

## Comprehensive Nutrient Management Planning

In general terms, a “Comprehensive Nutrient Management Plan” (CNMP) identifies actions or priorities that will be followed to meet clearly defined nutrient management goals at an agricultural operation. Defining nutrient management goals and identifying measures and schedules for attaining the goals is critical to reducing threats to water quality and public health from “Animal Feed Operations” (AFOs).

CNMPs should address, at a minimum, feed management, manure handling and storage, land application of manure, land management, record keeping, and management of other utilization options. While manure nutrients are often the major impact of concern, the plan should address other risks, such as pathogens, to minimize water quality issues and public health concerns associated with AFOs. CNMPs should include a schedule to implement the management practices identified.

In addition to protecting water quality and public health, CNMPs should be site-specific and be written to address the goals and needs of the individual owner/operator, as well as the conditions on the farm (e.g., soils, crops). Plans should also be periodically reviewed and revised in cases where a facility increases in size, changes its method of manure management, or if other operating conditions change. CNMPs should encourage and facilitate technical innovation and new approaches to manure and nutrient management. Development and implementation of CNMPs is the ultimate responsibility of the AFO operator, with assistance as needed from certified industry staff, government agency specialists, private consultants and other qualified vendors.

**Best Management Practices: Feed Management\*** — Where possible, animal diets and feed should be modified to reduce the amounts of nutrients in manure. The American Feed Industry Association developed a document called “Animal Agriculture: The Nutrition — Environment Relationship”. It is a useful outline of possible considerations in modifying feeds and animal and poultry formulation to reduce nutrient excesses in manure.

**Best Management Practices: Manure Handling and Storage\*** — Manure needs to be handled and stored properly to prevent water quality impacts from AFOs. Manure and wastewater handling and storage practices should also consider odor and other environmental and public health concerns. Handling and storage considerations should include:

*Divert Clean Water* — Siting and management practices should divert clean water from contact with feed lots and holding pens, animal manure, or manure storage systems. Clean water can include rainfall falling on roofs of facilities, runoff from adjacent lands, or other sources.

*Prevent leakage* — Construction and maintenance of buildings, collection systems, conveyance systems, and storage facilities should prevent leakage of organic matter, nutrients, and pathogens to ground or surface water.

*Provide Adequate Storage* — Dry manure, such as that produced in certain poultry and beef operations, should be stored in production buildings, storage facilities, or otherwise covered to prevent precipitation from coming into direct contact with the manure. Liquid manure storage systems should safely store the quantity and contents of animal manure and wastewater produced, contaminated runoff from the facility, and rainfall. Location of manure storage systems should consider proximity to waterbodies, floodplains, and other environmentally sensitive areas.



*Manure Treatment* — Manure should be handled and treated to reduce the loss of nutrients to the atmosphere during storage, to make the material a more stable fertilizer when land applied or to reduce pathogens, vector attraction and odors, as appropriate.

**Best Management Practices: *Land Application of Manure\**** — Land application is the most common, and usually most desirable method of utilizing manure because of the value of the nutrients and organic matter. Land application should be planned to ensure that the proper amounts of all nutrients are applied in a way that does not cause harm to the environment or public health. Land application in accordance with the CNMP should minimize water quality impacts and public health concerns. Considerations for appropriate land application should include:

*Nutrient Balance* —The primary purpose of nutrient management is to achieve the level of nutrients required to grow the planned crop by balancing the nutrients that are already in the soil and other sources with those that will be applied in manure, biosolids and fertilizer. At a minimum, nutrient management should prevent the application of nutrients at rates that will exceed the capacity of the soil and planned crops to assimilate the manure nutrients. Soils and manure should be tested to determine nutrient content.

*Timing and Methods of application* — Care must be taken when land-applying manure to prevent it from entering streams, other water bodies, or environmentally sensitive areas. The timing and method of application should minimize the loss of nutrients into the ground or surface water as well as the atmosphere. Manure application equipment should be calibrated to ensure that the quantity of material being applied is what is planned.

**Best Management Practices: *Land Management\**** — Tillage, crop residue management, grazing management, and other conservation practices should be utilized to minimize movement to surface and ground water of soil, organic materials, nutrients, and pathogens from lands where manure is applied. Forest riparian buffers, filter strips, field borders, contour buffer strips, and other conservation buffer practices should be installed to intercept, store and utilize nutrients or pathogens that may migrate from fields to which manure is applied.

**Best Management Practices: *Record Keeping\**** — AFO operators should keep records that indicate the quantity of manure produced and ultimate utilization, including where, when, and amount of nutrients applied. Soil and manure testing should be incorporated into the records management system.

**Best Management Practices: *Other Utilization Options\**** — In vulnerable watersheds, where the potential for environmentally sound land application is limited, alternative uses of manure, such as the sale of manure to other farmers, composting and sale of compost to home owners, and using manure for power generation may need to be considered. All manure utilization options should be designed and implemented to reduce the risk to all environmental resources and must comply with Federal, State, Tribal and local law.

\* *USDA and FDA Unified National AFO Strategy*