

expected to mitigate future water quality impairment and the associated human health and ecological risks by reducing pollutant discharges from facilities that confine a large number of animals in a single location.

EPA's revisions to the existing regulations also address the changes that have occurred in the animal production industries in the United States since the development of the existing regulations. The continued trend toward fewer but larger operations, coupled with greater emphasis on more intensive production methods and specialization, is concentrating more manure nutrients and other animal waste constituents within some geographic areas. These large operations often do not have sufficient land to effectively use the manure as fertilizer. Furthermore, there is limited land acreage near the CAFO to effectively use the manure. This trend has coincided with increased reports of large-scale discharges from CAFOs, as well as continued runoff that is contributing to the significant increase in nutrients and resulting impairment of many U.S. water bodies.

Finally, EPA's revisions to the existing regulations will make the regulations more effective for the purpose of protecting or restoring water quality. The revisions will also make the regulations easier to understand and better clarify the conditions under which an AFO is a CAFO and, therefore, subject to the regulatory requirements of today's final regulations.

C. What Are the Environmental and Human Health Concerns Associated With Improper Management of Manure and Wastewater at CAFOs?

This section provides a brief summary of the environmental and human health concerns associated with the improper management of manure and wastewater at CAFOs. It is intended to provide the necessary context for discussions in subsequent sections of this preamble. Information is provided on the amount of manure generated by animal agriculture and the areas of the country where the amount of manure generated by these operations is considered excess at the farm and county levels as defined in analyses by USDA. This information is critical to framing the action EPA is taking today. A detailed discussion of the environmental and human health impacts is presented in Section VII of this preamble, entitled Environmental Benefits of the Final Rule.

Livestock and poultry manure, if not properly handled and managed by the CAFO, can contribute pollutants to the environment and pose a risk to human

and ecological health. EPA's administrative record for this final rule includes estimates of the amount of manure and excess nutrients generated each year by CAFOs and provides information on the types of pollutants known to be present in animal manure and wastewater. The administrative record also documents the potential environmental problems associated with CAFOs, based on States reporting water quality impairment attributable to agricultural and animal production, survey data that show human and ecological health risks associated with these pollutants, and documented cases linking these risks to the discharge and runoff of pollutants from livestock and poultry facilities. More information is provided in the 2001 proposed rule (66 FR 2972-2974 and 66 FR 2976-2984) and other support documents referenced in the proposal and in the administrative record for this final rule. The administrative record contains information on the scientific and technical literature, as well as available survey and monitoring data, to corroborate the Agency's findings.

1. How Do the Amounts of Animal Manure Compare to Human Waste?

USDA estimates that operations that confine livestock and poultry animals generate about 500 million tons of manure annually (as excreted). This compares to EPA estimates of about 150 million tons (wet weight) of human sanitary waste produced annually in the United States, assuming a U.S. population of 285 million and an average waste generation of about 0.518 tons per person per year. By this estimate, all confined animals generate 3 times more raw waste than is generated by humans in the U.S. As a result of today's action, EPA is regulating close to 60 percent of all manure generated by operations that confine animals. Of the estimated amount of nutrients generated by these operations that is in excess of cropland needs, EPA's regulation will account for nearly 70 percent of manure generated by these operations.

2. What Are "Excess Manure Nutrients" and Why Are They an Indication of Environmental Concern?

An analysis developed by USDA provides a means to consider the potential environmental risk from confined livestock and poultry manure based on the amount of "excess" manure nutrients generated by CAFOs. USDA defines "excess manure nutrients" on a confined livestock farm as manure nutrient production that exceeds the capacity of the crop to

assimilate the nutrients. USDA's analysis of *1997 Census of Agriculture* data indicates that a considerable portion of the manure nutrients generated at larger animal production facilities exceeds the crop nutrient needs, both at the farm and local county levels. Given consolidation trends in the industry toward larger-sized operations that tend to have less available land on which to spread manure, the amount of excess manure nutrients being produced has been rising.

Among the principal reasons for the farm-level excess of nutrients generated is inadequate land for utilizing manure. USDA data show that the amount of nutrients, and the amount of excess nutrients, produced by confined animal operations rose about 20 percent from 1982 to 1997. During that same period, cropland and pastureland controlled by these farms declined from an average of 3.6 acres in 1982 to 2.2 acres per 1,000 pounds live weight of animals in 1997. The combination of these factors has contributed to an increase in the amount of excess nutrients produced at these operations. Larger-sized operations with 1,000 or more animals exceeding 1,000 pounds accounted for the largest share of excess nutrients in 1997. Roughly 60 percent of the nitrogen and 70 percent of the phosphorus generated by these operations must be transported off-site.

By sector, USDA estimates that operations that confine poultry account for the majority of on-farm excess nitrogen and phosphorus. Poultry operations account for nearly one-half of the total recoverable nitrogen, but on-farm use is able to absorb less than 10 percent of that amount. In 1997 poultry operations accounted for about two-thirds of the total excess on-farm nitrogen. About half of the estimated on-farm excess phosphorus was generated by poultry. This is attributable to not only the limited land area for manure application but also the generally higher nutrient content of poultry manure compared to the manure of most other farm animals, as reported in the scientific literature. Dairies and hog operations are the other dominant livestock types shown to contribute to excess on-farm nutrients, particularly phosphorus.

The regions of the United States that show the largest increase in excess nutrients between 1982 and 1997 are the Southeast and the Mid-Atlantic. The excess amounts are mostly the result of the number and concentration of large poultry and hog operations in those regions. These operations generate high nutrient concentrations and often have the smallest land area per animal unit