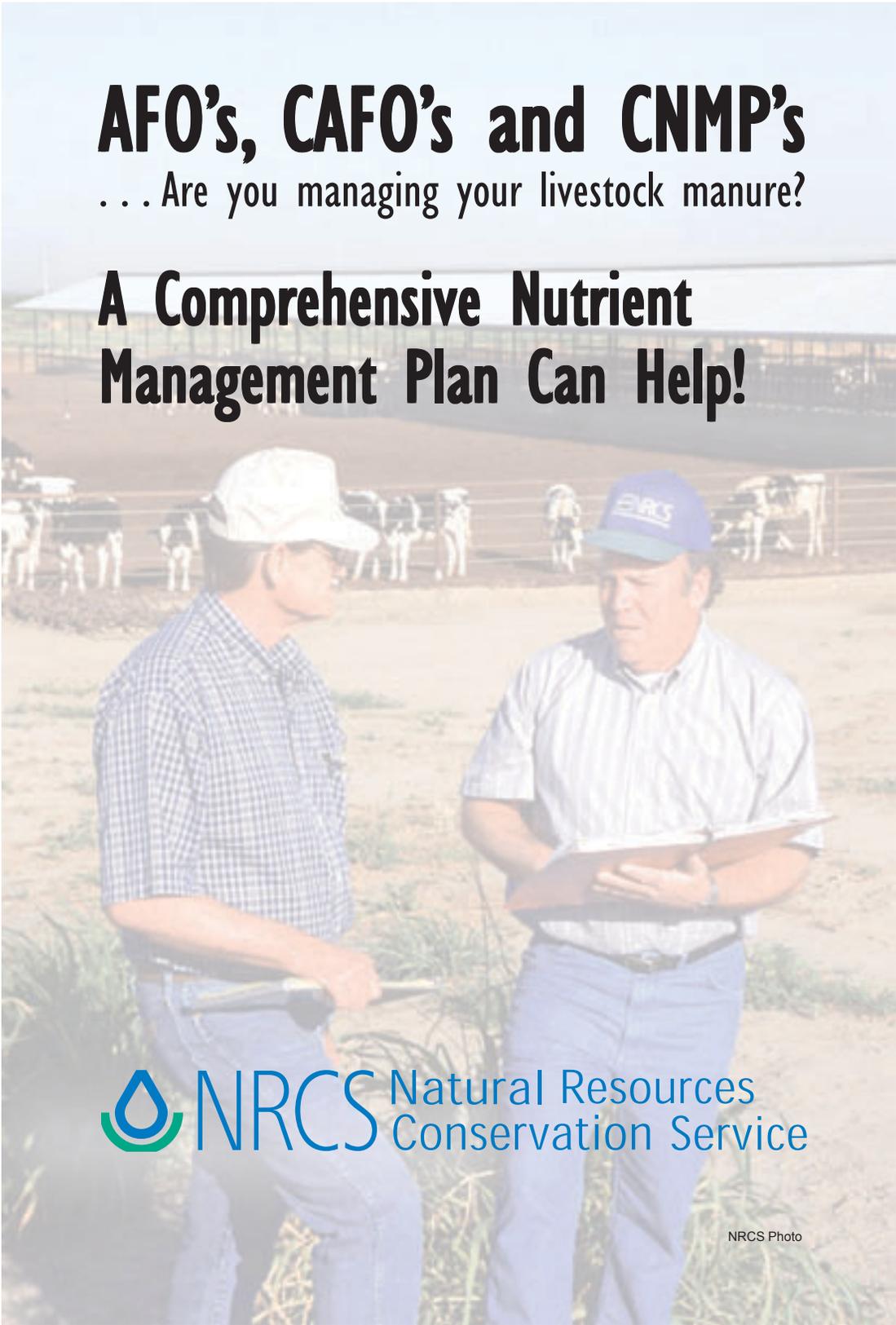


AFO's, CAFO's and CNMP's

... Are you managing your livestock manure?

A Comprehensive Nutrient Management Plan Can Help!



 **NRCS** Natural Resources
Conservation Service

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Animal Feeding Operations (AFOs)

Manure from Animal Feeding Operations (AFOs) can have both positive and negative impacts on the environment. If livestock by-products are **not** managed wisely water quality can be impaired. Implementing a Comprehensive Nutrient Management Plan (CNMP) will help ensure AFOs can be operated profitably while protecting the environment.

These guidelines can provide some understanding of what Animal Feeding Operations (AFOs) and Confined Animal Feeding Operations (CAFOs) are required to do for environmental compliance for federal and state permitting requirements. This information is provided with the assumption that the reader has a basic understanding of permit requirements.

A Comprehensive Nutrient Management Plan (CNMP)

A CNMP is a conservation plan unique to animal feeding operations grouping conservation practices and management actions which will help ensure production and natural resource protection goals are achieved.



Photo by: Pat McGrane, NRCS

A CNMP must address six elements: Manure and Wastewater Handling and Storage, Land Treatment Practices, Nutrient Management, Record-Keeping, Feed Management, and Other Utilization Options.

1) Manure and Wastewater Handling and Storage

This element is the engineering portion of a CNMP. Safe collection, handling, storage, treatment and transfer of manure and waste water from the production areas are required by state and federal regulations.

Pollution of surface and ground water must be prevented, usually with structural practices like holding ponds, tanks, lagoons, etc. Earthen storage structures must be properly lined, either with compacted earth or a synthetic liner, to comply with state regulatory seepage limits.



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Storage structures, transfer equipment and land application equipment must be operated and maintained to prevent spillage or overflow.

Non-production area runoff must be diverted around the facilities to the maximum extent possible.

A chemical handling and disposal plan must be in place for the operation, ensuring that livestock medical waste, pesticides and fuel spills don't eventually end up in the storage facility.

A mortality management and disposal plan must also be in place to ensure that dead animals are disposed of in accordance with state law and do not end up in the storage facility.

Use suitable handling equipment designed to safely transfer manure and wastewater between storage and/or treatment facilities as well as to application sites. Equipment and labor must be adequate to apply the volume of manure during the application "window" and include an emergency action plan to quickly react to power outages, storm damage and unplanned events.

2) Land Treatment Practices



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Conservation practices on application sites should be considered. On fields where manure, organic by-products and even commercial fertilizers are applied as beneficial nutrients, it is essential that runoff and soil erosion be minimized to allow for plant uptake.

Phosphorous loss assessments must be completed on each application site or field to determine the potential for loss of phosphorous to surface water. Erosion control practices such as crop residue management,

terraces, filter strips, grassed waterways, crop rotations with legumes or cover crops, and application setbacks to sensitive areas all help reduce runoff and positively affect the phosphorous loss assessment.

The potential for nitrogen loss must also be identified, and appropriate management practices must be considered to minimize nitrate leaching to groundwater.

The rate, form, method (injection or incorporation versus broadcast) and timing (growing season or split season applications instead of improper timing during winter on frozen or snow-covered ground) can also reduce runoff risk and positively affect both nitrogen and phosphorous loss potential.

3) Nutrient Management

Nutrient management involves managing the amount, form, method (injection, broadcast, etc.), and timing of the application of ALL nutrients (including commercial fertilizers). Proper nutrient management maximizes nutrient availability to crops and minimizes environmental impacts.

Manure rates must be based on a nutrient budget that accounts for:

- all sources of nutrients and the availability of those nutrients to the crops
- realistic yield goals
- manure test values
- soil test values
- other nutrient sources (irrigation water, soil organic matter, legumes, and past manure applications).

4) Record-keeping

Once a facility is in place and operating, the next big step is the annual record-keeping required to be in compliance with state and federal regulations, and possibly your conservation program contract with USDA.

All CAFO permit-holders in Nebraska will be required to submit an annual report to the Nebraska Department of Environmental Quality that summarizes the previous year's facility operation and land application activities. This report will depend heavily on the permittee's records.

Annual CNMP records must be kept for at least five years.

Critical records include:

- Manure application records documenting quantity, location, time and date, weather conditions, manure type, crops planted and crop yields, and soil and manure tests
- Storage structure records documenting levels before and after emptying
- Precipitation records
- Records of manure transferred off-farm
- Records required by state and local laws and regulations, such as agreements for non-owned land used for manure disposal.



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5) Feed Management

Imported animal feeds are often the single largest source of nitrogen and phosphorus arriving on many modern livestock and poultry operations. Feed management decisions are the most critical decisions by the producer relative to the nutrients that must be managed within an animal feeding operation.

Feeding management options include:

1. Cropping program alternatives that grow more of the protein (source of N) and phosphorus needs of the feeding program on the land base managed by the producer.
2. Feed management strategies that minimize excess feeding of nutrients. Once the minimum requirements of the animals are met for protein and phosphorus, all additional protein and phosphorus in the diet ends up in the manure. Feed rations that include ethanol production by-products (distiller's grains and gluten) can double the amount of phosphorus that a beef finisher must manage in the manure.
3. Feed management strategies that improve the availability of nutrients to the animal. Supplements such as Phytase can dramatically improve the availability of phosphorus sources in the feed to pigs and poultry.

In situations where significant quantities of feed are purchased from off-farm sources, manure nutrients will need to be returned to those off-farm suppliers of feeds. A manure marketing program is a critical nutrient planning tool for livestock operations importing feed nutrients from off-farm.

6) Other Utilization Options

Producers with an inadequate amount of cropland for manure disposal have a variety of options available. Selling or transferring the manure directly to off-farm users and composting are both valid alternatives. Capturing and converting methane for use as an alternative energy source is another alternative.

Who can assist in the development of a CNMP?

Due to the complexity of the regulations concerning CAFO's and CNMP's, it is recommended that you work with a certified nutrient management planning specialist.

The local Cooperative Extension office may be able to help you find a qualified CNMP specialist in your area, or:

1. Visit or call your local NRCS office to find out if anyone in that office is qualified.
2. You can find out if a qualified Technical



NRCS Photo

Service Provider (TSP) is available in your area also from your local NRCS office, and the staff can provide you with a list of certified TSPs. Or you can go on-line at www.Techreg.usda.gov and click "Find a Technical Service Provider".

3. A local agronomy consultant may be qualified.

CNMP Tools

Do you have an Operation & Maintenance (O&M) Plan for your operation? Are you using it?

- A depth marker (staff gauge) in the liquid or slurry storage facility is a required part of a permitted facility. Make sure you use the marker to maintain the facility at or below the "Must-Pump" level or the "Minimum Winter Pump-Down" level, depending on the season.

- Complete inspections of the facilities, waste transfer equipment, even land application equipment, on a regular basis. Your O&M plan will tell you what to check for and what should be done if deficiencies are found. Record any maintenance activities completed and keep with your reporting records.
- You should also be completing regular inspections and maintenance activities on land treatment practices you've installed.

Are you using any available tools and technology to help you manage your application sites according to your CNMP and state regulations?

- Keep current application site maps (aerial photos) with your nutrient management records. High-quality color photos are available through your local NRCS or Farm Service Agency office. Use these site maps to help you identify sensitive areas, conservation practices installed and required setbacks.
- Are you completing nutrient budgets and manure and soil sampling according to University of Nebraska guidelines? This is an important part of meeting NRCS nutrient management standards if you're receiving cost-share through the NRCS Environmental Quality Incentives Program (EQIP) or other programs.
- Are you monitoring the Phosphorous-loss potential of your application sites? This is an important part of Nebraska livestock waste regulations after January 1, 2007, and is a requirement for NRCS nutrient management standards.
- Look to Cooperative Extension to help you with application equipment calibration.
- Are you utilizing local Natural Resources District programs and NRCS assistance to help you apply conservation practices?

- Have you thought about completing a Whole-Farm nutrient balance to help you determine where and how you can reach a better balance between nutrients produced by your operation and nutrients utilized by your application sites? Contact your local Cooperative Extension office for assistance.

Does your CNMP fit your overall conservation plan objectives?

- Don't forget that changes in cropping or farming practices and changes in the livestock operation itself can affect your CNMP, potentially impact the approved version of the CNMP submitted with your permit application, and possibly even make your current nutrient management strategy invalid.
- Visit with your local NRCS office to make sure your application methods and cropping systems are not in conflict with your Highly Erodible Land (HEL) compliance plan.
- Be sure you visit with your agronomy consultant, NRCS and/or your TSP before you make any significant changes to your CNMP.

The Benefits of Using Manure as a Fertilizer

Manure is a valuable soil resource, and improves soil quality by:

- Increasing organic matter
- Increasing soil respiration rates
- Lowering bulk density
- Increasing infiltration rates
- Increasing water holding capacity
- Improving aeration
- Decreasing wind and water erosion potential
- Increasing soil organic carbon content

Increased soil quality leads to increased nutrient use efficiency by crops. Increased nutrient use efficiency lowers dependency on commercial fertilizer, ultimately affecting your bottom line.

For More Information

See a series of NRCS Soil Quality fact sheets at-
<http://soils.usda.gov/sqi/publications/sqis.html>

“Managing Livestock Manure to Protect Environmental Quality”
(EC02-179 available at <http://ianrpubs.unl.edu/wastemgt/ec179.htm>)

“Agricultural Phosphorus Management and Water Quality Protection
in the Midwest” (available at [http://www.ianrpubs.unl.edu/epublic/
live/rp187/build/rp187.pdf](http://www.ianrpubs.unl.edu/epublic/live/rp187/build/rp187.pdf))

The following NebGuides are excellent references for manure
management.

- Calculating the Value of Manure for Crop Production (G1519)
- Manure Incorporation and Crop Residue Cover – Part I:
Reduction of Cover (G1563)
- Manure Incorporation and Crop Residue Cover – Part II: Fine-
Tuning the System (G1564)
- Determining Crop Available Nutrients from Manure (G1335)
- Sampling Manures for Nutrient Analysis (G1450)
- Fertilizer Suggestions for Corn (G174)
- Fertilizer Suggestions for Soybeans (G859)
- Guidelines for Soil Sampling (G91-1000-A)
- Fertilizer Management for Alfalfa (G1548)

These and many other NebGuides are available through your local
Cooperative Extension office or on-line at <http://ianrpubs.unl.edu/>

Other Helpful Internet Links:

NRCS Animal Feeding Operations Website -
<http://www.nrcs.usda.gov/programs/afo/>

CAFO Fact Sheets -
<http://cnmp.unl.edu/cafofactsheets.html> or www.LPES.org and click on educational products-CAFO fact sheets

Heartland Regional Water Quality publications -
<http://www.heartlandwq.iastate.edu/manuremanagement>

Livestock and Poultry Environmental Stewardship publication series -
http://www.lpes.org/les_plans.html

How to develop required records of manure distribution, manure storage, reporting and more -
<http://www.heartlandwq.iastate.edu/manuremanagement>

NU Extension spreadsheets on developing manure use plan, taking nutrient inventory, determining if fields are accumulating excess nutrients -
<http://cnmp.unl.edu/cnmpsoftware.html>

EPA's Ag Center's AFO Website -
<http://www.epa.gov/agriculture/anafoidx.html>

Nebraska NRCS Animals/Animal Waste Website -
<http://www.ne.nrcs.usda.gov/technical/animals.html>

UNL's Manure Matters Website -
<http://manure.unl.edu/>

Nebraska Department of Environmental Quality -
<http://www.deq.state.ne.us/>

Nebraska Department of Agriculture-
www.agr.state.ne.us

Why Have a CNMP? It Makes Good Business Sense!

- **Reduced need for commercial fertilizer application** – Nutrients available from manure applied following a CNMP, can reduce the capital costs of commercial fertilizer. It also results in fewer nutrients being “imported” into the operation.
- **Emergency Response Preparedness** – A CNMP includes a plan that helps deal with unexpected emergencies. The Emergency Response Plan identifies key response contacts/phone numbers and describes the actions to take if someone falls in a manure pit, if a facility overtops, or if a spill occurs.
- **Improved soil health** – Using organic forms of nutrients will improve soil infiltration and the soil’s ability to retain water for crop use.
- **Conservation Security Program (CSP)** – An operation following a CNMP will receive credit when applying for the NRCS Conservation Security Program.
- **Carbon Sequestration** – Proper implementation of a CNMP can result in credits for carbon sequestered in the soil. Greenhouse gas emissions are reduced and carbon credits could possibly be traded.
- **Regulatory Requirements & Discharges** – State regulations require that a CNMP is being implemented and annually updated. Proper implementation of a CNMP will help protect the producer from regulatory actions in case an unplanned discharge occurs.
- **National Pollutant Discharge Elimination System (NPDES) permit** – Implementation of a CNMP will make an operation eligible for an NPDES permit. The NPDES permit protects the operator from regulatory actions if an unplanned discharge occurs because of a storm event that exceeds the minimum required by state regulations.

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