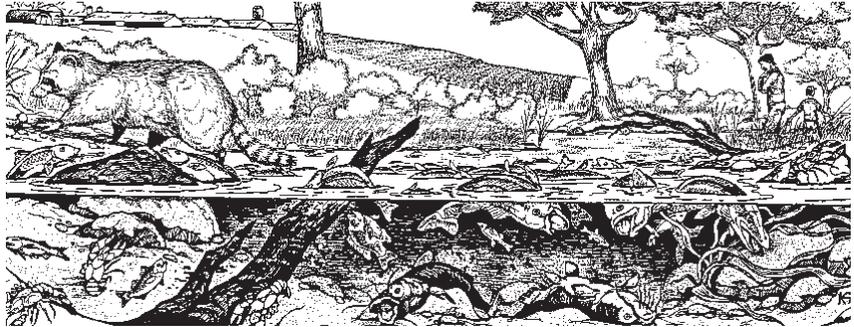




## When Manure Hits Water

*Large-scale livestock factories are a major threat to water quality in rural America.*

One large animal confinement operation can produce as much waste as a small city. That's because these facilities rely on a liquid waste management system to handle manure. This manure is stored in a semi-liquid state until it can be pumped out and applied on the land. These waste systems leave many opportunities for manure to leak or spill into waterways. In fact, there have been dozens of major manure-caused fish kills throughout the nation in the past few years.



### The damage done

A manure spill can damage a waterway in a couple of ways. As nutrients such as nitrogen and phosphorus start to break down, they consume all the dissolved oxygen needed to sustain life in a creek. The fish and other organisms literally suffocate. In addition, manure contains ammonia, which can be toxic to fish, particularly during warm weather. Waterways and lakes can also be polluted by manure over a longer period of time. Excess phosphorus, for example, can slowly make its way into water from surface applications, causing a condition where algae blooms and massive plant growth reduce life-giving dissolved oxygen levels.

### The causes

Manure reaches water in many ways; lagoons that break or overflow are a few of the major ones. In addition, malfunctioning washing mechanisms, employee incompetence or an ill-timed rain after a field application can send manure into a waterway. In fact, one major spill was blamed on a passing cow tripping a valve.

Slow, chronic leaking of manure over a long period of time can also be a problem. A study conducted by Laura Jackson and Dennis Kenney in Iowa concluded that even when no major spills occur, the daily operation of a factory livestock facility can create excess nitrogen in an area.<sup>1</sup> In short, when tens of thousands of animals are concentrated in one spot, it is nearly impossible to have enough growing plants available in the area to use up the excess nutrients produced by all that manure.

### A flood of pollution

◆ The Illinois Environmental Protection Agency has estimated that raw manure has a “pollution strength” that is 160 times greater than raw human sewage.<sup>2</sup> In fact, factory animal operations are one major reason agriculture is the leading cause of nonpoint source water pollution in the United States.<sup>3</sup>

◆ Animal waste is the largest contributor to pollution in 60 percent of the rivers and streams classified as “impaired” by the Environmental Protection Agency.<sup>3</sup>

◆ The United States generates 1.4 billion tons of animal manure every year — 130 times more than the annual production of human waste.<sup>3</sup>

◆ In Kentucky, a sinkhole collapse under a hog waste lagoon caused approximately 2.4 million gallons of hog waste to drain into an aquifer in less than five hours.<sup>4</sup>

◆ In Virginia and Maryland, waste from mega-poultry operations is contributing to an oxygen-short “Dead Zone” in the Chesapeake Bay.<sup>5</sup>

◆ Minnesota’s largest documented manure-caused fish kill thus far happened in June 1997. A faulty timing mechanism caused 100,000 gallons of liquid hog manure to flow into a tile line, which eventually drained into Renville County’s Beaver Creek. More than 690,000 fish were killed, and 18.7 miles of the stream was polluted. Even crayfish, which are tough bottom-dwellers, were scrambling out of the water to get away from the pollution, according to eye-

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witness accounts.<sup>6</sup>

◆ In North Carolina, a damaged lagoon servicing a 1,200-sow operation spewed a 22-million-gallon flood of feces into a river linked to a coastal community. That's twice the amount of oil spilled during the 1989 Exxon Valdez disaster in Alaska. Bacteria levels in the polluted water measured 15,000 times higher than normal after the manure hit the river. When Hurricane Floyd hit the state in the fall of 1999, overflowing manure lagoons, as well as floating rafts of dead hogs, became major public health risks.<sup>3</sup>

◆ In 1998, antibiotics and bacteria resistant to antibiotics were found in the large-scale manure lagoons sampled by researchers working with the federal government's Centers for Disease Control and Prevention. Antibiotics are routinely added to swine feed to promote growth in confinement systems.<sup>7</sup> That same study, which was conducted in Iowa, found similar contaminants in water flowing near the sample lagoons.

◆ Between 1955 and 1996, nitrogen concentrations in the lower Mississippi River tripled. About 30 percent of that nitrogen was produced by livestock manure. Leaching of nitrogen from Midwestern farms is the main cause of the Gulf of Mexico's "Dead Zone," an area about the size of Connecticut and Delaware together where sea life is unable to survive.<sup>8</sup>

## What you can do

◆ Start a citizen stream monitoring team.

◆ Know who to contact in case of a spill. The sheriff's office or a conservation officer is the best place to start.

◆ Be prepared to document the effects of the spill yourself. It is amazing how quickly evidence washes away in a small stream. Video cameras are invaluable tools for documenting a spill as well as for recording the collection of evidence. Obtain sterile containers from a local hospital and fill them with polluted water. Place that water on ice immediately and get it to a water testing laboratory as soon as possible.

◆ When a spill occurs, find out who owns the livestock that produced the manure. All too often large companies who have their livestock raised on contract by others do not take any of the blame for pollution problems.

◆ If you are a farmer, seek information on sustainable livestock production methods that do not rely on large liquid manure systems. Deep-bedded hoop house systems and managed rotational grazing are just two ways farmers are producing livestock in an environmentally and economically sound manner.

◆ Contact the Land Stewardship Project's Policy Program at 612-722-6377 or [bking@landstewardshipproject.org](mailto:bking@landstewardshipproject.org) for information on how citizens can help change local, state and federal policy related to factory livestock operations.

◆ Buy meat and dairy products that were produced by independent family farmers using methods that don't rely on massive liquid manure systems. Visit [www.landstewardshipproject.org](http://www.landstewardshipproject.org), or call 651-653-0618 for a listing of Land Stew-

ardship Project members who sell such products direct to consumers.

## Sources

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<sup>2</sup>*Understanding the Pollution Potential of Livestock Waste*. Illinois Environmental Protection Agency. 1991 [www.bbe.umn.edu/extens/enotes/enwin95/manure.html](http://www.bbe.umn.edu/extens/enotes/enwin95/manure.html).

<sup>3</sup>Wright, Andrew G. "A Foul Mess: EPA takes aim at factory farms, the No. 1 water polluter in the U.S.," *Engineering News-Record*, Oct. 4, 1999, p. 26

<sup>4</sup>Crawford, Nicholas. *Leakage and Sinkhole Collapses Under Hog Waste Lagoons in Kentucky*, Center for Cave and Karst Studies, Department of Geography & Geology, Western Kentucky University, Aug. 5, 1998

<sup>5</sup>Silverstein, Ken. "Meat Factories," *Sierra*, Jan./Feb. 1999, p. 28

<sup>6</sup>DeVore, Brian. "Anatomy of a Manure Spill." *Land Stewardship Letter*. Land Stewardship Project. August/September 1997. [www.landstewardshipproject.org/lsl/lspv15n4.html](http://www.landstewardshipproject.org/lsl/lspv15n4.html)

<sup>7</sup>Campagnolo, Enzo R.; Rubin, Carol S. *Report to the State of Iowa Department of Public Health on the Investigation of the Chemical and Microbial Constituents of Ground and Surface Water Proximal to Large-Scale Swine Operations*, Oct./Dec. 1998, Centers for Disease Control & Prevention, Atlanta, Ga.

<sup>8</sup>DeVore, Brian. "Dead Zone Puzzle." *Minnesota Conservation Volunteer*. Minnesota Department of Natural Resources. July-August 2001. [www.dnr.state.mn.us/volunteer/julaug01/hypoxia.html](http://www.dnr.state.mn.us/volunteer/julaug01/hypoxia.html)

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*This fact sheet is brought to you by the members and staff of the Land Stewardship Project, a private, nonprofit organization devoted to fostering an ethic of stewardship for farmland and to seeing more successful farmers on the land raising crops and livestock. For more information, call 651-653-0618 or visit [www.landstewardshipproject.org](http://www.landstewardshipproject.org)*