



## Natural Resources Conservation Service

### CONSERVATION PRACTICE STANDARD

## FEED MANAGEMENT

### CODE 592

(au)

#### DEFINITION

Manipulating and controlling the quantity and quality of available nutrients, feedstuffs, or additives fed to livestock and poultry.

#### PURPOSE

This practice is applied to achieve the following purpose:

- Water quality - prevent excess nutrients in surface and groundwater by reducing the quantity of nitrogen, phosphorus, sulfur, salts, and other nutrients excreted in the manure
- Water quality - prevent excess pathogens and chemicals from manure, biosolids or compost applications by reducing their quantity and viability in manure
- Air quality - reduce odor, particulate matter, and greenhouse gas (GHG) emissions production from animal feeding operations

#### CONDITIONS WHERE PRACTICE APPLIES

Livestock and poultry operations—

- With a whole farm nutrient imbalance, with more nutrients imported to the farm than are exported and utilized by crops in rotation on the farm.
- That have a significant accumulation of nutrients in the soil.
- That land apply manure and do not have a land base large enough to allow nutrients to be applied at rates recommended by soil test and utilized by crops in the rotation.
- Seeking to improve nutrient use efficiencies, reduce manure pathogens, or reduce odors and GHGs.

#### CRITERIA

##### General Criteria Applicable to All Purposes

Supply sufficient nutrients to maintain the health, growth, production, performance, and reproduction of livestock and poultry.

Develop diets for specific species of animals in accordance with the most current recommendations from one of the following:

- National Research Council (NRC)
- Land grant university (LGU)

Use laboratory analysis on the formulated diet, or on all feed ingredients used to formulate the diet, to determine its nutrient content.

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide online by going to the NRCS website at <https://www.nrcs.usda.gov/> and type FOTG in the search field.

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NRCS, CA  
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Conduct feed analysis as often as necessary to adjust diets for changes in chemical composition of the feeds being fed.

Use laboratories for feed analyses whose tests are accepted by the LGU, State departments of agriculture, or another appropriate body in the State in which the feeding strategy will be implemented. Data from analyzed feed ingredients and/or appropriate historic feed analysis information for the operation may be used for adjustments of ration formulation.

Determine nutrient use and excretion using manure analyses or calculated nutrient intake and excretion rate. If manure analyses are used, they must be conducted by laboratories whose tests are accepted by the LGU, the State departments of agriculture or another appropriate body in the State in which the feeding strategy will be implemented. Nutrient intake and excretion calculations from spreadsheets or computer models are also acceptable methods of monitoring nutrient intake and excretion. The calculations used in these spreadsheets and computer models must be science-based and developed from standards outlined in the most current recommendations of the NRC or LGU.

Use professional animal scientists, independent professional nutritionists, or other comparably qualified individuals in the development of diets and feed management strategies. Use animal nutritionists that are certified through a certification program recognized within the State when required by State policy or regulation.

Formulate diets to provide the quantities and correct relative ratios of available nutrients required by the animal species to meet the goals for which the plan is being developed.

Provide adjustments to nutrient levels to meet specific genetic potential, environmental demands, and requirements to insure health, well-being, and productivity

Use one or more of the following feed management practices and/or diet manipulation technologies to reduce nitrogen, phosphorus, or other excreted nutrients, pathogens, odors, and GHGs, while maintaining the health, well-being, and productivity of the animal:

- Formulating diets closer to animal requirements, complemented by feed management that results in grouping animals according to requirements and consistent delivery of the formulated diets to the correct group of animals.
- Reducing or eliminating phosphorus supplements.
- Reducing protein and supplementing with amino acids (nonruminants).
- Reducing protein in ruminant diets by formulating rations to meet rumen nitrogen and amino acid requirements.
- Manipulating the crude protein and energy (carbohydrate and fat) content of the diet to enhance the availability of amino acids (ruminants). This includes shifts in carbohydrates, fats, and types/quantities of protein utilized.
- Using highly digestible feeds and forages, as appropriate, in the diet.
- Using phytase or phytase combined with scientifically supported enzymes to improve phosphorus availability and reduce the supplemental phosphorus content of the diet (nonruminants).
- Reducing the phosphorus content of the diet of ruminants when phosphorus is being overfed. It is recognized that phosphorus levels in some diets will exceed NRC recommendations because of high phosphorus levels in forages, grains, and food by-products being fed.
- Using selected scientifically supported enzymes or other products to enhance feed digestibility or feed use efficiency.
- Using scientifically supported and environmentally benign growth promotants and additives as allowed by law.
- Implementing group feeding based on physiological or production status.
- Implementing phase feeding.

- Implementing split-sex feeding.
- Using other feed processing, management, additives, or diet manipulation technologies that have 592-CPS-3 NRCS, NHCP September 2016 demonstrated the ability to reduce manure nutrient content, pathogens, odors, or GHG.
- Improving form or method of delivery of feeds.
- When livestock are obtaining their diet by grazing pastures as well as mechanically harvested and processed feeds, pasture forages will be tested for nutrient content and accounted for in the feed ration and balance of nutrients. All feeds, including grazed pasture will be included in an analysis for meeting the livestock's nutritional requirements and avoiding excess nutrients being fed. Forage tests will meet the LGU acceptance and certification process.
- Modify cropping strategies or utilize alternative feed sources to provide nutrients that more closely match animal requirements.

## CONSIDERATIONS

Feed management can improve net farm income by feeding nutrients more efficiently.

Consider nutrient requirements for production based on stage of growth, intended purpose of the animal, and type of production (e.g., meat, milk, eggs).

Use management practices described in the NRCS Nutrient Management (feed management) technical notes for the specific animal species. See links to NRCS eDirectives Web site in the References section.

Consider alternative feed ingredients (e.g., by-products) and their potential impacts on the nutrient content of excreted manure.

Analyze drinking water consumed by the animals to determine its nutrient content, sulfur content, and presence of pathogens, and adjust the diet or treat the water to account for extra elements.

Consider the potential impact of feed management on the volume of manure excreted and on manure storage requirements.

Consider the impact of feed management practices and diet manipulation on manure odors, pathogens, GHG, dust, animal health and well-being, even if one or more of these are not included in the client's objectives.

Consider using concentrates and forages grown on the farm to minimize the quantity of nutrients imported to the farm, and to maximize the recycling of nutrients on the farm.

Analyze freshly excreted manure to determine manure nutrient content and to estimate the impact of the feeding strategy.

## PLANS AND SPECIFICATIONS

Plans and specifications for feed management must describe the specific feed management practices and/or technologies that are planned for the operation.

The following components may be included in the feed management plan:

- Type of technology or technologies, and/or feeding practices that will be used on the operation and their intended outcome.
- Feed analyses and ration formulation information prior to and after implementation of feed management on the operation.
- Feed weighing, mixing, and delivery to consistently provide the formulated diet that matches the requirements of each group fed.
- Protocols for sampling and preserving feed ingredients, manure, and water, as applicable, prior to sending for analysis.

- Estimated or measured nutrient content of the manure prior to the implementation of feed management on the operation.
- Estimated impact that feed management will have on manure nutrient content
- Expected impact on pathogen content, odor, and GHG reduction of manure.
- Guidance for how often the feed management plan will be reviewed and potentially revised.
- Quantities and sources of nitrogen and phosphorus that will be fed.
- Identification of the qualified feed management specialist who developed the plan.

## OPERATION AND MAINTENANCE

The producer/client is responsible for the operation and maintenance of the feed management plan.

Operation and maintenance activities include—

- Periodic feed management plan review to determine if adjustments or modifications are needed.
- Routine feed analysis to document the rates at which nitrogen and phosphorus were actually fed. When actual rates fed differ from or exceed planned rates, records will indicate reasons for the differences.

Maintain records to document plan implementation. As applicable, records include—

- Feed analysis and ration formulation, including the record of ration formulation used prior to implementing the feeding strategy.
- Records estimating the impact the feeding strategy is having on reducing manure nutrient content and nutrient efficiency.
- Manure analysis that was done after the feeding strategy was implemented to determine manure nutrient content.
- Dates of review and person performing the review, and any recommendations that resulted from the review.

Records of plan implementation shall be maintained for 5 years, or for a period longer than 5 years if required by other Federal, State, or local ordinances, program, or contract requirements.

## REFERENCES

National Academy of Sciences (NRC) Animal Nutrition Reports. <http://dels.nas.edu/Agriculture/Animal-Nutrition/Reports-Academies-Findings>.

USDA NRCS, and USDA-ERS. 2000. Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/dma/?&cid=nrcs143\\_014126](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/dma/?&cid=nrcs143_014126).

USDA NRCS. 2003 Nutrient Management Technical Note 1, Effects of Diet and Feeding Management on Nutrient Content of Manure. <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=18558.wba>.

USDA NRCS. 2003. Nutrient Management Technical Note 4, Feed and Animal Management for Poultry. <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=18561.wba>.

USDA NRCS. 2003. Nutrient Management Technical Note 2, Feed and Animal Management for Beef Cattle. <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=18559.wba>.

USDA NRCS. 2003. Nutrient Management Technical Note 3, Feed and Animal Management for Swine (Growing and Finishing) <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=18560.wba>.

USD NRCS. 2003. Nutrient Management Technical Note 5, Feed and Animal Management for Dairy Cattle. <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=18562.wba>.

USDA NRCS. 2012. Nutrient Management Technical Note 8, Animal Diets and Feed Management. <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=31266.wba>.