



# Animal Waste Management

CONTROL, TREATMENT, AND REUSE STRATEGIES

**CDM**

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The last several years have seen an increasing focus on animal wastes by regulators, Congress, and environmental groups. An estimated 1.3 billion tons of manure are generated annually in the United States and the management of this waste is quickly becoming a critical issue. In particular, confined animal feeding operations (CAFOs) have been identified as a significant source of surface water pollution, groundwater contamination, greenhouse gases, and odors.

Animal waste management in the 21st century presents extraordinary technical and economic challenges. The evolution of treatment processes for animal waste has not kept pace with demands to cost-effectively reduce pollutant concentrations in facility effluents, improve solids management, or reduce odors. Consequently, few affordable and effective treatment options are available to many livestock operators.

## INNOVATIVE STRATEGIES

Addressing the dual technical and economic constraints of animal waste management demands innovative approaches, with an emphasis on regional and voluntary strategies. Further, these approaches should be holistic—focusing not only on pollution concerns associated with manure, but also on the benefits manure provides as valuable sources of nutrients and organic matter. The following projects are just a few examples of how CDM has applied unique solutions to meet a variety of client needs.

**Regional Animal Waste Management Planning.** In response to concerns regarding phosphorus in the Bosque River watershed, the Brazos River Authority (BRA) retained CDM to identify regional management solutions for dairy manure generated in Erath County, Texas (home to 100,000 dairy cows).

CDM recommended a phased and diversified approach to manure management based on windrow composting as a primary processing technology. Report recommendations contributed to the development of grant projects worth more than \$7 million for Texas' North Bosque, Upper North Bosque, and Leon River watersheds—and the export of more than half of the manure generated in the area for roadway construction and other beneficial use projects.

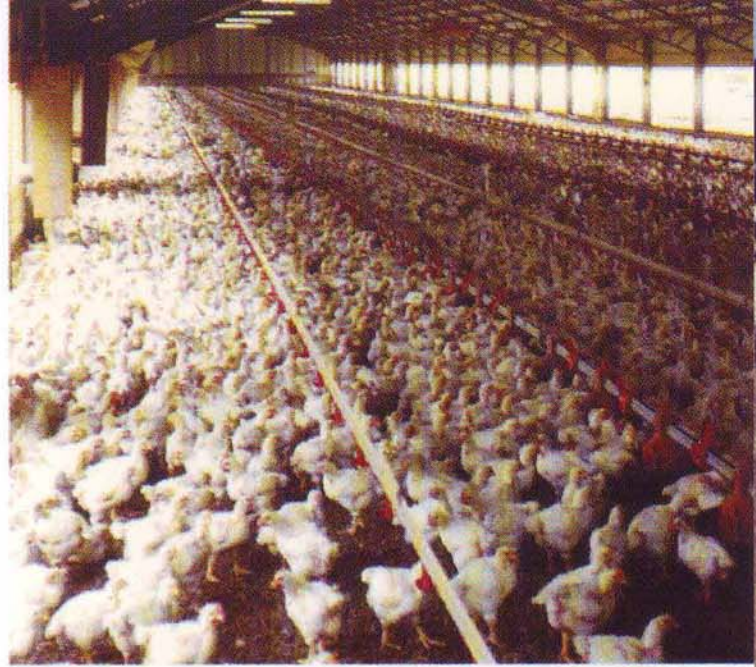
**Integrated Resource Planning (IRP).** Driven by the development of a large poultry industry (with 20 million birds) in Texas' Navasota and Brazos watersheds, the BRA initiated this IRP project to protect water resources, while supporting economic development in the area. With the assistance of CDM and the project's task force, the project has already resulted in a tangible benefit for local agricultural producers: the Natural Resource Conservation Service obtained an unprecedented \$500,000 in first-year Environmental Quality Improvement Project funding for water quality-related improvement projects in the watershed, lowering costs to local producers.

**Nutrient Management Planning.** CDM recently completed three agriculture nutrient management assessments for dairies in Florida's Lake Okechobee drainage basin that had

exhibited high phosphorus runoff concentrations. Prepared for the Florida Department of Agricultural and Consumer Services, each assessment included quantified farm characteristics (from farming operations to soil, hydrology, and water quality data), a farm phosphorus budget, and strategies to achieve discharge goals that incorporate both operational and structural practices.

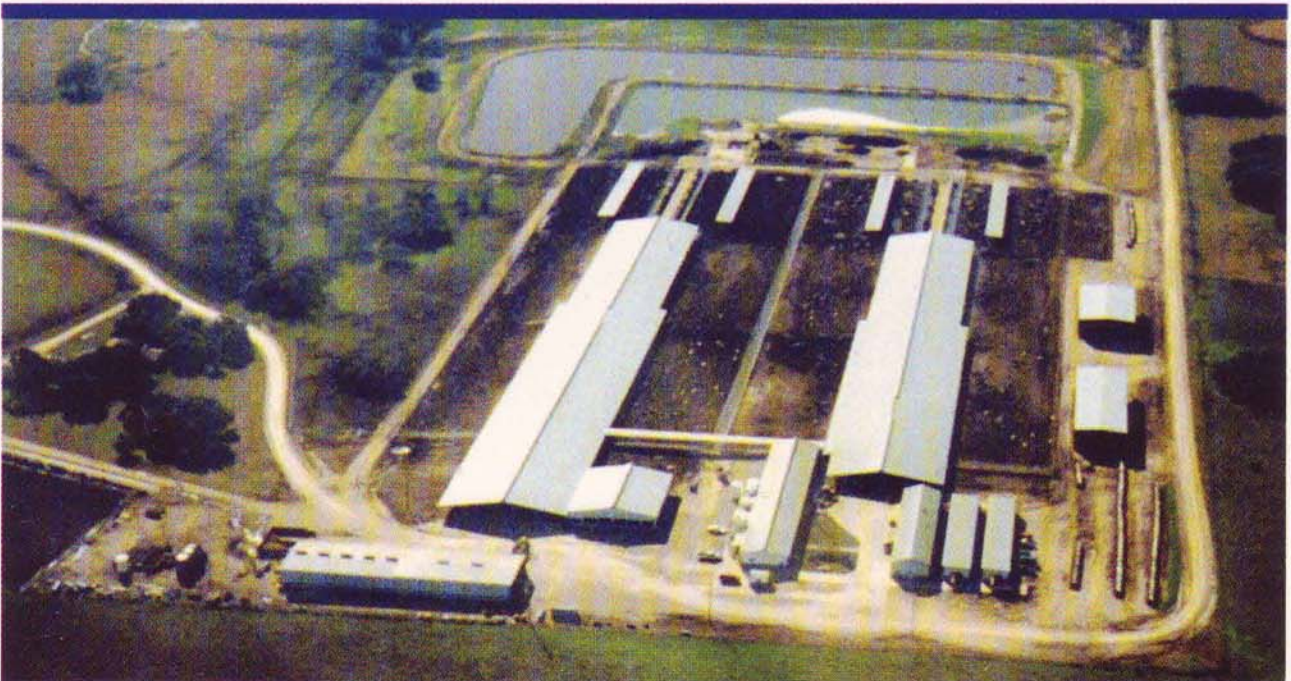
**Dairy Stormwater Control Design and Construction.** CDM was selected to provide stormwater treatment facilities for phosphorus reduction at a Florida dairy. The project, funded by the South Florida Water Management District, is part of a pilot project to reduce phosphorus loads into the Everglades system. For the project, CDM designed and constructed a stormwater impoundment area, diversion ditches to direct stormwater to the impoundment, an alum injection system, and a sedimentation pond for flocculent capture prior to offsite stormwater discharge.

*The management of manure from large livestock operations, such as this dairy, presents both technical and economic challenges—especially when these operations are concentrated in a small area.*



*CDM is working with agricultural, municipal, industrial, and public interest organizations to help ensure, through voluntary strategies, that competing water demands of the livestock industry do not affect water quality.*

**Dairy Complex Waste Management System Design.** CDM was retained to design waste management facilities for a new, state-of-the-art dairy barn for the State University of New York at Cobleskill. Sized for 200 milking cows and 150 heifers, the facilities include mechanical solids separation, gravity settling for separated liquids followed by earthen lagoon storage and irrigation, and composting for separated solids. CDM also performed construction services for the project.



## ANIMAL WASTE MANAGEMENT SERVICES

- **Wastewater Management** – feasibility planning, design, and construction of wastewater treatment and reuse systems.
- **Stormwater Management** – stormwater quality and quantity analyses of collection and treatment systems; design, permitting, and construction of stormwater management facilities.
- **Solids Management** – facility planning, marketing assessments, nutrient management planning, and manure processing facilities design and/or construction.
- **Water Resources Planning** – watershed studies to identify sources of nutrients in rivers and streams, total maximum daily load studies for wasteload allocations in rivers, and best management practices development and assessment.
- **Air Quality** – odor and other assessments, and odor control systems design and permitting.
- **Groundwater** – hydrogeologic assessments and monitoring, including modeling, installation of borings and monitoring wells, preparation of groundwater monitoring plans, and permitting assistance.
- **Integrated Resources Planning** – project development, facilitation, and implementation to address animal waste issues that directly involve stakeholders in the identification of solutions.
- **Risk Assessment** – risk assessments of the introduction of nutrients, antibiotics, hormones, and growth stimulants (some of which are indicated as endocrine disruptors) to receiving waters.



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