide water quality monitoring system in Nebraska, including preferred alternatives if multiple options exist. In developing this report, the NDEQ worked and consulted with an advisory group called the Water Quality Monitoring Advisory Committee which consisted of designees from each of the following organizations: American Consulting Engineers Council of Nebraska (ACECN), Central Platte Natural Resources District (CPNRD), Lincoln-Lancaster County Health Department (LLCHD), League of Nebraska Municipalities (LNM), Nebraska Association of Resources Districts (NARD), Nebraska Department of Agriculture (NDA), Nebraska Department of Natural Resources (NDNR), Nebraska Department of Health and Human Services Regulation and Licensure (NHHS R&L), Nebraska Game and Parks Commission (NGPC), North Platte Natural Resources District (NPNRD), Nebraska Public Power District (NPPD), Nebraska Wildlife Federation (NWF), University of Nebraska (UN), University of Nebraska Water Sciences Laboratory (UNWSL), United States Army Corps of Engineers (USACOE), United States Environmental Protection Agency (USEPA), and United States Geological Survey (USGS).

The following individuals served as representatives for their respective organizations on the Committee during Phase II and made important contributions to this report:

ACECN	Mark Stone	CPNRD	Milt Moravek
LLCHD	John Chess	LNM	Lash Chaffin
NARD	Dean Edson	NDA	Craig Romary
NDEQ	Dick Ehrman	NDEQ	Jeff Gottula
NDEQ	Dave Jensen	NDEQ	Marty Link
NDEQ	Kristin Oomen	NDEQ	Steve Walker
NDNR	Don Adelman	NDNR	Steve Gaul
NDNR	Guy Lindeman	NHHS R&L	Jack Daniel
NHHS R&L	Laura Hardesty	NHHS R&L	Howard Isaacs
NHHS R&L	Bob Leopold	NGPC	Frank Albrecht
NGPC	Dave Tunink	NPNRD	Ron Cacek
NPPD	Mike Gutzmer	NWF	George Cunningham
UN	Ed Vitzthum	UNWSL	Mary Spalding
USACOE	Bill Otto	USEPA	Lyle Cowles
USGS	Bob Joseph	USGS	Jennifer Stanton

We are especially grateful to all of the monitoring coordinators and managers in Nebraska and surrounding states who completed the monitoring questionnaires and provided us with information about their monitoring programs.

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EXECUTIVE SUMMARY

LB 1234 required the Nebraska Department of Environmental Quality (NDEQ) to conduct a two-phase comprehensive study of ground and surface water quality monitoring in Nebraska. The Phase I report was submitted to the Legislature's Natural Resources Committee on December 1, 2000, and consisted of an assessment of Nebraska's current ground and surface water quality monitoring efforts, and an analysis of what the existing system does well and what it fails to do or does inadequately. The purpose of this Phase II report is fulfill legislative requirements to identify monitoring needs to determine water quality trends in Nebraska. To meet the goal of determining statewide trends, the state would need to develop a more comprehensive, integrated statewide monitoring system.

In developing this report, the NDEQ worked with an advisory group called the Water Quality Monitoring Advisory Committee. A list of organizations participating on this advisory committee can be found on page ii. This report is based primarily on three sources of information: data collected and analyzed by NDEQ, recommendations and data gathered by the advisory committee; and responses from surveys that were distributed to all known organizations in Nebraska that conduct water quality monitoring programs.

Although some regions of the state have excellent monitoring coverage, such as ground water monitoring in the North Platte and Central Platte Natural Resources Districts, survey responses indicated that many monitoring programs would benefit from greater regional or statewide coverage of monitoring locations, collection of more samples, additional parameter analyses, and coordinated quality assurance/quality control (QA/QC) programs and monitoring strategies.

The report identifies seven main areas of focus: lake monitoring; stream fixed-site monitoring; ground water fixed-site monitoring; TMDL monitoring; information sharing; the development of periodic reports; and questionnaire responses regarding local and regional monitoring. Below is a brief description of the current situation, potential actions, and costs involved.

LAKE FIXED-SITE MONITORING NETWORK

Current situation – Nebraska's lakes are heavily used for outdoor recreation activities such as fishing, boating, swimming and camping, and adequate water quality must be maintained and protected in these lakes in order to support these recreational uses. Protection of lake water quality is also important because expenditures related to outdoor recreation provide significant benefits to Nebraska's economy. Although DEQ and the University have ongoing programs to monitor the quality of various lakes, there currently is not a fixed-site approach which would provide information related to water quality trends at lakes.

Potential actions – In order to assess trends, the state could establish a statewide lake fixed site monitoring network at Nebraska's highest public use lakes, including city lakes, to characterize the existing water quality of these lakes, and to determine if water quality is changing over time. A network of 25 lake monitoring locations would constitute about 5% of the 514 "publicly owned or open to the public" lakes in Nebraska.

Cost of the plan – \$75,000 annually. This includes the costs of collecting and analyzing monthly samples from May through September at 25 lakes for physical/chemical parameters.

STREAM FIXED-SITE MONITORING NETWORK

Current situation –A small statewide stream fixed-site monitoring network was established by NDEQ in 2000. This network consists of 29 stream locations at flow gaging stations. Since there are more than 16,000 miles of perennial streams in Nebraska, statewide trends in stream water quality cannot adequately be represented by these 29 sites. In addition, the state currently conducts monthly analysis of physical/chemical parameters at 14 coldwater streams and samples trout populations annually at 30 coldwater streams.

Potential actions -- In order to better assess trends, the state could install an additional 71 fixed-sites on streams at continuous flow gaging stations for a total of 100 fixed-sites. Each of these 100 stream sites would be sampled monthly for the same parameters analyzed in the existing ambient stream network. The state would need to install new continuous flow gaging stations at approximately 22 of the proposed 100 stream locations. A list of potential sampling sites and continuous flow gaging stations within each river basin is presented on page 10.

Cost of the plan – One-time costs for establishing of stream sites would be approximately \$220,000. Annual costs, including sampling, analysis, operation and maintenance, would be approximately \$800,000.

GROUND WATER FIXED-SITE MONITORING NETWORK

Current situation – The state does not have a statewide ground water fixed-site monitoring network in place currently, but there are considerable existing ground water monitoring locations throughout the state, primarily through NRDs and Groundwater Management Areas. Currently, there is significant variability in well types, well depths, sample schedules, parameters, and analytical methods used among the organizations conducting ground water monitoring in Nebraska.

Potential actions -- In order to better assess trends, the state could develop a statewide ambient ground water fixed-site monitoring network to characterize the water quality of aquifers throughout the state and determine if water quality is changing over time. In addition, standardized collection, reporting and laboratory procedures should be established. In certain areas, there is inadequate regional coverage of wells. It is estimated that installation of an additional 200 dedicated monitoring wells would be necessary to provide adequate regional and statewide coverage of ground water quality. We estimate a statewide network would consist of 1,000 wells sampled twice per year for nitrates, pesticides and other parameters.

Cost of the plan -- One-time costs to install approximately 200 dedicated monitoring wells would be approximately \$700,000. Annual costs for implementation are estimated to be about \$296,000.

TMDL Monitoring

Current situation -- One of the most important surface water issues facing Nebraska is the collection of water quality data for development of Total Maximum Daily Loads (TMDLs). Nebraska has a federal statutory obligation to develop TMDLs for all surface waters listed on its EPA-approved Section 303(d) list of impaired waters. The collection of detailed water quality monitoring data is important so that accurate TMDLs can be developed and used to reduce pollution loads to acceptable levels. Also, adequate monitoring data is important in listing water bodies on the Section 303(d) list of impaired waters.

Potential actions – In 1999, NDEQ staff conducted an analysis which established TMDL goals and defined what activities would be needed to attain these goals. The goals relevant to this report would be to collect adequate water quality monitoring data for the 114 waterbodies on the Nebraska Section 303(d) list. (*The TMDL information can be found in the 1999 NDEQ report, “Strategic Plan for Developing Total Maximum Daily Loads and Addressing Waterbodies Included on the 1998 Nebraska Section 303(D) List”*).

Cost of plan – The collection of adequate monitoring data at these sites would cost approximately \$360,000 annually.

INFORMATION SHARING

Current situation – One of the biggest surprises of this study was the number of organizations that were unaware of the monitoring programs being conducted by others. This information could potentially be used by other organizations if state mechanisms for sharing information existed.

Potential actions – To promote the exchange of statewide water quality data and monitoring information among organizations, two mechanisms would be needed: 1) the establishment of ground water and surface water monitoring technical advisory committees; and 2) the development of a centralized database for storage and public access to Nebraska ground water and surface water information. The advisory committees would help ensure the existing programs are well coordinated and that monitoring information is exchanged between organizations on a regular basis. A list of proposed organizations and suggested duties for the advisory committees are listed on **pages 18 and 19**.

To promote data sharing and “one-stop shopping” for all water quality data collected in Nebraska, the state could store all Nebraska ground water and surface water data in a centralized database. There was almost unanimous support by survey respondents for establishment of a centralized database for all ground water and surface water quality monitoring data collected in Nebraska. The existing Agrichemical Contaminant Database or “Clearinghouse Database” on the Nebraska Department of Natural Resource’s web site was recently established in Nebraska for nitrate and pesticide ground water quality data. This database could be expanded to include all ground water and surface water quality data collected in Nebraska including internet links to other databases that hold Nebraska water quality data.

Cost of the plan – There should be no additional costs associated with establishment of these technical advisory committees as these costs can likely be assumed within existing monitoring program budgets. The estimated cost to expand this database to include the storage of Nebraska surface water quality monitoring data and internet links to other water quality databases is an estimated \$150,000 annually. The current cost of maintaining the ground water database is \$75,000 annually, so a centralized database for storage of all

ground and surface water data in Nebraska is estimated to cost approximately \$225,000 annually.

REPORTS TO THE LEGISLATURE

Current situation – A total of \$50,000 was recently appropriated by the Nebraska Legislature in LB329, passed in 2001, for development of an annual ground water quality report to the Legislature. There currently is no funding for this type of report for surface water issues.

Potential actions – In conjunction with the implementation of ambient fixed-site ground and surface water monitoring networks, NDEQ could develop periodic ground and surface water quality reports to the Nebraska Legislature. These reports would provide the Legislature with concise, reader-friendly updates of the status and trends of ground and surface water quality in Nebraska and would be valuable in facilitating water quality management and policy decisions. In addition, these reports would be made available to the public and should be useful in improving public awareness of Nebraska water quality issues.

Cost of plan -- The estimated costs of developing and publishing ground and surface water quality reports are approximately \$100,000 annually (\$50,000 per report). Or, an alternative would be to use the existing \$50,000 allocated through LB 329 to have the agency submit ground water and surface water reports on alternating years.

QUESTIONNAIRE RESPONSES

The results of this portion of the report are based on questionnaires that were distributed to all known organizations in Nebraska that conduct water quality monitoring programs.

Current situation – According to questionnaire responses, most individual ground and surface water monitoring programs in Nebraska have a local or regional focus and often were developed in response to statutory or regulatory requirements. Most of these monitoring objectives are in addition to the statewide monitoring objectives. The questionnaire responses indicated that these local and regional objectives are not being attained.

Potential actions – Attainment of the other local and regional monitoring program objectives could be considered part of a comprehensive, integrated statewide monitoring system in Nebraska.

Cost of plan – Based on the questionnaire results and extrapolating these figures to account for missing NRD questionnaires, it is estimated that an additional \$1,550,000 (ground water) and \$400,000 (surface water) would provide funding needs identified from surveys.

COMPREHENSIVE STUDY OF WATER QUALITY MONITORING IN NEBRASKA

PHASE II REPORT

Introduction

Legislative Bill 1234 (LB1234) directed the Nebraska Department of Environmental Quality (NDEQ) to conduct a comprehensive study of surface and ground water quality monitoring in Nebraska. This study was conducted in two phases. During Phase I of the study, NDEQ worked with and consulted an advisory committee consisting of the following organizations: American Consulting Engineers Council of Nebraska (ACECN), Nebraska Department of Agriculture (NDA), Nebraska Health and Human Services Regulation and Licensure (NHHS R&L), Nebraska Department of Natural Resources (NDNR), League of Nebraska Municipalities (LNM), Nebraska Association of Resources Districts (NARD), Nebraska Game and Parks Commission (NGPC), United States Geological Survey (USGS), University of Nebraska (UN), and Nebraska Wildlife Federation (NWF). The advisory group for Phase II included the organizations from Phase I and the following organizations that were found by the NDEQ to be significant stakeholders in the water quality area: Central Platte Natural Resources District (CPNRD), North Platte Natural Resources District (NPNRD), University of Nebraska Water Sciences Laboratory (UNWSL), Nebraska Public Power District (NPPD), Lincoln-Lancaster County Health Department (LLCHD), U.S. Army Corps of Engineers (USACOE), and U.S. Environmental Protection Agency (USEPA). A description of the applicable sections of LB1234 pertaining to the comprehensive study of water quality monitoring in Nebraska is in Appendix A.

As required in LB 1234 “Phase II of the study shall utilize the information gathered during Phase I and shall consist of a detailed description of the changes required in the current system to establish a comprehensive, integrated statewide water quality monitoring system, including preferred alternatives if multiple options exist.” LB1234 instructs the Water Quality Monitoring Committee to address issues which are detailed in Parts 2 and 4 of this report.

The Water Quality Monitoring Advisory Committee was established during August of 2000. In order to assess the status of ground and surface water quality monitoring programs in Nebraska, monitoring questionnaires were developed by the Advisory Committee and distributed to all organizations in the state and surrounding states with potential to conduct water quality monitoring programs. The Advisory Committee first developed a brief monitoring questionnaire to identify major ongoing monitoring programs in Nebraska. A summary of the Phase I report findings and conclusions is presented in Appendix B. A more comprehensive detailed questionnaire was then developed and submitted to all identified major ongoing monitoring programs in Nebraska in an attempt to obtain information that could be used to address the Phase II requirements.

Part 1 of this report will provide a summary of existing surface and ground water programs being implemented and subsequent sections will focus on the questions posed in LB 1234. Part 2 will respond to Issues A through F posed in LB 1234 relating to establishing a statewide monitoring system which can identify water quality trends. Part 3 addresses additional considerations relevant to LB 1234. In response to Issue G of LB 1234, Part 4 of this report identifies potential costs of developing an integrated, statewide water quality monitoring network to assess water quality trends.

Part 1: Existing Surface and Ground Water Quality Programs

Current Ground Water Programs

Statewide collection of ground water quality data in Nebraska has been accomplished through the monitoring programs of several organizations including the 23 NRDs, NDEQ, NHHS R&L, USGS, UN Conservation and Survey Division, UN Water Center, and county health departments. These organizations collect ground water monitoring data for a variety of purposes ranging from one-time studies to ongoing monitoring over a large area. Samples are taken from a wide range of well types. Based on responses to the monitoring questionnaires, the following numbers of monitoring programs have collected samples from each of the following types of wells: monitoring wells (41 programs), domestic wells (39 programs), irrigation wells (38 programs), municipal wells (28 programs), and industrial wells (13 programs).

Since much of Nebraska is characterized by intense cropping and irrigation practices, the majority of the ground water quality data collected in Nebraska has been for the purpose of documenting nitrate-nitrogen and pesticide concentrations in the ground water and evaluating the relationship of these compounds to agricultural land use practices. To further this effort, the Nebraska Departments of Environmental Quality, Agriculture and Natural Resources have collaborated with the University of Nebraska Water Sciences Laboratory to develop and maintain a statewide database of ground water nitrate and pesticide data called the Agrichemical Contaminant Database or “Clearinghouse Database.” Ground water sampling results are provided to scientists at the Water Sciences Laboratory, who review the practices used in obtaining and analyzing the samples. The Water Sciences Laboratory then assigns a numerical rating from 1 to 5 for individual results, with “1” representing the most basic quality assurance/quality control (QA/QC) practices, and “5” representing the most advanced QA/QC. These quality “flags,” along with the sample results, are provided in database form to the Nebraska Department of Natural Resources which places the information on its website. In this way, the results of many years of ground water sampling are made readily available to the public, and these results are also presented in a format that allows the user to know the level of QA/QC inherent in each sample.

The Clearinghouse Database records extend from approximately 1976 to the present. As would be expected, the majority of samples are from areas that are heavily farmed, but a considerable number of samples have also been collected from wells in more pristine areas of the state, such as the Sand Hills. For information on specific well locations, please refer to the Clearinghouse Database, which can be accessed at “<http://dnr.state.ne.us>” on the NDNR web site.

A wide variety of ground water monitoring approaches are used across the state. The most common ground water monitoring approaches are:

- Long term fixed station ambient monitoring,
- Rotating random well monitoring,

- Mass well sampling,
- Compliance monitoring,
- Special studies,
- Investigative monitoring, and
- Other monitoring.

Long Term Fixed Station Ambient Monitoring -- Many NRDs have a network of wells that are monitored on a set schedule. Many of the wells in these networks are irrigation, domestic, stock, or dedicated monitoring wells. Wells may be sampled annually or once every two to four years. Data collected from these wells are used to identify potential ground water problems, identify trends, make Ground Water Management Area boundary and “phase trigger” decisions, and make recommendations on controls and best management practices in a particular area. The majority of samples collected with this monitoring approach are analyzed for nitrate-nitrogen. A more limited number of samples are analyzed for pesticides or major chemical constituents.

Rotating Random Well Monitoring -- Many NRDs randomly sample different types of wells across their district each year. This approach is conducted to identify potential ground water quality problems, make Ground Water Management Area boundary and “phase trigger” decisions, and make recommendations on controls and best management practices in a particular area. Most samples are analyzed for nitrate-nitrogen, but some NRDs also analyze for pesticides or major chemical constituents.

Mass Well Sampling -- Some NRDs sample all existing wells (or as many as possible) in a given area. The area sampled may be as large as the entire NRD, but is often limited to a particular geologic province, county, or watershed. This approach is conducted to identify potential ground water quality problems, make Ground Water Management Area boundary and “phase trigger” decisions, and make recommendations on controls and best management practices in a particular area. The majority of samples are analyzed for nitrate-nitrogen. A fewer number of samples are analyzed for pesticides and major chemical constituents.

Compliance monitoring -- NDEQ requires and does significant compliance ground water monitoring in the state. Compliance monitoring is required at many livestock waste control facilities, landfills, remediation sites, and permitted facilities. Monitoring may be done by NDEQ or the facility and decisions concerning compliance and remediation are made from the data. The monitoring occurs annually, semi-annually, monthly, or on other prescribed schedules. Monitoring may be conducted for a wide range of parameters, depending on the particular facility. For example, if ground water monitoring is required at livestock waste control facilities, monitoring for nitrate as nitrogen, chloride, and ammonia is conducted. At a hazardous waste facility, however, monitoring may be required for a various synthetic compounds.

NHHS R&L requires all public water supply systems to monitor their ground water sources for approximately 83 constituents over a six year schedule. This schedule may vary based on the past concentrations of parameters found, the population served, and other factors. Monitoring results are used to help protect public drinking water quality and to ensure compliance of the public water supply system with the drinking water limits imposed in the federal Safe Drinking Water Act.

Special studies -- Special ground water monitoring studies are sometimes conducted by NRDs, NDEQ, NHHS R&L, USGS, USEPA, and others. Usually these studies are a one-time event to meet a specific objective. An example of a special study is the Ground Water Management Area program implemented by NDEQ under Title 196 (Rules and Regulations Pertaining to the Ground Water Management Areas). NDEQ's studies usually involve one-time sampling of approximately 10 to 20 percent of the existing registered wells in a particular area of interest. The purpose of this monitoring is to help decide if a Ground Water Management Area is necessary in these areas. In the case of an existing NRD Ground Water Management Area, the NDEQ can assist the NRD in boundary or "phase trigger" decisions, or require additional controls.

Investigative monitoring -- Investigative monitoring is typically initiated in response to the occurrence of a significant pollution event, spill, or public complaint. This type of sampling may be conducted to define the extent and impact of the pollution event, determine if remedial actions should be implemented for public health or environmental protection, identify possible pollution sources and/or responsible parties, or determine if state rules and regulations have been violated. The type of sampling that is conducted for investigative purposes is highly specific to the situation under investigation.

Other monitoring -- Monitoring may also be conducted for educational or other purposes. For example, a homeowner with a private domestic well may take a ground water sample to a lab or NRD to find out what the nitrate level is. The analysis of "other" monitoring samples is usually done as a public service and will not meet the specific quality assurance procedures of most monitoring programs in the state.

Current Surface Water Programs

Surface water monitoring programs vary significantly among organizations in Nebraska, ranging from volunteer monitoring programs with little or no costs, to large sophisticated monitoring programs that cost several hundred thousand dollars annually. In general, statewide chemical water quality monitoring programs in Nebraska are conducted primarily by three organizations; the NDEQ, USGS, and U.S. Army Corps of Engineers (USACOE). The NDEQ conducts statewide stream, lake, and wetland monitoring programs. Several special studies are also conducted in cooperation with other organizations. The USGS conducts monitoring programs in river basins throughout the state and also conducts special studies in cooperation with local organizations. The ACOE conducts water quality sampling in flood control reservoirs it has constructed in Nebraska.

In addition to these statewide monitoring programs, a multitude of program-specific monitoring programs are conducted throughout Nebraska by federal, state, and local organizations. Some of these monitoring efforts are coordinated with other organizations, but many are conducted to meet specific program objectives with little or no collaboration. Many organizations target surface water quality monitoring within specific river basins or watersheds. The NDEQ collects most of its surface water quality data in conjunction with a rotating basin

monitoring strategy. Two or three river basins are sampled each year and all 13 river basins are sampled within a five-year period. Figure 1, (page 40) shows the locations of the 13 river basins in Nebraska.

Statewide biological monitoring programs are conducted primarily by two organizations; the NDEQ and NGPC. The NDEQ collects fish and macroinvertebrate community data at randomly selected stream sites using a probabilistic sample design (random sample site selection approach) in two to three river basins each year. The NDEQ also collects fish throughout Nebraska for its fish tissue monitoring program. The NGPC collects fish community data from the Missouri River and its tributaries, and from selected lakes and perennial streams throughout Nebraska.

Federal agencies and state agencies that use EPA grant funds (e.g., NDEQ) are required to store their surface water monitoring information on the EPA STORET national database. Since 1972, surface water quality monitoring data has been collected at a large number of sites in Nebraska. However, few of these sites have been continuously monitored. Water quality data collected by federal agencies and state agencies that use EPA funds can be accessed at “<http://dnr.state.ne.us>” on the NDNR web site. However, this is only a partial list of the historical surface water locations where water quality data has been collected in Nebraska.

Surface water monitoring programs in Nebraska collect samples from a number of different types of surface waters. Based on responses received from the monitoring questionnaires, the following numbers of monitoring programs collected samples from each the following types of surface waters: perennial streams (46 programs), lakes/reservoirs (27 programs), intermittent streams/drainages, waterways (16 programs), wetlands (10 programs), and other surface waters (14 programs). The “other” surface waters listed included effluents, runoff water, canals, reuse pits, and sandpits. (See Figure 1, page 40 – Locations of the 13 River Basins.)

A number of different approaches are used in Nebraska for monitoring surface waters. Examples of these monitoring approaches are listed below.

General Surface Water Quality Monitoring Approaches

Surface water quality monitoring approaches can generally be characterized as either source monitoring or ambient monitoring. Source monitoring usually involves collecting samples from a point source discharge (i.e., effluent discharged from a pipe) or the receiving water below the discharge. Ambient monitoring refers to all types of monitoring conducted in waters outside of the immediate influence of point source discharges. The main approaches to source and ambient surface water quality monitoring include:

Source Monitoring:

- **Self-monitoring of effluents** by industrial and municipal dischargers to evaluate compliance with permit conditions.

- **Compliance sampling inspections** by the NDEQ or USEPA to provide an independent evaluation of the compliance of industrial and municipal dischargers with their permit conditions.
- **Effluent characterization studies** to measure the chemical constituents of the effluent and/or the characteristics of the stream where the effluent mixes with the receiving water.

Ambient Monitoring:

- **Networks of “fixed stations”** are monitored to evaluate water quality conditions and trends at locations where water samples are systematically collected over time.
- **Intensive surveys** are conducted to collect detailed water quality data for specific monitoring objectives such as calculating pollution loads or identifying sources of pollution. These studies are often conducted using a rotating basin monitoring approach.
- **Statistically-designed special studies** usually involve randomly selected sampling locations within a given geographic area. These studies allow statements to be made about the water quality of a given area with a known level of confidence.

Part 2: Response to LB 1234 Issues A through F

This portion of the report presents NDEQ's findings in response to A through F of following excerpt of LB 1234. Item G will be addressed in Part 4 of this report. LB 1234 states:

- "The proposed monitoring system shall include, but not be limited to, the following:*
- (a) Recommended monitoring site locations;*
 - (b) A description of acceptable monitoring techniques;*
 - (c) The institutional flexibility to allow contaminants to be monitored on a statewide or regional basis as needed;*
 - (d) Procedures to determine when coordinated monitoring between state and local entities is needed and policies for directing such monitoring;*
 - (e) Provisions for the development of long-term trend lines for problem contaminants, for the inclusion of new contaminants, and for elimination of contaminants no longer requiring monitoring;*
 - (f) Mechanisms to determine the best locations to monitor water quality for different types of contaminants and how to define local or regional problem areas; and*
 - (g) An estimate of funding necessary to implement the recommendations of the study."*

A) Recommended Monitoring Site Locations

The advisory committee and agency could not develop a complete set of site specific locations for this report, but they have established recommendations that the proposed future advisory committees (see page 18) could pursue. Specifically, in order to assess trends and develop comprehensive, integrated ground and surface water quality monitoring systems in Nebraska, the state could:

I. Develop a statewide ambient fixed-site ground water monitoring network

A fixed-site ground water monitoring network would characterize the water quality of aquifers throughout the state and determine if water quality is changing over time. In addition, standardized collection, reporting and laboratory procedures should be established. In certain areas, there is inadequate regional coverage of wells. It is estimated that installation of an additional 200 dedicated monitoring wells will be necessary to provide adequate regional and statewide coverage of ground water quality. We estimate a statewide network would consist of approximately 1,000 wells.

Specific monitoring site locations be determined in the future by the recommended Ground Water Monitoring Technical Advisory Committee (see page 18) after specific monitoring objectives have been established. General regions where ground water contamination has been documented will likely receive the most attention for the selection of monitoring sites. These regions are described in (f) in this chapter. Some criteria or mechanisms that may be helpful in choosing the best specific monitoring locations are also described in (f). There are many important factors to be considered in developing a ground water monitoring network and it will take time to consider these issues and select appropriate monitoring locations.

This network can consist of different types of wells, but should include a consistent sampling procedure and schedule. Factors such as natural vulnerability, land use, ground water use, administrative factors, well type, etc, should be considered in the selection of site locations. Following are other factors which should be considered in establishing the statewide ground water fixed-site monitoring network.

- Detailed information must be available for all wells chosen for the network (e.g., details on construction, depth, age, screen placement, location).
- Existing wells should be utilized, as available.
- Where existing irrigation, public, domestic, or monitoring wells are not available or inadequate, dedicated monitoring wells should be installed. As stated, this could involve as many as 200 new monitoring wells. These wells would most likely be installed using a phased approach.
- Wells should be sampled annually, twice a year, once every two years, or on some other fixed frequency schedule as determined by the Ground Water Monitoring Technical Advisory Committee.
- At a minimum, wells should be sampled for nitrates.
- Wells should also be sampled for pesticides, volatile organic compounds (VOCs), and major anions and cations. The schedule for monitoring of these parameters should be the same or less often as that of nitrates.
- Quality assurance/quality control samples (e.g. duplicates and blanks) should be taken at a minimum rate of 10% of all samples collected.
- Standardized sampling and lab analysis methods consistent with federal and state regulations should be used.

The recommended statewide ambient fixed-site ground water monitoring network should consist of approximately 1,000 wells that should each be sampled twice per year for nitrates, pesticides, and other parameters (volatile organic compounds (VOCs), major anions and cations). The rationale for an ambient network of 1,000 wells is that this represents approximately 1% of the 115,313 registered wells in the state and 1,000 wells would allow between 40 to 50 of the best well locations to be selected within each of the 23 NRDs.

II. Install Additional Fixed Sites on Streams

In order to assess trends on a statewide basis, additional fixed site monitoring would be necessary. The state could install an additional 71 fixed-sites on streams at continuous flow gaging stations for a total of 100 fixed-sites. It is estimated that approximately 100 stream sites could be sampled monthly for the same parameters analyzed in the existing ambient stream network. For effective trend analysis, continuous flow gaging stations are necessary at the sites. Potential sampling sites and continuous flow gaging stations within each river basin are listed on the next page.

There are many important factors that need to be considered in developing monitoring networks. In addition, reconnaissance visits to potential sites should be conducted before the monitoring locations are selected.

The following factors should be considered in the preliminary selection of monitoring site locations for a statewide ambient fixed-site surface water monitoring network:

- Comprehensive coverage of all surface waters should be considered, but, at a minimum, statewide ambient fixed-site surface water monitoring networks should include streams and lakes.
- Spatial stratification (headwaters, middle reaches, lower reaches) of larger perennial streams.
- Indicator sites representative of ecoregions or specific land use practices (e.g., agricultural or urban development).
- Integrator sites at the lower reaches of the largest streams in each river basin.
- Impaired waters or waters in areas of known contamination.
- Locations above and below major tributaries and metropolitan areas.
- Reference sites for physical and chemical water quality data and biological condition.
- Locations on important waters entering and leaving the state or border waters (e.g., interstate waters, river compacts, Missouri River).
- Additional criteria or mechanisms that may be helpful in choosing the best monitoring locations are also described in (f) below.

If an expanded statewide ambient fixed-site stream monitoring network is implemented it should, at a minimum, include the existing ambient stream network of 29 stream sites at flow gaging stations and 30 coldwater stream sites. Active monitoring sites of other organizations should be considered and wherever possible, existing flow gaging stations should be used so that instantaneous and average daily flows can be obtained with all water quality samples collected. Historical stream monitoring sites should also be considered. Figure 2 (page 41) shows the locations of all active stream gaging and ambient fixed-site stream water quality monitoring locations in Nebraska.

A list of the recommended number of additional stream sites and new continuous flow gaging stations within each river basin for the recommended 100 site ambient stream monitoring network are listed below:

- Big Blue River Basin: 2 additional sites on the Big Blue River, 2 additional sites on major tributaries; 0 new flow gaging stations.
- Elkhorn River Basin: 2 additional sites on the Elkhorn River, 4 additional sites on major tributaries; 0 new flow gaging stations.
- Little Blue River Basin: 0 additional sites on the Little Blue River, 1 additional site on a major tributary; 0 new flow gaging stations.
- Loup River Basin: 0 additional sites on the Loup River, 10 additional sites on major tributaries, 0 new flow gaging stations.
- Lower Platte River Basin: 1 additional site on the Platte River, 5 additional sites on major tributaries, 1 new flow gaging station.
- Middle Platte River Basin: 2 additional sites on the Platte River, 2 additional sites on major tributaries, 1 new flow gaging stations.
- Missouri Tributaries River Basin: 2 additional sites on the Missouri River, 5 additional sites on major tributaries, 4 new flow gaging stations.

- Nemaha River Basin: 1 additional site on the Big Nemaha River, 1 additional site on a major tributary, 2 new flow gaging stations.
- Niobrara River Basin: 1 additional site on the Missouri River, 1 additional site on the Niobrara River, 7 additional sites on major tributaries, 5 new flow gaging stations.
- North Platte River Basin: 2 additional sites on the North Platte River, 7 additional sites on major tributaries, 5 new flow gaging stations.
- Republican River Basin: 2 additional sites on the Republican River, 5 additional sites on major tributaries, 0 new flow gaging stations.
- South Platte River Basin: 1 additional site on the South Platte River, 1 additional site on a major tributary, 2 new flow gaging stations.
- White River-Hat Creek River Basin: 1 additional site on Hat Creek, 1 additional site on a major tributary to the White River, 3 new flow gaging stations.

III. Establish a Stream Fixed-Site Biological Monitoring Network

Establishment of an ambient fixed-site stream biological monitoring network is recommended to determine if significant changes in stream biological populations are occurring over time. Biological monitoring is important because it provides a direct measure of the health of the assigned aquatic life beneficial uses. It is recommended that an ambient network of approximately 30 fixed-site biological reference sites be established in Nebraska's Level III and Level IV ecoregions (shown in Figures 3-4, on pages 42 and 43).

Ecoregions are ecological regions that reflect relatively homogeneous physical characteristics (such as climate, geology, soils, vegetation, biology, and land use.) Ecoregions have been defined in four categories: Levels I and II are on a broad, continental scale; Level III is more specific and used for national applications, and Level IV is the most specific breakdown of these regions, and it is used for state-level applications. Nebraska has six Level III ecoregions and 29 Level IV ecoregions.

Approximately one reference site should be selected from each of the 29 Level IV ecoregions in Nebraska or five reference sites should be selected in each of the six Level III ecoregions in Nebraska.

IV. Establish a Statewide Lake Fixed Site Monitoring Network

The state could establish a lake fixed site monitoring network at Nebraska's highest public use lakes, including city lakes, to characterize the existing water quality of these lakes, and to determine if water quality is changing over time. An ambient network of 25 lake monitoring locations would constitute about 5% of the 514 "publicly owned or open to the public" lakes in Nebraska.

B) A Description of Acceptable Monitoring Techniques

The University of Nebraska Water Sciences Laboratory has developed screening criteria for the acceptance of nitrate and pesticide ground water quality data in the Agrichemical Contaminant Database. As the first step, the "Clearinghouse" process "assesses" submitted data with quality flags from 1 to 5 (5 having the highest level of quality assurance). Data are assessed

according to the data collection technique, method analysis, well information available, locational information available, and the existence of written Quality Assurance Project Plans, Sampling and Analysis Plans and/or Standard Operating Procedures (SOPs). “Clearinghouse” data are submitted to NDNR for inclusion on the agency’s web site as the Agrichemical Contaminant Database.

The Advisory Committee recognized the importance of consistent and reliable sampling and analysis methods, but also recognized that every entity gathering data has their own purposes for that data. Different monitoring purposes may necessitate different data gathering techniques. The critical factor is that information (metadata) on the data itself, which states how the data was collected, is readily available. In that way, the user can be assured that they are using comparable data.

The following is recommended with regard to acceptable monitoring techniques:

- Encourage or require all ground water data be collected and analyzed with written acceptable Quality Assurance Project Plans, Sampling and Analysis Plans and/or Standard Operating Procedures. The Ground Water Monitoring Committee would be responsible for publishing guidance for such plans and procedures and for arranging for periodic Quality Assurance training.
- Encourage that all ground water quality data used in decision-making and policy development be taken from wells with detailed information available for type of construction, depth, age, screen placement, location, etc. Detailed well information should be required for all wells used in the ambient ground water quality monitoring network.
- Provide or expand statewide training for selecting wells and well locations and developing acceptable sampling and quality assurance techniques in conjunction with the University of Nebraska Cooperative Extension and Water Sciences Laboratory, the Nebraska Well Drillers Association, the Nebraska Association of Resources Districts, and other organizations.
- Encourage use of national standards and information to standardize data parameters, collection methods, and laboratory analysis methods. In the future, data comparability issues between states may become more important.
- Develop procedures for collecting and analyzing surface water quality samples. Whenever possible, these procedures should be consistent with national standards and methods so that sample data from Nebraska can be compared with data from other states.
- Provide assistance in the development of written procedures for collecting and analyzing surface water samples, such as standard operating procedures and quality assurance project plans.

C) The Institutional Flexibility to Allow Contaminants to be Monitored on a Statewide or Regional Basis as Needed:

Ground Water Institutional Flexibility

The State's 23 Natural Resources Districts (NRDs) are heavily involved in monitoring nonpoint source contaminants of concern for their particular land use and geologic conditions. NRDs were formed as local agencies with the flexibility and ability to make local decisions. This local control has always been a natural and accepted method of ground water management in Nebraska. Overall, good cooperation exists between NRDs and State and Federal Agencies on ground water monitoring efforts, therefore institutional flexibility to address a variety of ground water concerns already exists. The Advisory Committee believes that this cooperation can and will result in effective monitoring for a wide variety of concerns.

NDEQ and the Advisory Committee recommends the following be considered, with respect to institutional flexibility to monitor contaminants regionally or statewide, as needed:

- A Ground Water Monitoring Technical Advisory Committee could provide monitoring recommendations for particular contaminants of concern. For example, if the Nebraska Department of Agriculture must sample statewide due to new pesticide registration requirements, the Ground Water Monitoring Technical Advisory Committee could help organize the endeavor. Likewise, as new contaminants of concern arise, the Committee would serve as a guiding body and resource for development of strategies to deal with these issues.
- The Committee should maintain a current inventory of current monitoring activities to share with interested parties. This inventory would also be useful in coordinating and prioritizing monitoring activities.
- The Committee should act as a moderator in situations where conflicts concerning ground water monitoring issues occur between local and/or state agencies. This committee should help negotiate a amiable solution to these problems.

Surface Water Institutional Flexibility

The following provisions should be considered:

- A Surface Water Technical Advisory Committee could coordinate all statewide surface water quality monitoring programs and ensure that sample collection personnel are not prevented from sampling at the selected sample locations by any institutional restrictions such as city, county, NRD, or tribal boundaries.
- Annual reviews and updates of statewide Quality Assurance Project Plans by the Committee should include considerations of the parameters to be added or deleted from the parameter lists of each ambient surface water quality monitoring program due to national, statewide, or regional issues, concerns, or statutory requirements.
- Staff sharing agreements and contracts could be developed by the NDEQ as lead agency of the Surface Water Technical Advisory Committee with NRDs and other

organizations to insure that ambient monitoring can be conducted in all areas of the state where water quality samples are recommended.

- Memorandum of Understanding (MOU) documents could be developed as necessary between organizations to address any monitoring disputes that may arise and help ensure institutional flexibility occurs.

D) Procedures to Determine When Coordinated Monitoring Between State and Local Entities is Needed and Policies for Directing Such Monitoring:

Ground Water Procedures

Procedures for coordinating monitoring should be determined by the recommended Ground Water Monitoring Technical Advisory Committee. Methods to prioritize local concerns and problem areas versus statewide concerns should also be developed.

NDEQ and the Advisory Committee recommends that the following factors should be considered when procedures are established for coordinating ground water monitoring:

- The amount and source of funding available.
- The purpose of the ground water monitoring (e.g., Are there concerns about nitrate in drinking water?; Is ground water quality impacting surface water or vice versa?; Is the concern a gasoline additive such as MTBE?; Is there a natural public drinking water contaminant such as arsenic that should be investigated?).
- The particular aquifer or portions of aquifers that are of concern (shallow vs. deep; alluvial vs. upland; dryland vs. irrigated; rural vs. urban). Understanding the geology and geography is crucial to the selection of monitoring locations and parameters.
- Surface and ground water interaction issues. These issues may determine if monitoring plans for either ground water or surface water should be developed.
- The severity, physical extent, and urgency of a particular problem, as necessary to determine sampling and analysis schemes.

Surface Water Procedures

The following factors should be considered:

- The Surface Water Technical Advisory Committee should be charged with coordinating monitoring between organizations and developing policies.
- The Advisory Committee should review quality assurance project plans annually and incorporate any changes that would improve coordination between organizations.

E) Provisions for the Development of Long-Term Trend Lines for Problem Contaminants, for the Inclusion of New Contaminants, and for Elimination of Contaminants No Longer Requiring Monitoring:

Ground Water Provisions

Long-term trend lines must be developed from data gathered over many years. To date, the only long-term ground water data being gathered is from NRDs (primarily nitrate and limited pesticide data) and the public water supply wells across the state.

NDEQ and the Advisory Committee recommends that the following factors should be considered:

- Continue the Agrichemical Contaminant Database (use the University of Nebraska Water Sciences Laboratory for the “clearinghouse” component of the State ground water quality database) with a source of financial support that is reliable. Currently, \$75,000 is the minimum annual cost to maintain the Clearinghouse Database for only the parameters of nitrate and selected pesticides. The database is currently funded by year-to-year federal grants that may not continue.
- The Ground Water Monitoring Technical Advisory Committee should determine contaminants of concern and changes necessary to monitoring programs, based on changing state and federal regulations.
- Encourage or require all nitrate and pesticide ground water quality data be submitted to the “Clearinghouse” for inclusion in the Agrichemical Contaminant Database (see (b) above).
- Evaluate the costs and importance to establish a ground water database similar to the Agrichemical Contaminant Database for all other kinds of ground water monitoring data collected in the state, such as ground water monitoring data from landfills, livestock waste control facilities, leaking underground storage tank sites, Superfund sites, etc. Examples of new contaminants include MTBE, arsenic, sulfate, and Volatile Organic Compounds (VOCs) such as TCE or benzene.

Surface Water Provisions

The following provisions should be considered:

- National guidance should be examined to ensure that national pollutants of concern are considered in Nebraska’s monitoring strategy.
- Procedures should be developed by the Surface Water Monitoring Advisory Committee for including and deleting contaminants.
- The Advisory Committee should review and update the list of contaminants, as necessary, in the annual quality assurance project plans.

F) Mechanisms To Determine The Best Locations To Monitor Water Quality For Different Types Of Contaminants And How To Define Local Or Regional Problem Areas:

Ground Water Mechanisms

The best locations for ground water quality monitoring wells may vary greatly, depending on several factors, including the decisions to be made with the monitoring information. A Ground Water Monitoring Technical Advisory Committee should determine a list of questions or criteria to help make decisions about locations of monitoring wells (new or existing) and contaminants to monitor for. This list will be a good start for an ambient ground water monitoring network, as well as a guidance for various programs across the state. General regions where ground water contamination has been documented should be considered in determining the best monitoring locations. These regions are shown in Figures 5-7 on pages 44-49.

Some of the following factors should also be considered:

- Funding and personnel available for new wells, and additional sample collection, data manipulation, and data management.
- Relative priority or importance of the ground water concerns (public drinking water supply, domestic water supply, discharge to critical or endangered watersheds, etc.)
- Vulnerability of ground water to contamination (depth to water, types of soils and vadose zone sediments).
- Land use (e.g., intensive row crop, pasture, urban, irrigated crop, dryland crop).
- Types of contaminants being monitored (natural contaminants such as arsenic and uranium, or man-made contaminants such as pesticides or VOCs).
- Use of the monitoring data. What decisions will be made from the data? Will local land use decisions or statewide/legislative decisions be made?
- Types of irrigation used (e.g., furrow irrigated or sprinkler).
- Geologic and topographic conditions (alluvial vs. upland; sloping vs. flat land, etc.).
- Nonpoint source contaminants (nitrate and pesticides) vs. point source contaminants (benzene, carbon tetrachloride, MTBE, TCE, other Volatile Organic Compounds (VOCs)).
- Existing monitoring locations.
- Existing ground water monitoring data.
- Existing monitoring efforts at the federal, state, and local levels and methods for coordinating monitoring in the most efficient and effective manner possible.

Surface Water mechanisms

The following factors should be considered:

- The Surface Water Monitoring Technical Advisory Committee should determine the mechanisms to be used in determining the best locations for monitoring water quality and how to define water quality problem areas.

- Existing and historic ambient fixed-site stream monitoring locations and USGS gaging stations should be used to the maximum extent possible. Figure 5 above shows the active stream gaging stations and ambient fixed-site stream monitoring locations in Nebraska.
- Geographic Information Systems (GIS) data overlay maps should be used to help select monitoring sites. Suggested mechanisms that should be considered by the Surface Water Monitoring Technical Advisory Committee are land use, topography, soils, beneficial uses assigned, locations of point sources, livestock density, interstate waters, ecoregions, areas of ground water level declines, and identified impaired waters. Figures 6, 7, 8, 9, and 10 show the locations of Level III ecoregions, Level IV ecoregions, municipal and industrial NPDES facilities, state resource waters, and interstate and border waters, respectively.

Part 3: Other Considerations

One of the most important considerations identified is the establishment of a Ground Water Monitoring Technical Advisory Committee and a Surface Water Technical Advisory Committee to address water monitoring issues and facilitate statewide coordination of water monitoring programs. Additional guidance for establishing advisory committees is presented below.

Ground Water Monitoring Technical Advisory Committee

The Ground Water Monitoring Technical Advisory Committee should be a multi-organization technical advisory committee with representation from state, local, and federal organizations dealing with ground water quality and quantity issues. State representatives should include the Nebraska Department of Environmental Quality (NDEQ), Nebraska Health and Human Services – Regulation and Licensure Drinking Water Program (NHHS-R&L), Nebraska Department of Agriculture (NDA), Nebraska Department of Natural Resources (NDNR), University of Nebraska Conservation and Survey Division (UNCSD), University of Nebraska Water Sciences Lab (UNWSL), and the Nebraska Association of Resources Districts (NARD). Local representatives should include the 23 Natural Resources Districts and county health departments. Federal representation should include the United States Geological Survey (USGS) and the United States Environmental Protection Agency (USEPA). As other significant stakeholders are identified, they should be added to the Advisory Committee. The NDEQ should be the lead agency of the Advisory Committee. This committee should meet on an as needed basis with regular meetings held at least annually or semiannually. The Advisory Committee should contact other states that have implemented coordinated statewide monitoring approaches and attempt to learn from their experiences. Any costs associated with establishing a Ground Water Technical Advisory Committee and holding meetings will be met within existing monitoring program budgets.

The Advisory Committee should develop State Ground Water Quality Monitoring Goals to guide future ground water monitoring efforts in Nebraska. The Advisory Committee should consider including the following goals when the State Ground Water Quality Monitoring Goals are developed.

- Collect the data necessary to credibly assess ground water quality conditions and trends statewide and in specific regions.
- Collect data necessary to ensure the safety of drinking water supplies for public water systems relying on ground water.
- Collect the data necessary to identify potential problem areas for specific contaminants where further monitoring may be necessary.
- Collect the data necessary to ensure compliance in various regulatory programs, including but not limited to ground water monitoring at livestock waste control facilities, landfills, remediation sites, and permitted facilities.
- Collect data necessary to make Ground Water Management Area boundary and “phase trigger” decisions.

- Collect data necessary to make management decisions on particular controls and best management practices necessary in Ground Water Management Areas.
- Conjunctive use and other issues involving ground water/surface water interactions should be coordinated between the Ground Water Monitoring Technical Advisory Committee and the Surface Water Monitoring Technical Advisory Committee.

Surface Water Monitoring Technical Advisory Committee

State organization representatives on the Surface Water Monitoring Technical Advisory Committee should include the Nebraska Department of Environmental Quality (NDEQ), Nebraska Health and Human Services – Regulation and Licensure (NHHS-R&L), Nebraska Department of Agriculture (NDA), Nebraska Department of Natural Resources (NDNR), University of Nebraska (UN), Nebraska Game and Parks Commission (NGPC), and the Nebraska Association of Resources Districts (NARD). Local organization representatives should include the 23 Natural Resources Districts. The Nebraska Wildlife Federation (NWF) should represent private environmental organizations in the state. Federal representation should include the United States Geological Survey (USGS), U.S. Army Corps of Engineers (USACOE), and the United States Environmental Protection Agency (USEPA). As other significant stakeholders are identified, they should be added to the SWMTAC. Any costs associated with establishing a Surface Water Monitoring Technical Advisory Committee and holding meetings should be covered within existing monitoring program budgets.

The Advisory Committee should develop state surface water quality monitoring goals to guide future surface water quality monitoring efforts. The Advisory Committee should consider the following goals:

- Collect the data necessary to assess surface water quality conditions and trends statewide.
- In accordance with the federal Clean Water Act, prepare a Section 303(d) list, based on data that identifies waterbodies impaired or threatened by surface water pollution.
- Collect the data necessary to develop water quality-based effluent limitations where Total Maximum Daily Loads (TMDLs) are not established.
- Collect the data necessary to develop credible surface water quality management plans (i.e., Basin Management Plans, Watershed Management Plans, and TMDLs).
- Collect the data necessary to determine if regulated entities are in compliance with specified permit conditions regarding surface water discharges.
- Collect the data necessary to determine if implemented water pollution control measures effectively improved or protected surface water quality.
- Develop water quality criteria for the protection of surface water quality in Nebraska.
- Collect data to support enforcement actions regarding surface water quality regulations.

- The Surface Water Monitoring Technical Advisory Committee should coordinate conjunctive use issues and other issues involving ground water/surface water interactions with the Ground Water Monitoring Technical Advisory Committee.

Database Development

If statewide ground water quality trends or decisions are to be made from ground water monitoring data, the data must be readily available. A good start at this effort is the Agrichemical Contaminant Database, now on the Nebraska Department of Natural Resources internet site (www.dnr.state.ne.us). This project is funded by federal grants through the Nebraska Department of Agriculture and the Nebraska Department of Environmental Quality (both using USEPA grant money) and state match funding on an annual basis. The University of Nebraska Water Sciences Laboratory coordinates and assesses nitrate and pesticide ground water data from agencies and organizations across the state into a "Clearinghouse" and in turn, passes it to the Department of Natural Resources for placement on the internet, where it is available as the Agrichemical Contaminant Database. This data management effort is just as important as the expansion of monitoring locations and parameter analyses, as additional ground water quality information is of little value if it cannot be easily accessed and used in making decisions or policies.

Considerations should be made to expand this existing database to include surface water data in Nebraska.

This data management effort is just as important as the expansion of monitoring locations and parameter analyses, as additional collection of surface water quality information is of little value if it cannot be easily accessed and used in making decisions or policies. Assessing and storing surface water quality data compared to ground water quality data is more complex due to the much larger numbers of parameters that are measured in surface water.

Annual Reports

A total of \$50,000 was recently appropriated by Nebraska Legislature in LB329, passed in 2001, for development of an annual ground water quality report to the Nebraska Legislature. There currently is no funding for this type of report for surface water issues.

In conjunction with the implementation of ambient fixed-site ground and surface water monitoring networks, NDEQ could develop periodic ground and surface water quality reports to the Nebraska Legislature. These reports would provide the Nebraska Legislature with concise, reader-friendly updates of the status and trends of ground and surface water quality in Nebraska and would be valuable in facilitating water quality management and policy decisions. In addition, these reports would be made available to the public and should be useful in improving public awareness of Nebraska water quality issues.

The estimated costs of developing and publishing ground and surface water quality reports are approximately \$100,000 annually (\$50,000 per report). Or, an alternative would be to use the

existing \$50,000 allocated through LB 329 to have the agency alternate ground water and surface water reports.

TMDL Monitoring

One of the most important surface water issues facing Nebraska is the collection of water quality data for development of Total Maximum Daily Loads (TMDLs). Nebraska has a federal statutory obligation to develop TMDLs for all surface waters listed on its EPA-approved Section 303(d) list of impaired waters. The collection of detailed water quality monitoring data is important so that accurate TMDLs can be developed and used to reduce pollution loads to acceptable levels. Also, adequate monitoring data is important in listing water bodies on the Section 303(d) list of impaired waters.

Up until this point, the state has been using existing information collected during Basin Management Assessment and Planning surveys and Nonpoint Source Watershed Assessment surveys to develop TMDLs.

In 1999, NDEQ staff conducted an analysis which established TMDL goals and defined what activities would be needed to attain these goals. Primary activities relevant to this report would be to collect adequate water quality monitoring data for the 114 waterbodies on the Nebraska Section 303(d) list. *(The TMDL information can be found in the 1999 NDEQ report, "Strategic Plan for Developing Total Maximum Daily Loads and Addressing Waterbodies Included on the 1998 Nebraska Section 303(D) List").*

Questionnaire Responses

In order to assess the status of ground and surface water quality monitoring programs in Nebraska, the LB 1234 Water Quality Monitoring Advisory Committee first developed a brief monitoring questionnaire. A summary of the Phase I report findings and conclusions is presented in Appendix B. A more comprehensive detailed questionnaire was then developed and submitted to all identified major ongoing monitoring programs in Nebraska in an attempt to obtain information that could be used to address Phase II requirements. Coordination between these major monitoring programs could be considered a component in developing a comprehensive, integrated statewide water quality monitoring system in Nebraska.

According to questionnaire responses, most individual ground and surface water monitoring programs in Nebraska have a local or regional focus and often were developed in response to statutory or regulatory requirements. Most of these monitoring objectives are in addition to the statewide monitoring objectives. The questionnaire responses indicated that many local and regional objectives are not being attained.

Attainment of the other local and regional monitoring program objectives could be part of a comprehensive, integrated statewide monitoring system in Nebraska.

Part 4: Response to LB 1234 Issue G: Funding Necessary to Implement the Recommendations of the Study

This portion of the report presents NDEQ's findings in response to Issue G of LB 1234: An estimate of funding necessary to implement the recommendations of the study. The chart below provides an overall summary of potential costs of all categories, and lists the pages where narrative explanations can be found for each item listed.

Summary of Potential Costs		
Category	One-time costs	Annual costs
Ground Water Fixed Site Network (Page 8)	\$700,000	\$300,000
Surface Water Fixed Sites for Streams and Lakes (Page 9, 10)	\$220,000	\$720,000
Surface Water, TMDL Monitoring (Page 21)		\$360,000
Periodic Reports (Page 20)		\$50,000
Centralized Data Base (Page 20)		\$150,000
SUBTOTAL	\$920,000	\$1,580,000
Questionnaire Responses:		
Ground Water Local, Regional Survey Requests (Page 21)		\$1,550,000
Surface Water Local, Regional Survey Requests (Page 21)		\$400,000
TOTAL	\$920,000	\$3,530,000

Ground Water Activities

In order to establish a comprehensive, integrated statewide ground water monitoring system in Nebraska, each of the following potential activities should be considered:

- Development of a statewide ambient fixed-site ground water monitoring network to characterize existing water quality in Nebraska and determine if water quality is changing over time;
- Establishment of a Ground Water Monitoring Technical Advisory Committee to provide recommendations on statewide monitoring issues, coordinate statewide monitoring projects and sharing of data and resources, develop standardized approaches for collecting and analyzing data, assist organizations in developing quality assurance/quality control programs and sound monitoring approaches, and develop contracts with organizations for available pass-through funds associated with statewide monitoring projects;

- A centralized database to provide for storage and “one-stop shopping” access to all ground water quality data collected in Nebraska; and
- A periodic ground water quality report to the Nebraska Legislature and citizens of Nebraska.

Surface Water

In order to establish a comprehensive, integrated statewide surface water monitoring system in Nebraska, the following potential activities should be considered:

- Development of a statewide ambient fixed-site surface water monitoring network to characterize existing surface water quality in Nebraska and determine if water quality is changing over time;
- Establishment of a Surface Water Monitoring Technical Advisory Committee to provide recommendations on statewide monitoring issues, coordinate statewide monitoring projects and sharing of data and resources, develop standardized approaches for collecting and analyzing data, assist organizations in developing quality assurance/quality control programs and sound monitoring approaches, and develop contracts with organizations for available pass-through funds associated with statewide monitoring projects;
- A centralized database to provide for storage and “one-stop shopping” access to all surface water quality data collected in Nebraska; and
- A periodic surface water quality report to the Nebraska Legislature and citizens of Nebraska.

LITERATURE CITED

- Nebraska Department of Environmental Quality. 2001. Surface Water Quality Monitoring Strategy. CPP Document Number 2.1. Water Quality Division. Nebraska Department of Environmental Quality. March 2001. 65 pp.
- National Research Council. 2001. Assessing the TMDL Approach to Water Quality Management. Committee to Assess the Scientific Basis of the Total Maximum Daily Load Approach to Water Pollution Reduction. Water Science and Technology Board. National Research Council. 90 pp.
- InsideEPA.com 2001. Environmental Policy Alert. Date: July 11, 2001. Issue: Vol. 18, No. 14. Inside Washington Publishers.
- Nebraska Department of Environmental Quality. 1999. Strategic Plan for Developing Total Maximum Daily Loads and Addressing Waterbodies Included on the 1998 Nebraska Section 303(d) List.

APPENDIX A

APPLICABLE SECTIONS OF LB1234

Sec. 18. The Legislature finds that (1) existing monitoring of ground water quality performed by natural resources districts is excellent and deserves recognition, (2) substantial efforts have been undertaken by the Department of Environmental Quality to monitor surface water quality, and (3) it is within the state's capacity to develop a comprehensive, integrated statewide water quality monitoring system.

Sec. 19. The Department of Environmental Quality shall conduct a comprehensive study of water quality monitoring in Nebraska pursuant to section 20 of this act. In preparing Phase I of the study, the department shall work with and consult an advisory committee consisting of a designee from each of the following: The American Consulting Engineers Council of Nebraska, the Department of Agriculture, the Nebraska Natural Resources Commission, the Department of Health and Human Services Regulation and Licensure, the Department of Natural Resources, the League of Nebraska Municipalities, the Nebraska Association of Resources Districts, the Game and Parks Commission, the United States Geological Survey, and the University of Nebraska. The advisory group for Phase II of the study shall include the members listed in this section for Phase I and be expanded to include all groups found by the Department of Environmental Quality to be significant stakeholders in the water quality area. Phase I of the study shall be presented to the Natural Resources Committee of the Legislature on or before December 1, 2000, and Phase II shall be presented to the committee on or before June 30, 2001.

Section 20. (1) The study required by section 19 of this act shall consist of two phases. Phase I of the study shall consist of an assessment of Nebraska's current water quality monitoring efforts and shall address, but not be limited to, the following:

- (a) A detailed description of all current water quality monitoring efforts at the state and local levels, including scope, location, timing, procedure, number of personnel, state agency or local government involved, and funding; and
- (b) An analysis of current water quality monitoring efforts, indicating what the existing system does well and fails to do or does inadequately. The analysis shall address, but not be limited to, the following questions:
 - (i) Is the current number of monitoring sites sufficient to provide accurate information on water quality in all regions of the state;
 - (ii) Is the current frequency of monitoring efforts sufficient to provide an accurate measurement of changes in water quality over time;
 - (iii) Are the current methods of sample collection and analysis scientifically sound and is the collection of samples and subsequent testing conducted in a manner which reasonably assures accurate measurements;
 - (iv) Is the current reporting process timely and does it present information to policymakers in an understandable and usable form;
 - (v) Is the current coordination of monitoring efforts between the Department of Environmental Quality, natural resources districts, and county or local governments sufficient; and

- (vi) Does the current system provide a mechanism ensuring statewide or regional coordination of water quality monitoring efforts when desirable.
- (2) Phase II of the study shall utilize the information gathered during Phase I and shall consist of a detailed description of the changes required in the current system to establish a comprehensive, integrated statewide water quality monitoring system, including preferred alternatives if multiple options exist. The proposed monitoring system shall include, but not be limited to, the following:
 - (a) Recommended monitoring site locations;
 - (b) A description of acceptable monitoring techniques;
 - (c) The institutional flexibility to allow contaminants to be monitored on a statewide or regional basis as needed;
 - (d) Procedures to determine when coordinated monitoring between state and local entities is needed and policies for directing such monitoring;
 - (e) Provisions for the development of long-term trend lines for problem contaminants, for the inclusion of new contaminants, and for elimination of contaminants no longer requiring monitoring;
 - (f) Mechanisms to determine the best locations to monitor water quality for different types of contaminants and how to define local or regional problem areas; and
 - (g) An estimate of funding necessary to implement the recommendations of the study.

APPENDIX B

SUMMARY OF PHASE I REPORT

A summary of the findings and conclusions from the Phase I report is presented below. The brief questionnaire was submitted to 195 organizations including environmental groups, natural resources districts, irrigation districts and ditch companies, cities with populations of 5,000 or more, county health departments, universities and colleges, and state and federal agencies in Nebraska and the states of Colorado, Iowa, Kansas, Missouri, South Dakota, and Wyoming. A total of 76 organizations responded to the brief questionnaire.

Phase I Brief Questionnaire Responses

Responses by Organizations and Monitoring Programs to the Brief Monitoring Questionnaire

A total of 76 of 195 (39%) organizations responded to the brief monitoring questionnaire. A copy of the brief questionnaire is listed in Appendix A. Information was received on 117 water quality monitoring programs. Seventeen of the 76 organizations that responded to the brief questionnaire reported that they did not conduct water quality monitoring programs. Eleven of these 17 organizations were small irrigation districts and ditch companies. A total of 92 of the 117 surface and ground water monitoring programs were listed as ongoing programs. Sixty-nine (69) of these 92 ongoing programs were conducted by 13 organizations. The Nebraska Department of Environmental Quality reported the most ongoing monitoring programs (24).

Types of Water Quality Data Collected

The most common types of water quality data collected for surface and ground water monitoring programs were chemical (106); followed by physical (77); biological, including bacteriological (61); and radiological (29).

Ancillary Data Collected or Used with Water Quality Data

The most common types of ancillary data collected or used with water quality monitoring data were stream flow, lake level, global positioning system (GPS), and geographic information system (GIS) information for surface water monitoring programs; and ground water level, GPS, and GIS information for ground water monitoring programs.

Uses of Water Quality Data

The most common uses of monitoring data collected by surface and ground water monitoring programs were to “describe water quality conditions” (87), followed by “water quality trends” (80), “identify and prioritize water quality problems” (80), and “regulatory compliance” (52).

Funding Sources

Monitoring programs in Nebraska are supported by a number of different funding sources, with multiple sources of funding used in many programs. The most common sources of funding are state (65), local (57), federal (53), private (10), and none (6). The “none” category included volunteer monitoring and donation of lab analysis costs.

Willingness to Share Water Quality Monitoring Data

A total of 112 of the 117 surface and ground water monitoring programs stated that they were willing to share monitoring data with other organizations and the public. The other five programs did not respond to this question. Responses to this question show almost unanimous support for the sharing of monitoring data.

Support/Concerns for a State Clearinghouse Database

A total of 84 of 87 programs (97%) stated that their organization supported the concept of a state clearinghouse database. However, 30 programs did not respond to this question. This low response rate may indicate that these programs were unfamiliar with the concept of a state clearinghouse database. Comments received about the state clearinghouse database included concerns about additional workloads and costs associated with a centralized state database such as standardization of data collections, data entry, data quality reviews, and recoding of existing data. Concerns were also expressed about the disclosure of landowner and other confidential information and possible misuse or misinterpretation of data by the public or non-governmental organizations.

Data Storage Methods

The data storage methods reported by the 117 monitoring programs included paper files (112) and electronic files (92). These results indicate that most monitoring programs use both paper files and electronic files to store their water quality monitoring data. Spreadsheets were the most common type of electronic files used to store data (70) followed by databases (56).

Internet Access

Access to water quality data is generally not available on the internet web sites of organizations that collect water quality data in Nebraska. Only 9 of 114 organizations (8%) reported that water quality data could be accessed on their organization’s web site. Two of these organizations stated that some, but not all, of their data was available. Conversely, 105 organizations (92%) reported that the water quality data they collect could not be accessed on their web site. Several organizations stated that they do not yet have a web site. Many organizations reported that data accessibility on their web sites was a goal and they were planning to implement this in the future.

Periods of Record

The periods of record for water quality monitoring programs in Nebraska vary significantly. The NGPC's fish community sampling program dates back to the early 1900's, the public water system monitoring program began more than 50 years ago, and a few ongoing monitoring programs began in the 1970's. However, most current monitoring programs in Nebraska began in the 1980's or 1990's. Information was received for 92 ongoing surface and ground water monitoring programs. In addition, information was also received on 17 discontinued monitoring programs.

Quality Assurance/Quality Control

Overall, the quality assurance/quality control (QA/QC) procedures used by water quality monitoring programs in Nebraska are very good. A total of 85 of 107 programs (79%) reported that they collect water quality data in accordance with a quality assurance program that includes written methods and procedures. Copies of many standard operating procedures (SOPs) were received and most collection methods used by Nebraska organizations for surface and ground water monitoring are comparable. The major differences are that some organizations use much more rigorous scientific approaches in their collection methods and collect more samples, including quality control samples, than others to ensure the representativeness of their samples. Some organizations currently not using written procedures stated that they were concerned about the costs of initiating and maintaining a quality assurance program. Some organizations also indicated that they would like assistance with their QA/QC programs, sample collection methods, and monitoring networks.

Phase I Conclusions

Section 20. (1) The study required by section 19 of this act shall consist of two phases. Phase I of the study shall consist of an assessment of Nebraska's current water quality monitoring efforts and shall address, but not be limited to, the following:

(a) A detailed description of all current water quality monitoring efforts at the state and local levels, including scope, location, timing, procedure, number of personnel, state agency or local government involved, and funding; and

The brief monitoring questionnaire was submitted to 195 organizations including environmental groups, natural resources districts, irrigation districts and ditch companies, cities with populations of 5,000 or more, county health departments, universities and colleges, and state and federal agencies in Nebraska and the states of Colorado, Iowa, Kansas, Missouri, South Dakota, and Wyoming. A total of 76 organizations (39%) responded to the brief questionnaire. Based on the responses to the brief questionnaires, detailed surface and ground water questionnaires were submitted to organizations with major ongoing monitoring programs. At the time of this report, 49 detailed questionnaires had been returned. Please refer to the Water Quality Monitoring Program section of this report, beginning on page 2, for a description of all current water quality monitoring efforts in Nebraska at the federal, state, and local levels, and detailed descriptions of the scope, location, timing, procedure, number of personnel, state agency or local government

involved, and funding for several surface and ground water monitoring programs.

(b) An analysis of current water quality monitoring efforts, indicating what the existing system does well and fails to do or does inadequately. The analysis shall address, but not be limited to, the following questions:

(i) Is the current number of monitoring sites sufficient to provide accurate information on water quality in all regions of the state;

No, the current number of sites is not sufficient. Many regions of the state are currently not monitored for surface water quality data including streams, lakes, and wetlands. Some areas of the state with limited numbers of registered wells have not been adequately monitored for ground water quality. Most monitoring programs stated that the number of monitoring locations were not adequate.

(ii) Is the current frequency of monitoring efforts sufficient to provide an accurate measurement of changes in water quality over time;

No, the current frequency of monitoring efforts is not sufficient to provide an accurate measurement of changes in water quality over time. Several organizations collect monitoring data for the purpose of determining trends, but may not adequately account for spatial and temporal variability in the waters being sampled. Many programs do not collect any trend data and there is no trend data available in many areas of the state.

(iii) Are the current methods of sample collection and analysis scientifically sound and is the collection of samples and subsequent testing conducted in a manner which reasonably assures accurate measurements;

The current methods of sample collection and analysis used by most organizations are scientifically sound and conducted in a manner that reasonably assures accurate measurements. However, several organizations still collect water quality data without the use of written procedures or quality assurance project plans. Differences in lab analytical methods, lab method detection limits, and the parameters measured affect the comparability of data and affect data usage by some organizations.

(iv) Is the current reporting process timely and does it present information to policymakers in an understandable and usable form;

The current reporting process is timely for most organizations and information is presented to policymakers in an understandable and usable form. Several programs identified a need to increase the use of global positioning systems (GPS) and geographical information systems (GIS) in order to improve geo-referencing of data and facilitate the display of data for reports.

Is the current coordination of monitoring efforts between the Department of Environmental Quality, natural resources districts, and county or local governments sufficient; and

The current coordination of monitoring efforts between the NDEQ, NRDs, and county or local governments appears to be sufficient, but could be improved. Coordination of ground water monitoring is especially well coordinated. Good coordination exists between the NDEQ and several NRDs in the monitoring of lakes and streams. However, limited or no coordination exists between many federal, state, local, and private surface water quality monitoring programs. Many organizations were unaware of the number of other organizations collecting surface water quality data in the state.

(vi) Does the current system provide a mechanism ensuring statewide or regional coordination of water quality monitoring efforts when desirable.

No, there is currently no formal mechanism in place to ensure statewide or regional coordination of water quality monitoring efforts or to encourage the ongoing exchange of monitoring needs or sharing of monitoring resources.

APPENDIX C

Summary of Ground Water Detailed Questionnaire Responses and Updates

Name of organizations that responded (and acronym):

- Central Platte Natural Resources District (CPNRD)
- Douglas County Health Department (DCHD)
- Lewis & Clark Natural Resources District (LCNRD)
- Little Blue Natural Resources District (LBNRD)
- Lower Big Blue Natural Resources District (LBBNRD)
- Lower Elkhorn Natural Resources District (LENRD)
- Lower Loup Natural Resources District (LLNRD)
- Lower Niobrara Natural Resources District (LNNRD)
- Lower Platte North Natural Resources District (LPNNRD)
- Lower Platte South Natural Resources District (LPSNRD)
- Middle Niobrara Natural Resources District (MNNRD)
- Nebraska Health & Human Services Regulation & Licensure (NHHS R&L)
- Nebraska Department of Environmental Quality (NDEQ)
- Nebraska Game and Parks Commission (NGPC)
- Nemaha Natural Resources District (NNRD)
- North Platte Natural Resources District (NPNRD)
- South Platte NRD (SPNRD)
- Twin Platte Natural Resources District, TPNRD
- U.S. Geological Survey (USGS)
- Upper Big Blue Natural Resources District (UBBNRD)
- Upper Elkhorn Natural Resources District (UENRD)
- Upper Loup Natural Resources District (NRD)
- Upper Niobrara-White Natural Resources District (UNWNRD)

(Note: Responses were received from 23 organizations and 31 monitoring programs (18 NRDs, 1 county health department, 3 state agencies, 1 federal agency). Some agencies responded more than once for different monitoring programs)

Years that data have been collected

- 1976 to present

Number and type of wells reported to be sampled per year (approximate)

	Irrigation	Domestic	Stock	Public	Monitoring	Industrial	Other
Total = 7191	3326	1971	47	731	1106	9	1

Type of ground water samples/parameters collected

- **Field parameters (pH, conductivity, temperature)**
- **nitrates**
- **pesticides**
- **bacteria**
- **major anions and cations**
- **Halogenated aliphatics**
- **Ethers**
- **Monocyclic aromatics**
- **Nitrosamines and other nitrogen-containing compounds**

Data submitted to Clearinghouse (University of Nebraska -Water Sciences Lab)

14 of 31 programs currently submit data to the University of Nebraska Water Sciences Laboratory, which acts as a Clearinghouse for the data, and assesses and flags the quality of the data, and then submits it to Nebraska Department of Natural Resources for storage. (Note: There are over 90,000 entries (nitrates and pesticides) in the Agricultural Contaminant Database (www.dnr.state.ne.us), with 22,116 entries from NRDs, 4,715 entries from NDEQ, and 45,236 entries from NHHS (CDC study)).

Number of FTEs involved in ground water monitoring:

- **26.61 FTEs**

(Note: This number represents ONLY time spent collecting samples by those organizations responding to questionnaires. No FTE estimates were obtained for the public water systems)

Estimated current annual costs of monitoring programs:

- **\$3,154,212**

** Note: The 18 NRDs reporting estimated \$1,186,603 for current annual cost of ground water monitoring programs. If this amount is extrapolated to all 23 NRDs, the cost is estimated to be \$1,516,215. Public water system monitoring required under the federal Safe Drinking Water Act currently costs \$1,433,997 annually for lab analysis. After adding in the \$79,000 reported from other programs (non-NRD, non-public water system), \$75,000 for maintenance of the Clearinghouse Database, and \$50,000 for developing an annual report to the Nebraska Legislature, the total current estimated annual cost of ground water monitoring programs in Nebraska is **\$3,154,212**.

Sources of funding for current programs:

- **11% federal**
- **19% state**
- **70% local**

APPENDIX D

Summary of Surface Water Detailed Questionnaire Responses and Updates

Name of organizations that responded (and acronym):

- ☛ Cedar Knox Rural Water
- ☛ Lower Platte North Natural Resources District (LPNNRD)
- ☛ Nebraska Department of Environmental Quality
- ☛ Nebraska Game and Parks Commission (NGPC)
- ☛ Nemaha Natural Resources District (NENRD)
- ☛ Nebraska Public Power District (NPPD)
- ☛ North Platte Natural Resources District (NPNRD)
- ☛ Twin Platte Natural Resources District (TPNRD)
- ☛ University of Nebraska (UN)
- ☛ Upper Elkhorn Natural Resources District (UENRD)
- ☛ Upper Niobrara White Natural Resources District (UNWNRD)
- ☛ U.S. Geological Survey (USGS)

(Note: Responses were received from 13 organizations in Nebraska, 2 in Kansas, 1 in Iowa, and a total of 30 monitoring programs (6 NRDs, 6 state agencies, 1 federal agency). The organizations responding from Nebraska are listed above. Some agencies responded more than once for different monitoring programs)

Years that data have been collected

- ☛ 1967 to present

Types of surface water sampled:

- ☛ Streams and rivers
- ☛ Lakes
- ☛ Wetlands
- ☛ Effluent discharge

Types of “media” sampled:

- ☛ Water column – physicochemical and bacteria
- ☛ Sediment
- ☛ Fish flesh
- ☛ Plankton community
- ☛ Fish community
- ☛ Macroinvertebrate community
- ☛ Habitat

Estimated FTEs of current programs:

- 26.84 FTEs

(Note: this number represents ONLY time spent collecting samples by those organizations responding to questionnaires)

Estimated annual costs of current programs:

- \$1,668,075

Sources of funding for current programs:

- 75% federal
- 23% state
- 2% local
- <1% private

APPENDIX E

CURRENT ANNUAL EXPENDITURES OF GROUND WATER MONITORING PROGRAMS IN NEBRASKA

Name of Organization	Annual Cost	Sources of Funding	Federal	State	Local
Central Platte Natural Resources District (CPNRD)	\$38,500	100% Local	\$0	\$0	\$38,500
Douglas County Health Department (DCHD)	\$10,000	100% Local	\$0	\$0	\$10,000
Lewis & Clark Natural Resources District (LCNRD)	\$25,000	70% State, 30% Local	\$0	\$17,500	\$7,500
Little Blue Natural Resources District (LBNRD)	\$38,800	95% Local, 5% Federal	\$1,940	\$0	\$36,860
Lower Big Blue Natural Resources District (LBBNRD)	\$40,000	50% State, 50% Local	\$0	\$20,000	\$20,000
Lower Elkhorn Natural Resources District (LENRD)	\$156,182	75% State, 25% Local	\$0	\$117,137	\$39,046
Lower Niobrara Natural Resources District (LNNRD)	\$50,000	67% State, 33% Local	\$0	\$33,500	\$16,500
Lower Loup Natural Resources District (LLNRD)	\$81,600	100% Local	\$0	\$0	\$81,600
Lower Platte North Natural Resources District (LPNNRD)	\$62,530	80% Local, 20% State	\$0	\$12,506	\$50,024
Lower Platte South Natural Resources District (LPSNRD)	\$105,000	55% Federal, 45% State	\$57,750	\$47,250	\$0
Middle Niobrara Natural Resources District (MNNRD)	\$9,000	80% State, 20% Local	\$0	\$7,200	\$1,800
Nebraska Department of Environmental Quality (NDEQ) - GWMA program	\$40,000	50% Federal, 50% State	\$20,000	\$20,000	\$0
Nebraska Health & Human Services Regulation & Licensure (NHHS R&L) Public Water System Sample Analysis Costs	\$1,433,997	100% Local	\$0	\$0	\$1,433,997
Nebraska Game and Parks Commission (NGPC)	\$1,000	75% Federal, 25% State	\$750	\$250	\$0
Nemaha Natural Resources District (NNRD)	\$5,000	70% Federal, 20% State, 10% Local	\$3,500	\$1,000	\$500
North Platte Natural Resources District (NPNRD)	\$150,000	25% Federal, 25% State, 50% Local	\$37,500	\$37,500	\$75,000
South Platte NRD (SPNRD)	\$7,000	30% Federal, 60% State, 10% Local	\$2,100	\$4,200	\$700
Twin Platte Natural Resources District (TPNRD)	\$78,534	54% Federal, 28% State, 18% Local	\$42,408	\$21,990	\$14,136
Twin Platte Natural Resources District (TPNRD)	\$44,134	54% Federal, 28% State, 18% Local	\$23,832	\$12,358	\$7,944

Name of Organization	Annual Cost	Sources of Funding	Federal	State	Local
Twin Platte Natural Resources District (TPNRD)	\$22,713	54% Federal, 28% State, 18% Local	\$12,265	\$6,360	\$4,088
Twin Platte Natural Resources District (TPNRD)	\$20,300	54% Federal, 28% State, 18% Local	\$10,962	\$5,684	\$3,654
U.S. Geological Survey (USGS)	\$26,000	50% Federal, 50% State	\$13,000	\$13,000	\$0
U.S. Geological Survey (USGS)	\$24,000	50% Federal, 50% State	\$12,000	\$12,000	\$0
U.S. Geological Survey (USGS)	\$18,000	50% Federal, 50% State	\$9,000	\$9,000	\$0
Upper Big Blue Natural Resources District (UBBNRD)	\$30,000	60% State, 40% Local	\$0	\$18,000	\$12,000
Upper Big Blue Natural Resources District (UBBNRD)	\$7,500	60% State, 40% Local	\$0	\$4,500	\$3,000
Upper Elkhorn Natural Resources District (UENRD)	\$38,280	100% State	\$0	\$38,280	\$0
Upper Elkhorn Natural Resources District (UENRD)	\$16,030	100% State	\$0	\$16,030	\$0
Upper Niobrara-White Natural Resources District (UNWNRD)	\$95,000	60% Federal, 40% Local	\$57,000	\$0	\$38,000
Upper Niobrara-White Natural Resources District (UNWNRD)	\$60,000	75% State, 25% Local	\$0	\$45,000	\$15,000
Upper Loup Natural Resources District (ULNRD)	\$5,500	100% Local	\$0	\$0	\$5,500
Totals:	\$2,739,600*		\$304,008	\$520,243	\$1,915,349
Sources of Funding			11%	19%	70%

*Note: The total of \$2,739,600 does not include the current estimated costs for 5 NRDs, \$75,000 for the cost of maintaining the Agrichemical Contaminant Database, or \$50,000 for development of an annual ground water quality report to the Nebraska Legislature.
(Source: Detailed Monitoring Questionnaire Responses and Recent Updates)

APPENDIX F

CURRENT ANNUAL EXPENDITURES OF SURFACE WATER MONITORING PROGRAMS IN NEBRASKA

Name of Organization:	Ann. Cost:	Sources of funding:	Federal	State	Local	Private
Cedar Knox Rural Water	\$10,000	100% Federal	\$10,000	\$0	\$0	\$0
Lower Platte Natural Resources District (Lower Platte NRD)	\$23,700	60% Federal, 40% Local	\$14,220	\$0	\$9,480	\$0
Nebraska Department of Environmental Quality (NDEQ) Ambient Bacteria/Pesticide	\$182,562	60% Federal, 40% State	\$109,537	\$73,025	\$0	\$0
Nebraska Department of Environmental Quality (NDEQ) Ambient Fixed-Site Stream Network	\$234,352	60% Federal, 40% State	\$140,611	\$93,741	\$0	\$0
Nebraska Department of Environmental Quality (NDEQ) Ambient Wetlands	\$33,530	75% Federal, 25% State	\$25,148	\$8,383	\$0	\$0
Nebraska Department of Environmental Quality (NDEQ) Fish Kill/Citizen Complaints Section 106	\$14,465	60% Federal, 40% State	\$8,679	\$5,786	\$0	\$0
Nebraska Department of Environmental Quality (NDEQ) Fish Tissue	\$26,127	60% Federal, 40% State	\$15,676	\$10,451	\$0	\$0
Nebraska Department of Environmental Quality (NDEQ) Joint State Atrazine	\$22,374	95% Federal, 5% Private	\$21,255	\$0	\$0	\$1,119
Nebraska Department of Environmental Quality (NDEQ) R-EMAP Biological Monitoring	\$89,234	100% Federal	\$89,234	\$0	\$0	\$0
Nebraska Department of Environmental Quality (NDEQ) NPS Studies - Lakes, NPS Runoff Studies in 2 watersheds, GPS sediment basin studies	\$118,322	60% Federal, 40% State	\$70,993	\$47,329	\$0	\$0
Nebraska Game and Parks Commission (NGPC)	\$190,000	70% Federal, 30% State	\$133,000	\$57,000	\$0	\$0
Nebraska Game and Parks Commission (NGPC)	\$25,000	70% Federal, 30% State	\$17,500	\$7,500	\$0	\$0
Nebraska Game and Parks Commission (NGPC)	\$10,000	50% Federal, 50% State	\$5,000	\$5,000	\$0	\$0
Nebraska Public Power District (NPPD)		100% Private				
Nemaha Natural Resources District (NNRD)	\$7,000	50% Federal, 10% State, 40% local	\$3,500	\$700	\$2,800	\$0
North Platte Natural Resources District (NPNRD)		25% Federal, 25% State, 50% Local				

Name of Organization:	Ann. Cost:	Sources of funding:	Federal	State	Local	Private
Twin Platte Natural Resources District (TPNRD)	\$8,222	54% Federal, 28% State, 18% Local	\$4,440	\$2,302	\$1,480	\$0
U.S. Environmental Protection Agency (USEPA) REMAP	\$90,737	100% Federal	\$90,737	\$0	\$0	\$0
U.S. Environmental Protection Agency (USEPA) RAFTMP Fish Tissue	\$68,450	100% Federal	\$68,450	\$0	\$0	\$0
U.S. Geological Survey (USGS)	\$300,000	100% Federal	\$300,000	\$0	\$0	\$0
U.S. Geological Survey (USGS)	\$28,000	100% Federal	\$28,000	\$0	\$0	\$0
U.S. Geological Survey (USGS)	\$11,000	50% Federal, 50% Local	\$5,500	\$0	\$5,500	\$0
University of Nebraska-Lincoln (UNL) Lake Classification Study - Contractual Section 319	\$150,000	60% Federal, 40% State	\$90,000	\$60,000	\$0	\$0
Upper Elkhorn Natural Resources District (UENRD)	\$15,000	100% State	\$0	\$15,000	\$0	\$0
Upper Niobrara White Natural Resources District (UNWNRD)	\$10,000	100% Local	\$0	\$0	\$10,000	\$0
Totals	\$1,668,075		\$1,251,480	\$386,216	\$29,260	\$1,119
Source of Funding:			75%	23%	2%	<1%

(Source: Detailed Monitoring Questionnaire Responses and Recent Updates)

Part III

*Committee Findings and Recommendations
and
Fiscal Analyst's Opinion*

PROGRAM EVALUATION COMMITTEE RECOMMENDATIONS

Nebraska Department of Environmental Quality: Administering the Livestock Waste Management Act

On 27 March 2003, in accordance with Neb. Rev. Stat. sec. 50-1211(1) of the Legislative Program Evaluation Act, the Legislative Program Evaluation Committee (committee) convened to consider the findings and recommendations contained in the Program Evaluation Unit's (unit's) final draft report entitled *Nebraska Department of Environmental Quality: Administering the Livestock Waste Management Act* and the department's response to that report. The committee adopted the following recommendations.

Findings		Recommendations
1	As compared to the laws of other states, Nebraska's livestock-waste-management statutes and regulations are adequate. However, the level of protection that should be afforded the state's waters is always an open policy question.	The Legislature and the department should re-examine the state's position on issues such as the rate at which lagoons and holding ponds are allowed to seep, artificial-liner requirements, and construction and location requirements. To the extent that policymakers wish to afford more protection to the environment, changes should be made.
2	The department's record-management system is a model system.	We commend the department for its level of documentation and organization; it should continue with its planned improvements, such as developing a method of tracking individual documents. Additionally, other state agencies should familiarize themselves with and emulate, when feasible, the department's system.
3	The department appears to be complying with all provisions of law and compelling the livestock industry to do the same.	None.

Findings		Recommendations
4	The department's relationship with both the livestock industry and environmentalists is strained.	A degree of tension with both groups probably means that the department is striking a fair balance between economic and environmental concerns. However, the department should make efforts to smooth relations when possible.
5	Producers and their engineers sometimes complain that the department is unrealistic in its expectations and requirements, thereby causing costly delays in construction.	The department should ensure, through ongoing training and required field work, that all of its staff members are familiar with the realities of the livestock industry, especially construction concerns.
6	The act created a backlog of initial inspections that the department is still working to eliminate. To the department's credit, the backlog has been reduced; it is now limited to operations that have or will require a Class I facility.	As a means of reducing the backlog further, the department should adjust its inspection schedule to ensure maximum efficiency. For example, Class IV facilities that have never had a problem probably do not need to be inspected quarterly. This would not only free up time to reduce the backlog, it may improve the department's complaint-response time.
7	The complaint process is generally adequate but occasionally frustrating to citizens. It probably needs to be updated; the department has already begun this process.	The department should continue to refine its complaint process to make sure that it is efficient; it should bring its web-based system, including a tracking component for concerned citizens, online as soon as possible.
8	The department sometimes allows producers to build their facilities in a phased-construction process.	The department should develop a guidance document addressing the phased-construction process to provide notice and ensure that every producer is treated similarly.

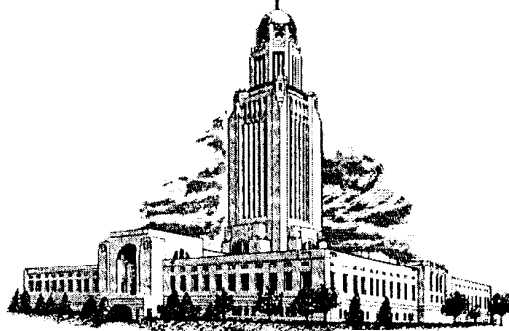
Findings		Recommendations
9	The department should find ways to improve its enforcement of comprehensive nutrient-management plans.	The department should: 1) use its integrated-information system to track land-application sites; 2) consider ways to supplement land-application record reviews, perhaps with random soil sampling and a requirement that producers annually provide proof that easement agreements have been reached; and 3) attempt to utilize an experienced agronomist.
10	The department is requiring groundwater monitoring for an increasing number of facilities.	The department should continue its efforts in this area. Better data concerning how facilities affect groundwater can only serve to improve the program.
11	The program is almost entirely funded through the General Fund; the fees imposed by the Legislature in the act are inadequate to fully fund the program.	The Legislature should enact legislation that will result in additional cash revenue for the program. The legislation could raise fees—perhaps basing the fee calculation on the actual number of animal units rather than a classification structure—or require expiration dates on permits and additional fees for reapplication.
12	The department’s enforcement process is adequate, but there have been complaints that violators are not pursued intensely enough.	The department’s emphasis on compliance rather than punishment is reasonable in a world of limited resources. Nevertheless, when producers do not comply voluntarily, or when they willfully violate the law, the department should vigorously pursue them.
13	The bad-actor statute, Neb. Rev. Stat. sec. 54-2409, is ineffective and may be constitutionally suspect. It should be amended to clarify definitions and provide the department with more guidance.	The department should submit to the Program Evaluation Committee draft language suggesting changes to the statute. (The committee should also consider supporting other technical changes to the act if the department wishes to submit them.)

Findings		Recommendations
14	The department's Phase II report, submitted to the Legislature pursuant to LB 1234 (2000), made reasonable and useful recommendations for the improvement of water-quality monitoring.	The department, and all other entities involved, should implement the recommendations of the Phase II report if they have not done so already.

State of Nebraska

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Legislative Fiscal Office
PO Box 94604, State Capitol
Lincoln, NE 68509-4604

April 22, 2003

Cynthia Johnson, Director
Program Evaluation Unit
Room 1201 – State Capitol
Lincoln, NE 68509

Dear Cynthia,

The Legislative Fiscal Office has reviewed the recommendations of the Program Evaluation Committee contained in the report titled *Nebraska Department of Environmental Quality: Administering the Livestock Waste Management Act*. It is the estimate of the Legislative Fiscal Office that the recommendations impacting the Department of Environmental Quality could be carried out using the existing resources of the agency.

If you have any questions, please feel free to contact me.

Sincerely,

A large, stylized handwritten signature in black ink, which appears to read "Michael Calvert".

Michael Calvert, Director
Legislative Fiscal Office

Part IV

Background Materials

BACKGROUND MATERIALS

The “background materials” provided here are materials (in addition to the unit’s report) that were available to the committee when it issued the findings and recommendations contained in Part III of this report. They include: 1) the department’s response to a draft of the unit’s report (the draft findings and recommendations are also provided for context), 2) the unit director’s review of the department’s response, and 3) a summary of the testimony given at a public hearing that the committee held.

UNIT DRAFT FINDINGS AND RECOMMENDATIONS

The scope statement adopted by the Legislative Program Evaluation Committee directed the Legislative Program Evaluation Unit (unit) to answer the following questions:

- Are the provisions of the Livestock Waste Management Act and the department's regulations adequate to protect the groundwater and surface water of the state?
- Is the department fully complying with all provisions of law?
- Are there adequate rules and procedures in place to ensure ongoing compliance with the act and the department's regula-

tions? (For example, does the department engage in enough routine inspections and complaint-driven inspections to ensure compliance?)

- If and when the department uncovers a problem, are there adequate rules and procedures in place to ensure that the pollution is cleaned up and that the violator is punished effectively and efficiently?

The unit's findings and recommendations are found in the following table.

Findings		Recommendations
1	As compared to the laws of other states, Nebraska's livestock-waste-management statutes and regulations are adequate. However, the level of protection that should be afforded the state's waters is always an open policy question.	The Legislature and the department should reexamine the state's position on issues such as the rate at which lagoons and holding ponds are allowed to seep, artificial-liner requirements, and construction and location requirements. To the extent that policymakers wish to afford more protection to the environment, changes should be made.
2	The department's record-management system is a model system.	The department should be commended for its level of documentation and organization. We encourage the department to continue with its planned improvements, such as a method of tracking individual documents. Additionally, we encourage other state agencies to familiarize themselves with and emulate the department's system.

Findings		Recommendations
3	The department appears to be complying with all provisions of law and compelling the livestock industry to do the same.	None.
4	The department's relationship with both the livestock industry and environmentalists is strained.	A degree of tension with both groups probably means that the department is striking a fair balance between economic and environmental concerns. However, to the extent possible, the department should make every effort to smooth relations. Toward that end, the department should consider public-relations actions such as issuing letters of thanks to cooperative producers and making sure that staff members who respond to complaints are able to deal with frustrated citizens.
5	Producers and their engineers sometimes complain that the department is unrealistic in its expectations and requirements.	The department should ensure that all of its staff members are familiar with the realities of the livestock industry, especially construction concerns. Toward this end, the department's engineers and program specialists should be required to spend some time on construction sites.
6	The act created a backlog of initial inspections that the department is still working to eliminate. To the department's credit, the backlog has been reduced; it is now limited to operations that have or will require a Class I facility.	As a means of reducing the backlog further, the department should adjust its inspection schedule to ensure maximum efficiency. For example, Class IV facilities that have never had a problem probably do not need to be inspected quarterly. This would not only free up time to reduce the backlog, it may improve the department's complaint-response time.

Findings		Recommendations
7	The complaint process is generally adequate but occasionally frustrating to citizens. It probably needs to be updated; the department has already begun this process.	The department should continue to refine its complaint process to make sure that it is efficient. We encourage the department to bring its web-based system, including a tracking component for concerned citizens, online as soon as possible.
8	The department sometimes allows producers to build their facilities in a phased-construction process.	The department should consider addressing the phased-construction process in its regulations to provide notice and ensure that every producer is treated similarly.
9	The department should find ways to improve its enforcement of comprehensive nutrient-management plans.	The department should: 1) use its integrated-information system to track land-application sites; 2) consider ways to supplement land-application record reviews, perhaps with random soil sampling and a requirement that producers annually provide proof that easement agreements have been reached; and 3) attempt to hire an experienced agronomist.
10	The department is requiring groundwater monitoring for an increasing number of facilities.	The department should continue its efforts in this area. Better data concerning how facilities affect groundwater can only serve to improve the program. The increased cost to producers is justified by the importance of the resource at risk.
11	The program is almost entirely funded through the General Fund; the fees imposed by the Legislature in the act are inadequate.	The Legislature should enact legislation that will result in additional cash revenue for the program. The legislation could raise fees—perhaps basing the fee calculation on the actual number of animal units rather than a classification structure—or require expiration dates on permits and additional fees for re-application.

Findings		Recommendations
12	The department's enforcement process is adequate, but there have been complaints that violators are not pursued intensely enough.	The department's emphasis on compliance rather than punishment is reasonable in a world of limited resources. Nevertheless, when producers do not comply voluntarily, or when they willfully violate the law, the department should vigorously pursue them.
13	The bad-actor statute, Neb. Rev. Stat. sec. 54-2409, is ineffective and may be constitutionally suspect. It should be amended to clarify definitions and provide the department with more guidance.	The department should submit to the Program Evaluation Committee draft language suggesting changes to the statute. (The committee should also consider supporting other technical changes to the act if the department wishes to submit them.)
14	Changes to the federal National Pollutant Discharge Elimination System (NPDES) program could significantly affect the scope of Nebraska's livestock-waste-management program.	None.
15	Changes to county zoning ordinances could determine, to a large extent, how much the livestock industry can expand in Nebraska. This would in turn affect the scope of Nebraska's livestock-waste-management program.	None.

STATE OF NEBRASKA



Mike Johanns
Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

Michael J. Linder

Director

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1200 'N' Street

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Lincoln, Nebraska 68509-8922

Phone (402) 471-2186

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OCT 28 2002

Cynthia Johnson
Director of Research
Program Evaluation Unit
Nebraska Legislative Research Division
PO Box 94945, State Capitol
Lincoln, NE 68509-4945

RECEIVED

OCT 28 2002

LEGISLATIVE RESEARCH

Dear Cynthia:

Thank you for the opportunity to provide comment on the draft report of your evaluation of the Livestock Waste Management Act. We found your staff to be very professional, well-versed, and courteous during their discussions with me and my staff. At your request, I am providing a response to the findings and recommendations issued in the report. In addition, staff has provided comments on what they feel are technical errors or omissions discovered during their review of the draft report.

Recommendation #1: The requirements listed in Title 130 are the result of input from a cross-section of individuals, agencies, and organizations in the state. Items such as seepage rate, liner construction, and locational requirements were evaluated and discussed by a Title 130 advisory committee to the Department. This process occurred in 1998 and 1999. Under the Administrative Procedures Act, these recommendations were then considered by the Environmental Quality Council during their approval process and subsequently approved by the Governor, Attorney General, and Secretary of State. Of course, if there is a desire to re-examine any of these issues by the Legislature, the Department would follow a similar process.

Recommendation #2: The Department appreciates the comments about its record-management system. A considerable amount of staff resources have been expended to develop and implement the system into what we feel is necessary for records management. Our Department receives as many or more requests from the public to examine its records than any other agency so the need for this system is apparent.

Recommendation #3: No comment required.

Recommendation #4: The Department recognizes the importance of maintaining open communications with the public and the industry. We will continue with our outreach efforts to both inform individuals of the rules and regulations and listen to their comments on possible changes or modifications. It is our current, as well as future, goal to be as responsive to all

individuals as efficiently and effectively as possible. We appreciate your comments regarding public relations efforts but, as a regulatory agency, we must be careful to remain objective.

Recommendation #5: Staff working in the Livestock Waste Control Program all have experience and background in the agriculture industry. Many have 25 plus years working specifically with livestock interests. They have backgrounds in agronomy, engineering, farming practices, feed specialties, construction practices, and natural resource management. We are proud of their efforts and knowledge. We provide training to maintain their professional knowledge and will evaluate areas that can be enhanced to expand their knowledge.

Recommendation #6: The Department will examine its current practice on conducting onsite inspections and investigations. However, the public and the Legislature have expressed concerns with large livestock operations, particularly the Class IV operations. The Legislature even mandated that the Department enforce the Livestock Waste Management Act by giving priority to livestock waste control facilities within classes in the following order: Class IV, Class III, Class II, and Class I. We have committed resources to ensure that all operations maintain compliance with Title 130 and individual permit conditions. Compliance records of the operation are important in evaluating future inspections and monitoring activities.

Recommendation #7: The Department agrees with the commitment in responding to citizen complaints.

Recommendation #8: The Department has not observed inconsistent handling of the phased-construction process. However, the Department will develop a guidance document on the process. Based on the results of the guidance document, the next time that Title 130 is amended, the Department will consider the issue of including the phased-construction process in Title 130.

Recommendation #9: The Department agrees that the integrated information system is a useful tool in livestock waste management. It will continue to store land application site information in the system. The Department does not agree with the final two points in this recommendation, primarily because of the resources that would be required. The current state operating permit requires a permittee to notify the Department when land application sites are changed. An annual proof of an easement would become an administrative burden beyond our resources. In addition, it would be more beneficial if the Department would split-sample soil samples instead of random samples. There is too much variability in the land application sites for random sampling.

Recommendation #10: The Department appreciates the comments on its work with ground water monitoring.

Recommendation #11: As a result of LB1217 in the 2000 Legislative Session, the Department provided the Legislature Appropriations Committee with a report on the current permit fee system and options for a possible revised fee structure that would increase the revenue available for the program. We will continue to work with the Legislature if it decides to revisit the fee issue.

Recommendation #12: The Department's efforts to obtain compliance through voluntary efforts is supported by section 81-1510 of the Nebraska Environmental Protection Act which requires that "the Director shall make every effort to obtain voluntary compliance through warning, conference, or any other appropriate means prior to initiating enforcement proceedings". When enforcement is necessary, the Department has an existing internal enforcement process that is followed by all programs. We will continue to evaluate this process to ensure that the appropriate enforcement actions fit the documented violations.

Recommendation #13: The Department agrees with the second sentence in the Findings (which could possibly be listed under Recommendations) that changes are needed in the statutory language concerning "bad actors". The Department, or possibly the Attorney General's Office, can provide the technical expertise on implementing such a statute. However, the Department needs Legislative direction as to Nebraska's goals with this provision before developing language. Is the section designed to prevent new permit applicants from starting business in the state or is it to also loom over existing permittees as a possible punishment and loss of permit? The issue of determining what is a "violation" is also very difficult.

Recommendation #14: No comment required.

Recommendation #15: No comment required.

General Comments:

- The report uses the term "groundwater" as one word. It should be "ground water" as referenced in the statutes and department materials. Also, the report refers to one-eighth inch per day seepage rate. Although discussions usually refer to 1/8th inch per day, Title 130 actually allows 0.13 inches per day.

Specific Comments:

- Page 4, column 2, line 5: should read 'hydrogeologic area' not 'hydrographic area'.
- Page 4, column 2: under "The Department's Program Prior to 1998", the report should probably reference the Nebraska Environmental Protection Act passage in 1971 as the source for the start of the program.
- Page 5, column 1, paragraph 2: there is "statutory guidance" for the livestock waste control program in the Nebraska Environmental Protection Act (§81-1505(10)). Also, the Department was not ignoring ground water concerns. Some of the Title 130 location and construction requirements were specifically included to protect ground water.
- Page 5, column 2, paragraph 2, under "Passage of the Act": statement is made that "Large populations of confined hogs make lagoons a *requirement* for waste collection." Based on economics, a lagoon would be a *logical economic choice* for handling the wastes, but it is not a requirement. There are large operations that have underfloor pits as the livestock waste control facility.

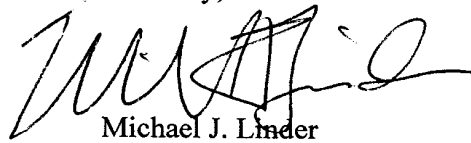
- Page 7, column 1, paragraph 2: the third & fourth sentences should probably read: “The section has a staff of 13 people in Lincoln and *utilizes* four more people in field offices across the state²³. It has a section supervisor, *one engineering supervisor and three* engineers, nine program specialists (including the four field-office employees), an administrative assistant, *a staff assistant*, and *a secretary*.”
- Page 7, column 2, paragraph 1: it is unclear what is meant by “Enforcement of the act comprises its own program within the section.” There is a Legal Services Division in the Department for enforcement activities for all programs.
- Page 8, column 2, last sentence: suggest the sentence read “*Generally speaking, Class I facilities are less stringent.*”
- Page 9, footnote 38: the reference regarding the professional engineer requirement refers to Title 130. It should be noted that the engineering requirements in the regulations are a reflection of those specified in statute (81-3449 (13), 81-2453 (12), and 54-2412 (2)).
- Page 10, column 1, paragraph 1: the report states that the engineer ultimately determines if a permit will be issued or denied. However, a permit isn’t issued until the Director or Director’s designee approves it. The engineer determines if the application can be approved. Also, at the end of the paragraph it implies that there is always negotiation to “satisfy all the parties”. All application reviews are to determine if all the regulatory requirements have been met and a permit will not be issued if the requirements are not met. Often, rather than push an unacceptable application to denial, an applicant will simply not pursue an inappropriate site or unacceptable technology.
- Page 10, column 2, last sentence: it is indicated that the ground water review is limited to lagoons or holding ponds, but that is simply incorrect. All facilities are reviewed based on location.
- Page 11, column 1: the Department of Natural Resources also needs to review facilities that contain more than 50 acre-feet of storage above grade, or are a high hazard structure, or are structures, the failure of which would have a significant impact on the environment.
- Page 11, column 2, last sentence: the Department issues only one construction permit for a phased construction application. Thus, the phrase “separate construction permits” should probably read “*a construction permit with separate construction phases*”.
- Page 11, footnote 56: the reference to construction of the facility to begin within 24 months is applicable to only a proposed livestock operation. If it is an existing operation, the construction permit will include a compliance date for completing construction.
- Page 12, column 2, paragraph 1: first sentence could read “...application that was submitted to *and approved by* the department.”

- Page 12, footnote 65: suggest the last sentence to read, “However, they are *generally* more expensive than clay liners.”
- Page 13, column 2, paragraph 1: the report should clarify that the 1,600 routine inspections have been completed since the Livestock Waste Management Act was passed. There have been considerably more completed since the programs inception in 1972. (This could be addressed in a footnote.)
- Page 14, column 2, line 2: suggest the sentence read “*All of the Class IV, III, and the majority of II operations have been inspected and the majority of these granted permits if necessary, but there are still a number of Class I operations that have yet to be inspected.*”
- Page 15, column 1, last sentence: the word “pollution” should probably be “water quality”.
- Page 15, column 2, last sentence: the word “solution” should probably be “*a site-specific remedy is developed*”.
- Page 20, column 2: the statement leaves out that when an application is deemed incomplete, the applicant is notified of the incomplete items specifically and in writing. In the first sentence we suggest adding “...the department either *identifies in writing specific deficiencies and* returns it to the producer...”
- Page 21, column 2, paragraphs 3 & 4: The easiest way to avoid the allegation of a regulatory “moving target” is to be completely inflexible. The Department chooses to approach each site with the ultimate goal of protection of the environment and compliance with the law. Under this approach, internal communication is important and we will examine ways to improve.
- Page 23, column 2, line 8: the word “eliminating” should probably be changed to “reducing”.
- Page 23, column 2, last paragraph: the UN-L model has been a useful tool for the Department. The Plans are the Department’s vehicle for ensuring proper use of manure. They are enforceable under the permit and the Department verifies compliance during inspections. Our knowledge of permittee’s attitude toward the Plans differs from the report’s text if the authors assert that all producers and consultants believe the regulation is laughable.
- Page 26, column 2, paragraph 2: We typically do not send two letters of warning for the same offense. If we do not receive voluntary compliance with the letter of warning, we would typically then issue a notice of violation. Both the letter of warning and notice of violation are measures to try and obtain voluntary compliance. As such, both letters will include a description of the violation, actions the producer needs to take to come into compliance, a deadline to complete these actions, the penalties associated with the

violation, and a requirement to contact the department. Since both letters are measures to try and obtain voluntary compliance, we do and can send a notice of violation without sending a letter of warning. The decision on which letter to send is determined on a case-by-case basis. Any enforcement process, including the Department's, is a fluid process. For example, if an especially egregious violation is discovered, we can go directly to legal action. In addition, compliance with the notice of violation does not preclude the department from taking legal action. This is specifically noted in the letter of warning and the notice of violation to the producer.

Again, I want to thank you for the opportunity to provide these comments. Hopefully, these will assist in providing the Legislature with the necessary information about the Department's implementation of the Livestock Waste Management Act.

Sincerely,

A handwritten signature in black ink, appearing to read "M. Linder", written in a cursive style.

Michael J. Linder
Director

UNIT DIRECTOR'S REVIEW OF AGENCY RESPONSE

On 28 October 2002, the director of the Department of Environmental Quality submitted a response to the Program Evaluation Unit's report prepared in conjunction with this evaluation. Neb. Rev. Stat. sec. 50-1210 of the Nebraska Legislative Program Evaluation Act requires the Program Evaluation Unit Director to "review the response, prepare a brief written evaluation of it, and forward the evaluation to the committee for review." The director's evaluation of the response follows.

The department's response to the unit's draft report is detailed, but the department noted no major errors or disagreements. The department partially disagreed with one recommendation and was equivocal about a few others. We have only a few comments relative to the recommendations.

- Comments relative to Recommendation 4: The department's comments indicate a hesitancy to engage in public relations efforts because of a desire to remain objective. While we certainly understand the department's position, we believe there is a perception, especially among some producers, that objectivity is exactly what is missing. We were told on more than one occasion that it is dangerous for producers to go out of their way to work with the department (to "stick their heads out") because the department then regulates them more heavily. Meanwhile, producers who do the bare minimum (or perhaps even violate the laws) are left alone. That is not the incentive the department should give. While it strikes us as unavoidable that the department focuses on the producers it has in front of it, it should also express some appreciation for their cooperation. Similarly, environmental groups and concerned citizens should be made to feel like their contributions are valuable. Informing people of the rules and listening to their comments are admirable actions, but we think the department could do something more without sacrificing objectivity. A thank-you letter or telephone call to a producer or concerned citizen could go a long way toward changing how the department is perceived, even if it doesn't change any of the department's other actions.
- Comments relative to Recommendation 5: We did not intend to imply that the department's staff lacked experience; that is clearly not the case. Our recommendation was intended to encourage the department to continue its training efforts, especially as they relate to construction because every construction situation is different. It seems like a good idea for engineers to spend some time in the field looking at buildings rather than designs. Again, the goal is to send a message to producers and their engineers that the department understands the complexities and costs of construction and, consequently, does not impose delays lightly.
- Comments relative to Recommendation 6: We are well aware of the Legislature's mandate that the department give priority to regulating larger facilities. However, the department still enjoys a lot of flexibility; inspection schedules could easily be adjusted without shifting priorities. Even so, we agree that the Legislature may wish to consider modifying the language of the statutory mandate to provide the department with more flexibility, if that is what the Legislature wants to do.

- Comments relative to Recommendation 8: If the department developed a guidance document in response to Recommendation 8, we would find that satisfactory. Our interest in recommending that the department commit its policy to writing is to ensure that the department does not leave itself open to allegations that it is treating some producers preferentially.
- Comments relative to Recommendation 9: This is the recommendation with which the department partially disagreed. We suggested that the department find ways to improve its enforcement of comprehensive nutrient-management plans by supplementing land-application record reviews and perhaps hiring an agronomist. The department believes that any supplementation strategy or additional personnel would be too costly.
- Comments relative to Recommendation 13: The department would prefer not to submit draft legislation to the committee without a clear legislative policy to guide it. We understand the department's concern. Perhaps the committee can discuss the goals of the bad actor statute and work with the department to draft more precise language, seeking the Attorney General's advice when appropriate.

In addition to discussing each recommendation, the department also made a number of comments about the contents of the report. Because the suggestions are detailed, we believe it best to address each of them separately.

General comments:

- Regardless of statutes or departmental documents, common usage requires groundwater to be written as one word.
- With regard to seepage rates, we will make it clear in the text that the regulatory seepage rate is 0.13 inches, which is *approximately* one-eighth of an inch, and we will change the title of Table C to clarify that the scale is in *approximate* inches per day. We like using the fractions whenever possible because they are much easier for readers to understand, but we understand the department's desire for absolute accuracy.

Specific comments:

- Page 3, first bullet: We agree with this correction.
- Page 3, second bullet: We will consult with the department and clarify the language to ensure accuracy.
- Page 3, third bullet: We will consult with the department and clarify the language to ensure accuracy.
- Page 3, fourth bullet: We will consult with the department and clarify the language to ensure accuracy.
- Page 4, first bullet: We will consult with the department and clarify the language to ensure accuracy.

- Page 4, second bullet: We agree with this correction and will change the word “enforcement” to “implementation.”
- Page 4, third bullet: We disagree with this correction but will consult with the department to see if it can provide further explanation.
- Page 4, fourth bullet: We are confused by this comment and will have to consult with the department. Neb. Rev. Stat. secs. 81-3449(13) and 81-3453(12) exempt certain farming practices from engineering and architectural requirements when those practices are not related to a departmental permit, and Neb. Rev. Stat. sec. 54-2412(2) allows the department to require professional engineers to stamp applications. The language of the statutes appears to be permissive, meaning that the requirement is contained only in regulation.
- Page 4, fifth bullet: We agree with this correction and will make it clear that the ultimate decision to issue or deny a permit rests with the director or the director designee.
- Page 4, sixth bullet: We will consult with the department and clarify the language to ensure accuracy.
- Page 4, seventh bullet: We will consult with the department and clarify the language to ensure accuracy.
- Page 4, eighth bullet: We will consult with the department and clarify the language to ensure accuracy.
- Page 4, ninth bullet: We agree with this correction and will note that existing operations that are expanding are given a compliance date.
- Page 4, tenth bullet: We agree with this correction.
- Page 5, first bullet: We agree with this correction.
- Page 5, second bullet: We agree with this correction.
- Page 5, third bullet: We will consult with the department and clarify the language to ensure accuracy.
- Page 5, fourth bullet: We agree with this correction.
- Page 5, fifth bullet: We agree with this correction and will clarify the language.
- Page 5, sixth bullet: We agree with this correction and will clarify the language.
- Page 5, seventh bullet: We entirely agree that the department could avoid such allegations by being draconian, and we in no way suggest that its flexible approach is improper. We believe such

an approach is commendable. However, flexibility should not be confused with inconsistency. That is the point we were trying to make.

- Page 5, eighth bullet: We agree with this correction.
- Page 5, ninth bullet: We will clarify the language to remove the suggestion that all producers believe the department's model is laughable. Such is surely not the case. Also, we wish to note that we are in no position to evaluate the model—we are only repeating what we heard.
- Page 5, tenth bullet: We will consult with the department and clarify the language here to ensure accuracy.

SUMMARY OF TESTIMONY

Program Evaluation Committee Public Hearing
Livestock Waste Management Act
5 December 2002

The Program Evaluation Committee held a public hearing on 5 December 2002 in Room 1507 of the State Capitol to receive testimony on the preliminary report entitled *Nebraska Department of Environmental Quality: Administering the Livestock Waste Management Act*. Nineteen individuals provided oral testimony regarding the report. In order of (initial) appearance, the testifiers were:

Andrew Slain	Legal Counsel	Legislative Program Evaluation Unit
Mike Linder	Director	Department of Environmental Quality
Patrick Rice	Assistant Director, Water Quality	Department of Environmental Quality
David Vogler	Legal Counsel	Department of Natural Resources
Dean Edson	Executive Director	Nebraska Assoc. of Resource Districts
Stan Staab	General Manager	Lower Elkhorn NRD
Greg Ruehle	Executive Vice President	Nebraska Cattlemen
Mary Ann Keller	Environmental Comm. Chairperson	Nebraska Pork Producers Association
Dean Settje	President	Settje Agri-Services and Engineering
Jack Sukovaty	President	JES Environmental Services
Ken Winston	Lobbyist	Nebraska Sierra Club
Marty Link	Groundwater Unit Supervisor	Department of Environmental Quality
Dennis Heitmann	Agriculture Section Supervisor	Department of Environmental Quality
Donna Ziems	Farmer	Ewing, Nebraska
Wayne Frost	Rancher	Wolbach, Nebraska
Jon Bailey	Rural Research Director	Center for Rural Affairs
Lorrie Benson	Senior Policy Advisor	The Groundwater Foundation
Jim Knopik	Farmer	Fullerton, Nebraska
David Hansen	Farmer	Anselmo, Nebraska

Exhibits were submitted to the committee by:

Sen. Cap Dierks	Senator	District 40
Mike Linder	Director	Department of Environmental Quality
Sen. Chris Beutler	Senator	District 28
Dean Edson	Executive Director	Nebraska Assoc. of Resource Districts
Elaine Thoendel	Farmer	Ewing, Nebraska
Greg Ruehle	Executive Vice President	Nebraska Cattlemen
Mary Ann Keller	Environmental Comm. Chairperson	Nebraska Pork Producers Association
Ken Winston	Lobbyist	Nebraska Sierra Club
Donna Ziems	Farmer	Ewing, Nebraska
Jon Bailey	Rural Research Director	Center for Rural Affairs
Lorrie Benson	Senior Policy Advisor	The Groundwater Foundation
Jim Knopik	Farmer	Fullerton, Nebraska
David Hansen	Farmer	Anselmo, Nebraska

Andrew Slain, Program Evaluation Unit Legal Counsel, briefly summarized the report and noted the unit's response to each of the scope statement questions.

Mike Linder, director of the Nebraska Department of Environmental Quality commented briefly on the report and then proceeded through a list of questions submitted to him by Senator Beutler, Vice Chairperson of the Program Evaluation Committee. Mr. Linder discussed the inspection backlog, water-quality monitoring, the bad-actor statute, and the possible effects of new federal regulations. Mr. Linder was joined in his testimony by Patrick Rice, the department's assistant director in charge of water quality. Mr. Linder and Mr. Rice answered a number of questions posed by Senator Beutler dealing with water-quality monitoring.

David Vogler, Legal Counsel for the Department of Natural Resources (DNR) then testified about that agency's involvement in the livestock-waste management program. The DNR does not handle water quality issues and is not really involved beyond granting permits for certain storage facilities.

Dean Edson and Stan Staab from the Nebraska Association of Resource Districts testified next. Mr. Edson and Mr. Staab reviewed efforts being made by NRDs to monitor water quality. They also commented on the Lower Elkhorn's practice of verifying adequate land-application sites. The committee was very supportive of that effort.

The next two testifiers were Greg Ruehle from the Nebraska Cattlemen and Mary Ann Keller from the Nebraska Pork Producers Association. Both testifiers were generally supportive of the report but had specific thoughts about certain recommendations. Specifically, both testifiers argued against higher permit fees or permit expiration dates and supported changes in the department's inspection schedule.

The next two testifiers represented the interests of engineering consultants. They were Dean Settje of Settje Agri-Services and Engineering and Jack Sukovaty from JES Environmental Services. Again, both testifiers were generally supportive of the report but had specific thoughts about certain recommendations. Specifically, both testifiers argued that phased construction was beneficial and that the biggest problem with the department is too much bureaucracy.

Ken Winston testified next on behalf of the Nebraska Sierra Club. The Sierra Club would like to see DEQ strengthen the bad-actor statute, respond to complaints more rapidly, more vigorously pursue violators, and eliminate lifetime permits. It is opposed to any reduction in inspections or local zoning authority.

Next, DEQ was given an opportunity to respond to the previous testimony. Marty Link, the Groundwater Unit Supervisor, clarified some confusion about groundwater-monitoring data. Dennis Heitmann, the Agriculture Section Supervisor, answered questions about land application, and Mike Linder, the Director, provided further testimony regarding possible changes to federal regulations.

The public testimony portion of the hearing opened with Donna Ziems, a farmer who believes that DEQ allows producers to operate lagoons like storage pits. She also testified that her county is strongly opposed to any reduction in county zoning authority.

Next, Wayne Frost, another farmer, testified that DEQ does not regulate land application as it should. He also is opposed to any reduction in county zoning authority.

Jon Bailey from the Center for Rural Affairs testified that the Legislature must use caution when imposing regulations so that small producers who cannot afford expensive changes are not driven out of business. He noted, however, that making fees contingent on the actual number of animals on site would not be unfair to small producers. He also emphasized the need for a bad-actor statute.

Lorrie Benson from the Groundwater Foundation testified that the report was inadequate. She would like the report to contain information about water quality, comments from “neutral” experts, and comments directly attributed to specific sources.

The last two testifiers were Jim Knopik, a farmer from Fullerton, Nebraska, and David Hansen, a farmer from Anselmo, Nebraska. Mr. Knopik testified that DEQ is in the business of protecting big business rather than water quality. Mr. Hansen testified that he is concerned about both water quality and odor problems.

Addenda

ADDENDA

The two addenda presented here are for the reader's information. Addendum A contains the department's response to the committee's findings and recommendations (see Part III). Addendum B is a summary of recent changes to the EPA's National Pollutant Discharge Elimination System program. These changes were released in December 2002, after the unit's report was written.

Addendum A

STATE OF NEBRASKA



DEPARTMENT OF ENVIRONMENTAL QUALITY

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May 8, 2003

Mike Johanns

Governor

Cynthia Johnson
Director of Research
Program Evaluation Unit
Nebraska Legislative Research Division
PO Box 94945, State Capitol
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LEGISLATIVE RESEARCH

Dear Ms. Johnson:

Thank you for the opportunity to provide comment on the report of your evaluation of the Livestock Waste Management Act. We have reviewed the final report, the findings and recommendations, and have the following comments:

Recommendation #1: The requirements listed in Title 130 are the result of input from a cross-section of individuals, agencies, and organizations in the state. Items such as seepage rate, liner construction, and locational requirements were evaluated and discussed by a Title 130 advisory committee to the Department. This process occurred in 1998 and 1999. Under the Administrative Procedures Act, these recommendations were then considered by the Environmental Quality Council during their approval process and subsequently approved by the Governor, Attorney General, and Secretary of State. Of course, if there were a desire to re-examine any of these issues by the Legislature, the Department would follow a similar process.

Recommendation #2: The Department appreciates the comments about its record-management system. A considerable amount of staff resources have been expended to develop and implement the system into what we feel is necessary for records management. Our Department receives as many or more requests from the public to examine its records than any other agency so the need for this system is apparent.

Recommendation #3: No comment required.

Recommendation #4: The Department recognizes the importance of maintaining open communications with the public and the industry. We will continue with our outreach efforts to both inform individuals of the rules and regulations and listen to their comments on possible changes or modifications. It is our goal to be responsive to all individuals as efficiently and effectively as possible. We appreciate your comments regarding public relations efforts and will continue to evaluate our actions in that regard as we seek to remain objective.

Recommendation #5: Staff working in the Livestock Waste Control Program all have experience and background in the agriculture industry. Many have 25 plus years working specifically with livestock interests. They have backgrounds in agronomy, engineering, farming practices, feed specialties, construction practices, and natural resource management. We are proud of their efforts and knowledge. We provide training to maintain their professional knowledge and will evaluate areas that can be enhanced to expand their knowledge.

Recommendation #6: The Department will examine its current practice on conducting onsite inspections and investigations. However, the public and the Legislature have expressed concerns with large livestock operations, particularly the Class IV operations. The Legislature even mandated that the Department enforce the Livestock Waste Management Act by giving priority to livestock waste control facilities within classes in the following order: Class IV, Class III, Class II, and Class I. We have committed resources to ensure that all operations maintain compliance with Title 130 and individual permit conditions. Compliance records of the operation are important and considered in evaluating future inspections and monitoring activities.

Recommendation #7: The Department agrees with the commitment in responding to citizen complaints.

Recommendation #8: The Department has not observed inconsistent handling of the phased-construction process. However, the Department will develop a guidance document on the process to help ensure it is uniformly applied to all applications. Based on the results of the guidance document, the next time that Title 130 is amended, the Department will consider the issue of including the phased-construction process in Title 130.

Recommendation #9: The Department agrees that the integrated information system is a useful tool in livestock waste management. The system will continue to store basic facility information, including land application site information. The Department's ability to perform random soil sampling is severely limited. Funds to conduct soil sampling have never been an identified part of the Agriculture Section budget. Diverting existing funds to cover the costs for laboratory analysis would come at the expense of reduced site inspections and program management. The current state operating permit requires a permittee to notify the Department when land application sites are changed. An annual proof of a land application area agreement would become an administrative burden and again, limit our resources for other tasks.

Recommendation #10: The Department appreciates the comments on its work with ground water monitoring.

Recommendation #11: As a result of LB1217 in the 2000 Legislative Session, the Department provided the Legislature Appropriations Committee with a report on the current permit fee system and options for a possible revised fee structure that would increase the revenue available for the program. We will continue to work with the Legislature if it decides to revisit the fee issue.

Recommendation #12: The Department's efforts to obtain compliance through voluntary efforts is supported by section 81-1510 of the Nebraska Environmental Protection Act which requires that "the Director shall make every effort to obtain voluntary compliance through warning, conference, or any other appropriate means prior to initiating enforcement proceedings". When enforcement is necessary, the Department has an existing internal enforcement process that is followed by all programs. We will continue to evaluate this process to ensure that the appropriate enforcement actions fit the documented violations.

Recommendation #13: The Department agrees with the second sentence in the Findings (which could possibly be listed under Recommendations) that changes are needed in the statutory language concerning "bad actors". The Department, or possibly the Attorney General's Office, can provide the technical expertise on implementing such a statute. However, the Department needs Legislative direction as to Nebraska's goals with this provision before developing language. Should the bad-actor statute be designed only to prevent new permit applicants from starting business in the state or should it be expanded to provide a means to suspend or revoke an operating permit? The issue of determining what constitutes a "violation" is also very difficult.

Recommendation #14: The Department agrees with the recommendation that the state begin to implement the recommendations of the Phase II report. In fact, the Department has established the Nebraska Surface Water Monitoring Council and a Statewide Ground Water Monitoring Committee. A 1,000-well ambient ground water monitoring well network is being established with the assistance of the Natural Resources Districts. The ambient stream monitoring network has been expanded from 42 to 98 sites including 5 new sites on the Missouri River.

Again, I want to thank you for the opportunity to provide these comments. Hopefully, this report will provide the Legislature the necessary documentation to conclude that the Department is implementing the Livestock Waste Management Act in compliance with the Legislature's intent and in the best interests of the State of Nebraska.

Sincerely,

A handwritten signature in black ink, appearing to read "Jay Ringenberg", with a long, sweeping underline.

Jay Ringenberg
Deputy Director

Addendum B

RECENT CHANGES TO THE EPA'S NPDES PROGRAM

As noted in the evaluation report, the Nebraska Department of Environmental Quality (department) issues permits for the Environmental Protection Agency's (EPA's) National Pollutant Discharge Elimination System (NPDES) program. The NPDES program focuses on eliminating point-source pollution resulting from, among other things, discharges of livestock waste. The rules governing whether a livestock facility needs an NPDES permit are contained in the EPA's Concentrated Animal Feeding Operation Rule (rule).¹

At the time the evaluation report was written (October 2002), the EPA was planning to revise the rule. It had published several drafts of proposed changes to which the department responded. However, the final changes had not been published, thus section V of the report speculated about two proposed changes that, if made, would have a large impact on the state's livestock waste-management program. Specifically, the changes discussed would have affected which facilities would be required to obtain NPDES permits and how land-application rates would be calculated for purposes of developing nutrient-management plans.

On 16 December 2002, the EPA issued its revised rule.² The two changes noted above came to pass (at least in part), as well as some others noted below. While the changes were not as sweeping as they could have been, they will nevertheless have a significant impact on the department's workload and attempts to eliminate its inspection backlog.

¹ Rules pertaining to livestock operations permitted under the National Pollutant Discharge Elimination System are set forth in the Federal Register, Vol. 68, No. 29, parts 122 and 412.

² The full text of the EPA's final Concentrated Animal Feeding Operation rule and its preamble [hereinafter Preamble] can be found at: <http://www.epa.gov/npdes/caforule>

Changes to the NPDES Program

Under the old rule, only open-lot cattle feeding operations needed NPDES permits because they pose the greatest risk of runoff pollution. However, under the new rule, *all* operations with more than approximately 1,000 animal units are required to apply for an NPDES permit unless they can show that there is no potential for discharges because of specific geographic and climatic conditions.³

The new rule also changes exemption provisions and adds reporting requirements. Regarding exemptions, the EPA has removed the permit exemption for facilities built to hold runoff from 25-year 24-hour storm events.⁴ Thus, many facilities that had previously been exempt will have to apply for NPDES permits. Regarding reporting requirements, producers with permitted facilities will be required to submit annual reports to the department, describing ongoing management practices.⁵

Finally, the rule requires all NPDES permittees to develop nutrient-management plans to govern the land application of waste.⁶ Each permittee will need to develop a nutrient-management plan by 31 December 2006 and keep a copy of it on site, along with records documenting the implementation of practices and procedures identified in the plan.⁷

³ Federal Register Vol. 68, No. 29 part 122.23. Smaller operations that have discharged waste may also be required to apply for a permit.

⁴ As noted in the report, a 25-year 24-hour storm is a large rainfall event.

⁵ Federal Register, Vol. 68, No. 29, part 122.42.

⁶ Previously, runoff from land-application areas was considered nonpoint-source pollution and therefore beyond regulation through the NPDES program. With this rule, the EPA has expanded the scope of its authority.

⁷ Federal Register, Vol. 68, No. 29, parts 122.42 and 412.4.

While significant, the scope of this change is not as dramatic as many feared. Some of the EPA's draft rules indicated that the calculation of required acreage for land application would be based on the amount of phosphorous the land could safely absorb, rather than the amount of nitrogen, which is a more common standard.⁸ The new rule strikes a balance and requires producers to consider both when calculating land-application rates. Producers will be required to use strictly phosphorous-based land-application rates only if their operations meet certain risk criteria.^{9,10}

Implementation of the Changes

The department has until 31 December 2006 to implement the rule changes required by the EPA.¹¹ As part of this process, it must update its rules and regulations, and, if necessary, make statutory changes.¹² The EPA estimates that the rule changes will expand the regulated population from 4,500 to 15,500 operations nationwide.¹³ Department personnel estimate that they will have to issue a total of 1,000 permits in Nebraska to comply with the rule changes.¹⁴ When the department implements

these changes, program staff members will be responsible for processing more permits, inspecting more facilities, and reviewing annual reports. Furthermore, the current inspection backlog will increase.

⁸ To be in compliance with a *state* permit, the number of acres required for land application is calculated based on the amount of nitrogen that crops can absorb with as little risk of seepage or runoff as possible. As noted in Section V, the amount of phosphorous that can be applied is less than that of nitrogen, so it takes more acres of land—as many as double—to allow for the application of the nutrients at an acceptable level.

⁹ Federal Register, Vol. 68, No. 29, part 412.4.

¹⁰ Currently, the state considers using a phosphorous-based land application standard only *after* an operation has used the nitrogen-based standard and soil tests indicate a high level of phosphorous (more than 150 parts per million). Telephone conversation with Dennis Heitmann, supervisor of the department's livestock section, 5 February 2003.

¹¹ Preamble, pg. 125.

¹² The EPA has set a timeline for state regulators to comply with this requirement. Regulators have one year to make changes in their rules and regulations; if statutory changes are necessary, they will be allowed two years. Preamble, pg. 126-7. According to the department, Nebraska will probably require statutory changes to implement the rule.

¹³ EPA Press release, 16 December 2002.

¹⁴ Telephone conversation with Dennis Heitmann, 5 February 2003.