Comprehensive Nutrient Management Plan

For

(Name)

(location)

By

(Name of Preparer)

Natural Resources Conservation Service

(Date)
COMPREHENSIVE NUTRIENT MANAGEMENT PLAN (CNMP)
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SECTION 1
CNMP Purpose and Conditions

PURPOSE OF THE CNMP:

The Comprehensive Nutrient Management Plan (CNMP) is a conservation system for your animal feeding operation. It is designed to address, at a minimum, the soil erosion and water quality concerns of your operation. The CNMP encompasses the storage and handling of the manure as well as the utilization and application of the manure nutrients on the land.

Manure and Nutrient Management involves managing the source, rate, form, timing, and placement of nutrients. The practice of nutrient management serves four major functions:
1. Supply essential nutrients to soils for plant utilization to produce adequate food, forage, and fiber.
2. Provide for efficient and effective use of scarce nutrient resources so they are not wasted.
3. Help maintain or improve the physical, chemical, and biological condition of the soil.
4. Minimize environmental degradation caused by excess nutrients in the environment.

NITROGEN AND PHOSPHORUS vs. WATER QUALITY:

The two major nutrients of concern are phosphorus and nitrogen because they can impact water quality, human health, and animal health. Nitrogen as nitrate is water soluble and has the potential to leach into ground water supplies. Nitrogen rich drinking water has potential health impacts to small babies and to adults if consumed in high quantities. Surface applied nitrogen, that isn’t incorporated, can be lost to the atmosphere as gaseous ammonia nitrogen and nitrous oxide. Not only does this loss reduce available crop nutrients but nitrous oxide is a gas that contributes to the greenhouse effect. Ammonia volatilized to the atmosphere is also a component of nitrogen-enriched rain, which effects many things. Ammonia can also be harmful to aquatic life if it becomes concentrated in levels of 0.02mg/L or greater.

Phosphorus is a concern because when it gets into surface water bodies it can cause explosive algae blooms and eutrophication in the water body. This can lead to depressed oxygen levels and fish kills. Phosphorus is often the limiting nutrient for plants in water bodies, so when it becomes readily available, plants like algae, thrive and algae blooms result.

The primary way phosphorus can get into water bodies is through runoff and erosion. This is especially true if excess phosphorus is surface applied, as either manure or commercial fertilizer, or if heavy rains occur just after spreading. Phosphorus can get into water bodies through erosion because phosphorus tends to attach to soil particles and move with them. Controlling erosion through erosion control practices, therefore not only keeps soil in place but also limits the amount of phosphorus lost to the environment, keeping it available for crop needs. Controlling erosion is also important since phosphorus tends to accumulate in the soil from one year to the next. Only 80% of the phosphorus that is in manure is available to the current crop and the remaining 20% stays in the soil. This reserve increases each year that spreading continues at excessive rates if this reserve is not accounted for with a soil test. Phosphorus can also get into surface water by being carried in solution as soluble phosphorus. This soluble form is highly bioavailable and can contribute significantly to eutrophication even at low levels.

CONDITIONS:

The State of New Hampshire DES Water Quality Regulations requires pollutants (manure, milkhouse waste, silo drainage, non-point sources of pollution, etc.) to be managed so as not to enter the waters of the State. Your CNMP provides the basic information on how the wastes produced from your operation, and/or applied on your fields, will be utilized. Following your CNMP will keep you in compliance with the State Water Quality Regulations.

NOTE: If the number of livestock change (10% or more), your fields change, your soil test results change significantly upwards, your rotation changes, the method of storage changes, or if the method of application needs to change, contact the NRCS/SWCD office to get this plan revised.
Sample Farm

BASIC FARM INFORMATION

**Farm Operator Information:**
Name: 
Address: 
County: 
Phone: 
E-mail: 

**Farm Description and Purpose:**

**Goals:**
1. Maintain and improve the economic return from the dairy operation.
2. To apply dairy manure to obtain maximum nutrient benefit while minimizing runoff of nutrients.
3. To control erosion on the crop fields 
4. To operate the farm in an environmentally and socially acceptable manner.

**Future Plans:** (anticipated change of more than 15% of land base or greater than a 50 animal unit change on an annualized basis)

**Total Acres Cropped:**
Corn silage and hay are grown for feed. The best fields are in a hay-corn rotation. A crop rotation schedule is included.

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Owned:</th>
<th>Rented:</th>
<th>Total:</th>
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</thead>
<tbody>
<tr>
<td>Corn Land:</td>
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<td>Hay in Rotation:</td>
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<td>Hay/Legume:</td>
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<td>Pasture:</td>
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<tr>
<td>Other Crops:</td>
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<table>
<thead>
<tr>
<th></th>
<th>Acres:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total:</td>
<td></td>
</tr>
</tbody>
</table>

**Contacts for rented acreage** (names and phone numbers):
**Number and Type of Animals:**

<table>
<thead>
<tr>
<th>Animal Type</th>
<th>Number</th>
<th>Ave. Wt.</th>
<th>A.U.</th>
<th>Manure Storage Options</th>
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</thead>
<tbody>
<tr>
<td>Holsteins milkers</td>
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<tr>
<td>Breeding heifers and dry cows</td>
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<td>Yearlings</td>
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<tr>
<td>Young calves</td>
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</table>

Total AUs from animals is:

**Special Environmental Factors:** (i.e. sensitive watersheds, sand/gravel aquifers, bedrock etc.):

**Sketch:**
Sketch (or enlarged and labeled aerial photo) of farmstead area

**Maps:**
Attached are copies of aerial photos showing fields, field identification numbers, acreage and sensitive areas. Sensitive areas shown are wells, ponds, streams, waterways, and property boundaries. Field stacking sites for manure are also located on these maps. Soils maps and a legend are also attached.
SECTION 2

COMPREHENSIVE NUTRIENT MANAGEMENT PLAN
CERTIFICATION

Farm: _______________________________________________

Location: ____________________________________________

I have received a copy of my Comprehensive Nutrient Management Plan and have had it explained to me. By signing I acknowledge receipt of the plan and confirm my intent to implement it. I also understand that I am responsible for the record keeping and operation and maintenance of this plan.

______________________________                     _______________
Landowner/user        Date

______________________________                     _______________
Certified Specialist in Manure and Wastewater Handling and Storage Date

______________________________                     _______________
Certified Specialist in Land Treatment Practices Date

______________________________                     _______________
Certified Specialist in Nutrient Management Date

______________________________                     _______________
Certified CNMP Planner Date
CERTIFICATION OF CONSERVATION PLAN

Farm: ________________________________________________

Location: _____________________________________________

By signing the participant acknowledges receipt of this conservation plan and confirms intent to implement it.

_____________________________________________                      _______________
Landuser/owner            Date

This Conservation Plan meet the requirements of the Field Office Technical Guide

_____________________________________________                      _______________
NRCS Certified Conservation Planner                     Date

Approved By:

_____________________________________________                      _______________
Conservation District                     Date
Schedule of Operations *(may be parts of the Conservation Plan, or include LTP-11 copies here)*

Environmental and Resource Assessments *(may be part of Conservation Plan, or include assessment documentation here from "Nut Mgt Manual Calc worksheets")*
SECTION 3

MANURE PRODUCTION, STORAGE, AND USE:

Numbers and average weight of animals by type, period of confinement and estimated or measured manure production. (Use NH Manure Screening Tool Spreadsheet printout to document this information or similar manual calculations)

Manure storage type, volume and length of storage, who designed it, design criteria. (Use NH Manure Screening Tool Spreadsheet data or AWM software calculations to document the preliminary design for the storage facility)

Describe Manure Spreaders used and capacities:

Manure to be exported: (amount, to whom, phone number, where it is going)

Waste water volumes produced: (milk room waste, wash water, silage leachate etc.) (Use NH Manure Screening Tool Spreadsheet data or AWM software calculations to document the preliminary design needs)
Plan View (Sketch) of Farmstead showing existing and planned components
WASTE STORAGE FACILITY (313) Liquid and Semi-Solid Manure Pit

Operation and Maintenance:

- Maintain the fence around the top of the storage pit.
- Maintain, repair, or replace warning signs as needed.
- Check for cracks or shifting of concrete components when pit is empty.
- Monitor the earth berm surrounding the structure periodically for burrowing animals, noxious and invasive plant species, small trees and shrubs and remove as required.
- Maintain healthy vegetation on the earth berm.
- Repair any bare spots or burrows in the earth berm.
- Waste levels will be monitored during and following unusual storm events.
- As full capacity is approached, enough waste shall be removed at the earliest environmentally safe period to ensure that sufficient capacity is available to accommodate subsequent storm events.
- Waste shall be removed from storage and utilized at locations, times, and rates in accordance with the Nutrient Management (590) developed for this farm.
- After emptying liquid waste and if needed upon inspection, remove the end gate and remove accumulated solids to preserve storage capacity. Reinstall and reseal the endgate.

WASTE STORAGE FACILITY (313) Concrete or Earthen Stacking Pad

Operation and Maintenance:

- Maintain vegetation on the earth berm surrounding three sides of the pad. Remove burrowing animals and repair damage.
- Control noxious and invasive weeds and shrubs and trees as they start to grow on the earth berm.
- Annually harvest filter strip vegetation to encourage dense growth and to maintain an upright growth habit. Controlled grazing may be used to remove the vegetation provided the animals are removed when stubble has been reduced to 3 to 4 inches tall. Controlled grazing should only be used when soil moisture conditions will support livestock traffic without excessive compaction.
- Remove manure to a field stacking site when full capacity is reached and more space is needed.
- Waste shall be removed from the stacking pad and utilized at locations, times, and rates in accordance with the Nutrient Management (590) developed for this farm
- Use caution when emptying the stacking pad so as not to damage the earth berm
EMERGENCY ACTION PLAN FOR MANURE SPILLS

Emergency Response Personnel

<table>
<thead>
<tr>
<th>Name</th>
<th>Home Phone</th>
<th>Cell Phone</th>
<th>Pager</th>
</tr>
</thead>
</table>

Recovery Equipment and Material

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Owner</th>
<th>Location</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawdust bedding</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hay bales</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tractor, loader</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Backhoe</td>
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<tr>
<td>Dozer</td>
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<td></td>
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<tr>
<td>Excavator</td>
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<tr>
<td>Vacuum Type Septic</td>
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<tr>
<td>Tank Pump Truck</td>
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Preventing Spills:
- Don’t fill the storage too full.
- Keep the area mowed around the storage to discourage woodchucks and other burrowing animals. Monitor for animal activity, patch holes, and remove animals.
- Make sure end gate is properly installed and tight before filling.
- Frequently monitor filling of storage, levels before and after rainfalls, and loads removed to better manage storage capacity and understand capacity changes with each inch of rainfall.
- Schedule routine maintenance of storage system. Keep written records of maintenance.
- Train employees to drive carefully. Transporting manure can be a source of spills. Tanker trailers, and manure spreaders can overturn, especially on narrow bridges and steep hills. Be careful when applying manure near open waterways.
- Identify all locations where system failure may occur, how serious a problem it may be, and ways to eliminate or stop the source of the spill or runoff.

Spills From Containment Breach or Structure Failure:
- Construct earthen dikes or use sawdust bedding or other materials to contain or divert spill away from watercourses, roadways, wells, lawns etc. Use sawdust bedding to soak up liquid manure where it can’t be collected and pumped.
- Set up equipment and procedures to secure the structure from further release of manure. Utilize materials on the farm to contain the leak.
- Remove liquid spill from diked areas and low areas with vacuum type septic tank pump truck. Remove sawdust and manure with tractor loader. Transport to fields for spreading or to another storage.
Spills From Pumping Operation:
- Shut off pumping equipment.
- Use sawdust bedding or solid manure from pad to divert, or contain spill away from watercourses, roadways, and wells and lawns. Use sawdust bedding to soak up liquid manure.
- Remove liquid spill from diked areas and low areas with septic tank vacuum pump trucks. Remove sawdust and manure with tractor loader. Transport to fields for spreading or to another storage.

Spills During Transportation on Public Roadways:
- Coordinate efforts with local law enforcement and emergency personnel.
- Contain spill or divert manure away from watercourses, roadways or improved property.
- Remove solid manure with a tractor loader, backhoe, or excavator and transport to field for spreading.
- Wash liquid or slurry manure from roadways and public use areas into a contained area using a fire truck.
- Remove liquid spill from contained area with a vacuum type septic tank pump truck or front end loader if bedding was used to soak up the liquid.

Spill Reporting:
- Notify the local town emergency response personnel (Police or Fire Department) if manure spill threatens a water body.
- Information to provide when calling agencies include: name, telephone number, nature of emergency, location of spill including address and site description, direction of spill movement, the perceived impact, and any control action implemented.

Clean Up Spill Area:
- Remove dike and any materials used.
- Level any soil disturbance and incorporate any residue.

Documentation:
The following should be documented in writing and kept with the Emergency Action Plan for future reference and emergency response training:
- Date, time, location of spill, affected landowners
- Effect of manure spill on any surface water body or potable water well.
- Approximately how much manure was released and for what duration.
- Amount of manure, if any, that left the farm property.
- Any damage done, such as personal injury, fish kill, property damage.
- Cause of the spill.
- Procedure to handle the emergency.
- Clean up efforts.
- List of authorities called, those that responded, and the time it took for them to respond.
- Recommendations to prevent a reoccurrence.
**ODOR CONTROL:**

Barns should be routinely cleaned and bedding applied.

The stored manure, both liquid and solid, should not be disturbed until the time it is loaded for spreading.

Manure spread on land to be tilled should be incorporated as soon as possible to capture the ammonia-N.

Avoid spreading around holidays and on weekends when the weather is sunny and mild and neighbors are out and about.

Take the direction of the wind in consideration when spreading manure. Do not spread when the wind is blowing towards a neighbors home.

**PEST CONTROL:**

The stored manure, both liquid and solid, should not be disturbed until the time it is to be loaded for spreading.

A fly control program should be followed around the buildings and manure piles especially during warm weather.

Flies and other pests are to be controlled using materials and methods currently recommended by the Cooperative Extension Service.

Read the label before mixing and applying the spray materials. The label is the law.

The applicator must wear the protective equipment required by the label.
SECTION 4
LAND TREATMENT PRACTICES

Maps of Land Application Areas: (may be located in Section 1)

Identification of Sensitive Areas: (may be located in Section 1)

Soils Information: (may to located in Section 1)

RUSLE Calculations: (as needed and could already be in the Conservation Plan)

Crop Rotations Planned: (as needed and could already be in the Conservation Plan)

Proposed Locations of Planned Practices: (show on field maps and describe)

Operation and Maintenance for Practices Installed and Planned:
SECTION 5

SAMPLE FARM
NUTRIENT MANAGEMENT PLAN

OVERVIEW:

Nutrient Management is managing the source, rate, form, timing, placement and utilization of manure, other organic by-products, bio-solids, and other nutrients in the soil and residues. The goal is to effectively and efficiently use the nutrient resources to adequately supply soils for plants to produce food, forage, fiber, and cover while minimizing the transport of nutrients to ground and surface water and environmental degradation.

The potential environmental and health risks that can occur from excessive levels of nitrogen and phosphorus are the reasons for nutrient management. Nutrient Management plans are intended to prevent nutrients supplied for production purposes from contributing to water quality impairment. Nutrient Management plans also aim to adequately meet the crop nutrient requirements with nutrients produced on the farm to minimize the amounts of fertilizer that must be purchased.

GENERAL RECOMMENDATIONS:

The following are broad-based recommendations that should be considered when applying nutrients on crop, vegetable, or hay fields. They may not all be applicable for your operation as they are general recommendations for everyone.

- Timing of nutrient applications:
  - Time applications to correspond as closely as possible with plant nutrient uptake, while considering cropping system limitations, weather and climatic conditions, and field accessibility. Consider splitting applications of nitrogen to provide it at the times of maximum crop needs.
  - Time applications of animal manure to minimize odors to downwind neighbors. Do not spread when it is real windy or when you can not incorporate soon after spreading.
  - Time applications to minimize potential runoff if rainfall is forecasted within 24 hours. Do not spread if you can not incorporate before rainfall occurs.
  - If manure is to be spread on soils subject to flooding they should either be plowed down immediately or spread after the danger of flooding is minimal (about mid-June).
  - Nutrients should not be applied to flooded or saturated soils when the potential for soil compaction and the creation of ruts is high.

- If spreading in the fall is necessary avoid sloping fields.

- Use of cover crops:
  - Consider using cover crops whenever possible to tie up and recycle residual nitrogen in the soil. Cover crops also serve to trap phosphorus during periods of runoff.
  - Fields with high intensity cropping cycles (for example corn or another tilled crop every year) should have a cover crop planted to take up some of the excess phosphorus in the soil.
  - When spreading manure in the fall on tilled land, incorporate and plant a cover crop to reduce potential runoff and erosion.

- Erosion control and management of runoff water should be practiced to prevent pollution of surface waters.

- Do not spread directly in diversion channels, grassed waterways, or other areas of concentrated flow.

- Establish and maintain vegetated setbacks from environmentally sensitive areas such as sinkholes, wells, gullies, perennial streams, and waterbodies. The vegetation will act as a filter and prevent pollutants and excess nutrients from entering the sensitive area(s). Distances of 15 to 150 feet, depending on site conditions, can greatly improve water quality.
• If nitrogen needs to be conserved because allowable application rates are limited, spread only when it can be incorporated that day. This will reduce the amount lost to volatilization.

• Other nutrients besides nitrogen, phosphorus, and potassium are to be applied at rates consistent with soil test results and/or Cooperative Extension recommendations.

• Consider potential affects to National Register listed or eligible cultural resources and listed threatened or endangered species.

• A cropping sequence using a variety of crop types (grasses, legumes, summer annuals, winter annuals, or perennials) with various rooting characteristics (shallow roots, deep roots, fibrous root system, tap root) will better utilize the available nutrients in the soil over several years.

• Adjusting nutrient inputs based on the current levels of nutrients available and amount required for crop production is the best way to maintain crop production and avoid excess accumulations. Complete soil tests annually to measure the current levels of nutrients in the soil. Test manure and other organic material to obtain the nutrient content of that source. Add in any atmospheric deposition and nitrogen credits from previous legume crops to get the total nutrients available.

HOW PLAN WAS DEVELOPED:

The Nutrient Management Plan was developed according to the following 10 steps:

1) A farm resource inventory was conducted. This involved—
   a) Documenting the short and long term nutrient management goals
   b) Collecting field aerial photos, soils maps, and any other conservation plans (HEL plans for example)
   c) Organizing existing field information such as crop and manure history, soil tests, crop yield potentials, etc.
   d) Conducting a whole-farm field-by-field environmental assessment to locate environmentally sensitive features such as: proximity to wells and streams, shallow bedrock, leaching and runoff potential of soils, soil loss calculations, etc.
   e) Estimating the whole farm manure production and nutrient value if the farm has livestock
   f) Calculating an approximate whole-farm nutrient budget to estimate the balance between land base and manure produced

2) The overall cropping plan was established for the years that the nutrient management plan is intended to support the whole farm goals. This included the crops to be grown on each field, the planned rotation, tillage measures, realistic yield expectations, etc.

3) Manure was sampled and analyzed
4) Soil sampling was done and submitted for routine soil testing
5) A Phosphorus Risk assessment was completed for all fields to determine if the nutrient budget should be balanced for nitrogen or phosphorus.
6) Fields were evaluated by soil type to determine if there was a threat for nitrogen leaching. High-risk fields were noted for less nitrogen to be applied.
7) Fields were prioritized for manure and other nutrient application based on crop needs and environmental assessment results.
8) The manure application rate, or fertilizer rate, was then determined as well as the timing and method of application for each individual field using the recommendations from the soil test reports, the manure analysis, and the field resource inventory (including the P index and nitrogen leaching potentials).
9) Any additional fertilizer and/or aglime amounts were determined
10) Crop and nutrient spreading record keeping systems were established

Attached you will find your current nutrient management plan and the subsequent spreading recommendations that were developed using the previous ten steps. Please note the setbacks and other concerns per field. Also please remember that this is a plan that can change. It will have to be updated according to soil test results, new agricultural research, different Cooperative Extension recommendations, manure tests, different legume credits, different crop rotations, etc. It is also a plan that was developed according to the requirements of the current NRCS 590 standard and any applicable Federal, state, or local regulations or policies; and that changes in any of these requirements may necessitate a revision of the plan.
Table 1. Summary of Field Data.
Field names, Crops grown (corn, grass, barley pasture etc.), Planned Rotations, Acreage and Anticipated nutrient source and last soil test date:

<table>
<thead>
<tr>
<th>Field Names</th>
<th>Crop(s) Grown and planned rotations $C = \text{corn, } H = \text{hay}$</th>
<th>Acres</th>
<th>Antic. Nut. Source</th>
<th>Last soil test date</th>
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SD = Solid Dairy manure  
LD = Liquid Dairy manure  
P = Poultry manure  
U = Urea  
SF = Starter Fertilizer  
MP = Muriate of Potash
Manure Lab Test Results are attached for each manure type.

Whole Farm Nutrient Budget (attached) shows farm can utilize all nutrients produced. (Use NH Manure Screening Tool Spreadsheet to document Nutrient Budget if land base is adequate)

Manure is utilized as nutrients for the production of the farm’s corn and hay crops. None is exported. Extra nutrients needed will be supplied by starter fertilizer for corn, urea and muriate of potash for topdressing of sod and side dressing of corn.

Nutrients to be imported: (where crop needs exceed nutrients produced)

   __ commercial fertilizer
   __ imported manure, specify type and amount____________________
   __ non-regulated residuals (please list)________________________
   __ regulated residuals* (please list)___________________________
   __ Lower crop yields

* See DES Regulations for Sludge and Bio-solids
**Nutrient Management Plans for Individual Fields or Groups of Fields Having Similar Soil Test Values, Crop Management, and Soils**

(Suggest using "Nut. Mgt Manual Calc worksheets" for displaying field data and application recommendations)

### Field Information:

<table>
<thead>
<tr>
<th>Field Name(s)</th>
<th>Acres</th>
<th>Soil Type and Slope</th>
<th>Resource Concerns</th>
</tr>
</thead>
</table>

### Spreading Setbacks from sensitive areas:

### Crops Grown and Yield Goals:

<table>
<thead>
<tr>
<th>Field(s)</th>
<th>Crops Grown</th>
<th>Rotations</th>
<th>Yield Goals</th>
</tr>
</thead>
</table>

### Limiting Nutrient

The limiting nutrient to balance on for manure application was determined using current soil test data and the N - Index and P - Risk Index. *(Suggest using P-Index Multi-field spreadsheet to document P Risk)*

<table>
<thead>
<tr>
<th>Field(s)</th>
<th>Limiting Nutrient</th>
<th>Lbs. P₂O₅ for limiting manure application rate</th>
</tr>
</thead>
</table>

### Recommended Nutrient Applications to meet yield goal (lbs. per acre) from soil test.

<table>
<thead>
<tr>
<th>Field(s)</th>
<th>Nitrogen</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>Lime</th>
</tr>
</thead>
</table>
# Nutrient Balance Table

*(may use NH Manure Screening Tool Spreadsheet to document Available and Needed Nutrients)*

For Field(s):

<table>
<thead>
<tr>
<th>Nutrient Sources</th>
<th>(Pounds per acre)</th>
<th>P$_2$O$_5$</th>
<th>K$_2$O</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CREDITS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. N credits from previous legume crop</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2. Residual N from previous manure</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>3. Other credits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N credits----------------------------------</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**PLANT AVAILABLE NUTRIENTS**

4. Credits (from above)

5. Starter fertilizer to be applied

6. Planned manure application contribution

7. Additional fertilizer needs:

8. Total nutrient contributions (add 4,5,6,7)

9. Nutrients Recommended (from Current Soils Tests)

10. Lbs. P$_2$O$_5$ for limiting manure application rate if required to balance on P.

11. Field balance (plus = excessive amounts minus = shortage)

Method, Form and Planned Timing of Application:
OPERATION AND MAINTENANCE:

1) Calibrate application equipment to ensure uniform distribution of material at planned rates.
2) Maintain pH levels so that crops have the optimum ability to utilize the nutrients.
3) Conduct soil and manure tests according to the schedule established in your nutrient management plan.
4) Document the actual rate at which nutrients were applied in each field. When the actual rates used differ from the recommended and planned rates, records will indicate the reason for the differences.
5) Conduct a periodic plan review to determine if adjustments or modifications to the plan are needed. As a minimum, plans will be reviewed and revised with each soil test cycle. Plans should be reviewed and revised as necessary when changes occur with crop types, animal number changes, land base changes, etc. Document the dates of any plan reviews, the person performing the review, and recommendations that resulted from the review.
6) Maintain records to document plan implementation. Applicable records include:
   a) Soil test results and recommendations for nutrient application
   b) Quantities, analyses and sources of nutrients applied
   c) Dates and method of nutrient applications
   d) Crops planted, planting and harvest dates, yields, and crop residues removed
   e) Results of water, plant, and/or organic by-product analysis
7) Records should be maintained for at least five years; or for a period longer than five years if required by state, Federal, or local ordinances; or program or contract requirements.
8) Protect fertilizer and organic by-product storage facilities from weather and accidental spillage or leakage.
9) Workers should be protected from and avoid unnecessary contact with chemical fertilizers and organic by-products. Protection should include the use of protective clothing when working with plant nutrients. Extra caution must be taken when handling ammonia sources of nutrients, or when dealing with organic wastes stored in unventilated enclosures.
10) The disposal of material generated from cleaning nutrient application equipment should be spread on cropland according to label directions. Excess material should be collected and stored or field applied in an appropriate manner. Excess material should not be applied on areas of high potential risk for runoff and leaching.
11) The disposal or recycling of nutrient containers should be done according to state and local guidelines or regulations.
### End of year summary of manure and nutrient application and crop yield data

Table 2. Actual manure/crop history--field by field

<table>
<thead>
<tr>
<th>Field/crop</th>
<th>Application dates/rates</th>
<th>Fertilizers/rates</th>
<th>Yields</th>
<th>Plant Date</th>
<th>Harvest Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Notes:  *Notes would include reasons for differences in actual vs. planned applications, weather factors, populations, problems etc.*
Emergency Spill Response Activities:

<table>
<thead>
<tr>
<th>Date</th>
<th>Amount Spilled</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>

Soil Tests Completed and Scheduled:

(Enclose a spreadsheet showing test schedule for each field)

Manure Analysis Results:

(File here or in Section 5)

Application Equipment Calibration:

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Date Completed</th>
<th>Comments</th>
</tr>
</thead>
</table>

Record of Maintenance Activities:

Changes made to CNMP that were not revised into this plan:
SECTION 7
OTHER ACTIVITIES

Feed Management: (Discuss as necessary)
There is adequate land area to utilize the nutrients produced by the animal operation. Discussed Feed Management with landowner and he decided not to do anything with it at this time. Will evaluate this option in the future if nutrient overload becomes a problem.

Other Utilization Options: (Discuss as necessary)
## SECTION 8
HELPFUL FACT SHEETS, ETC

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix A</td>
<td>Soil Testing Procedure</td>
</tr>
<tr>
<td>Appendix B</td>
<td>Manure Analysis Procedure</td>
</tr>
<tr>
<td>Appendix C</td>
<td>Application Equipment Calibration</td>
</tr>
</tbody>
</table>
Testing Your Soil

*What is a Soil Test?*

A routine soil test is a tool to manage the mineral nutrition of growing plants. It is a quick and inexpensive way to check the levels of essential soil nutrients. Soil is sampled and sent to a lab for analysis.

*Why Test the Soil?*

Homeowners, farmers and others often test soil from their gardens, yards and fields. The soil tests tell them soil pH and the level of nutrients that are available for plant growth.

The pH of the soil is a measurement of relative acidity. Soils that are too acid are not suitable for most plants.

The amount and balance of nutrients in the soil has an effect on plant growth, too. Low levels slow plant growth. High levels can pollute the environment or cause imbalances. A soil test lets you know if you need to add more nutrients and how much, if any, to add. It can save you money and prevent water pollution.

*What Information Does a Soil Test Provide?*

The soil test will tell you:

* the soil pH;
* levels of potassium (K), phosphorus (P), calcium (Ca), magnesium (Mg);
* organic matter level;
* if there is lead contamination;
* how much lime and fertilizer (organic or chemical) to add; and
* other management tips for growing your crop.

*How Often Should I Test the Soil?*

Test your soil at least once every three years. Keep the test results handy so you can monitor any changes in soil fertility. You may want to test more often if you have a problem area or if you’ve applied lots of nutrients. Some people test their soil every year to save money on fertilizer, lime and other soil amendments. How often you test depends on the value of the crop and how closely you manage it.
What Time of Year Should I Test My Soil?

Recommendations are made for the next growing season, so you should test soil well before the growing season, such as early spring (after the frost is out of the soil) or in the fall before the ground freezes. A soil test usually takes two to three weeks (from shipping to the lab to return of results). Fall sampling will give the same results as spring sampling. With fall sampling, you will get results back in plenty of time for planting.

How Do I Take a Good Soil Sample?

1. Get a New Hampshire Soil Testing Information Sheet, bags, and tags Analytical Services Lab at the University of New Hampshire, Spaulding Life Science Center, Room G-54, Durham, NH 03824. Phone number 603-862-3210 and email Soil.Testing@unh.edu You can also go to the following web site to download the appropriate forms and cost data instead of sending for the testing information: http://aslan.unh.edu/UNHSoilTesting/Index.htm
2. Use a clean spade, trowel or soil probe to sample the soil. Take several cores (approximately 1 cup of material per core) in different spots to fully represent the garden or field. Collect one sample for each 20 acres (or 1 per field for small fields unless they contain similar soils and cropping patterns). For agricultural fields, take a minimum of one core per acre to make up the sample for the field. You will want to sample at rooting zone depth (usually six to eight inches for gardens or fields and three to four inches for sod or turf). Use a clean container to combine all of the cores to make up each sample. For agricultural fields, collect a subsurface sample made up of 6 to 8 cores per 20 acres at depths of 10 to 24 inches to test for nitrates in the subsurface zone which is still available for plant use.
3. Mix the soil thoroughly and fill the sample container with soil.
4. Label the container with your name, address and sample identification.
5. Fill out the information form as completely as possible.
6. Make a copy of the form for your records.
7. Put the sample container(s) and information (with check or money order) in a mailing container and mail to the address noted above.

How do I use the Soil Test Information?

Soil test analyses are reported as parts per million (ppm). The results are interpreted by test category and adjusted by soil: very low (VL), low (L), optimum (Opt), high (H), and very high (VH). The optimum category is the most profitable category to maintain over time. The low and very low categories indicate deficient soil test levels, while the high and very high categories indicate a higher test level than required for crop production.

Nutrient applications with soil test levels in the H and VH categories seldom generate a profitable yield response. The very high soil test category indicates that the nutrient concentration exceeds crop needs, and further additions of that nutrient very seldom produce a profitable yield response and may lead to environmental degradation or potential water quality problems in the area.
Why Sample?

A field-by-field nutrient management program requires that multiple practices be implemented to maintain adequate fertility for crop growth and development. The program includes soil sampling for soil test analysis, crop rotation, and giving appropriate nutrient credit to legumes in the rotation. Manure sampling and manure spreader calibration are part of a comprehensive nutrient management program so manure can be credited effectively as a nutrient source. A well-designed soil sampling plan, along with manure sampling and nutrient analysis, can reduce input costs and the potential of environmental pollution.

One of the many factors affecting the nutrient content of manure is how the manure is handled and stored. Each handling system results in different types of nutrient losses - some unavoidable and others that can be controlled to a certain degree. The most important thing in collecting a manure sample is that it should be obtained in a similar way to the method used in developing standard nutrient value recommendations. The following guidelines are designed for collecting on-farm animal manure samples.

When do I Collect a Manure Sample?

Sample manure at the time of land application or as close as possible to application. Sampling at the time of land application will not provide manure nutrient recommendations that can be used at that time to adjust the amount of manure applied. The results, however, can be used for subsequent manure applications and to adjust commercial fertilizer application. Take manure samples every three to five years after establishing a base level or if animal management practices change significantly from present methods. If you apply manure several times a year, take samples when you plan to apply the bulk of manure. For example, sample in the spring when manure that has accumulated all winter will be used as a nutrient source.

Manure sampling should be done in the field as manure is land applied. This ensures that losses that occur during handling, storage, and application are taken into account.

How do I Collect a Manure Sample from the Field?

Manure accumulates in different types of livestock holding areas. These areas include barns and other similar housing - where manure is collected in gutters or in dry stacks - and open paved feedlots. It is recommended that manure from holding areas should be sampled during field application. Collect manure samples according to the following field sampling procedure.

1. Spread a sheet of plastic or tarp on the field. A 10 feet by 10 feet sheet works well for sampling manure.
2. Drive the tractor and manure spreader over the top of the plastic sheet to spread manure over the sheet.
3. Collect a manure sample using the hand-and-bag method described in the following section.

**Dry or Solid Sample Preparations**

The technique for collecting all solid manure samples is the hand-and-bag method. It is recommended a minimum of three subsamples be taken to obtain a representative sample of manure. When making nutrient recommendations, use an average of the three subsamples.

To collect samples, place a one-gallon resealable freezer bag turned inside out over one hand. Grab a handful of manure with the covered hand and turn the freezer bag right side out over the sample with the free hand. Seal the bag and place it in another freezer bag to prevent leaks. Label the bag for identification and freeze it immediately to prevent nutrient losses and minimize odors. Manure samples should be mailed or delivered to the laboratory as soon as possible.

**Liquid Manure Sampling**

Every effort should be made when sampling to agitate manure in the storage facility so a representative sample is obtained for laboratory analysis.

1. Immediately after filling the tank spreader, use a clean plastic pail to collect manure from the unloading port or the opening near the bottom of the tank. Be sure the port or opening does not have a solids accumulation.
2. Ensure that the manure in the pail is well-stirred and immediately fill a one-quart plastic sample bottle to within one inch from the top. Only one sample is necessary for liquid manure.
3. Be sure to put your name, date, and storage pit identification on the bottle.
4. If the sample cannot be transported to a laboratory within a few hours, it should be frozen. Place the container in a tightly sealed bag and keep cool until it can be taken to the laboratory.

Sampling from storage facilities directly is not recommended because of safety considerations and the difficulty of obtaining good representative samples. Manure stored outside in a solid waste storage facility or in a field stack is best sampled using the method described above for Dry or Solid Manure. Samples from the stack can be taken if collected from various locations within and along the sides for the stack, mixed and sampled using the hand-and-bag method described above. Three subsamples should be collected and averaged for the stack.

**What will the Laboratory Analysis give me?**

Manure samples should be sent to the lab for chemical analysis as quickly as possible to avoid nutrient losses. Basic manure analyses determined by the laboratory includes total Kjeldahl nitrogen (TKN), phosphate (P₂O₅), and potash (K₂O).

Results from commercial laboratories are presented as a percent of the sample weight, as pounds per ton or in pounds per 1,000 gallons of manure. In any case, manure values from commercial laboratories express nutrients as the total amount of nutrient available in the manure sample. Primary nutrients (N, P, and K) are not all available for plant growth the
first year manure is applied. A portion of some nutrients is present in manure in an organic
form and unavailable for plant uptake. Organic nutrients require transformation to an
inorganic state to be available for plant uptake.

This transformation is dependent on temperature, moisture, chemical environment, and
time. Availability of nutrients can be limited by field losses, which are affected by types of
manure and by manure application methods. These losses are not accounted for in
laboratory results. Refer to the NRCS Practice Standard 590 - Nutrient Management for
information on availability based on application and incorporation data.

In New Hampshire, manure samples need to be sent to the following address for analysis:
University of Vermont, Agricultural and Environmental Testing Lab, 219 Hills Building,
Burlington, VT 05405-0082. Phone number is 802-656-3030.
Appendix C

Application Equipment Calibration:

Commercial Fertilizer Application Equipment Calibration:
The nitrogen applicator, the commercial broadcast spreaders, and corn planter will be set per the manufacturers recommendations then filled with an known amount and checked over known acreage. Adjustments will be made to achieve the planned rates.

Manure Spreader Calibration
There are several methods that can be used to calibrate the application rate of a manure spreader. The two best methods are the load-area method and the plastic sheet method. It is desirable to repeat the calibration procedure 2 to 3 times and average the results to establish a more accurate calibration.

Before calibrating a manure spreader, the spreader settings such as splash plates should be adjusted so that the spread is uniform. Most spreaders tend to deposit more manure near the spreader than at the edge of the spread pattern. Overlapping can make the overall application more uniform. Calibrating of application rates when overlapping requires measuring the width of two spreads and dividing by two to get the effective spread width.

Calibration should take place annually or whenever manure is being applied from a different source or consistency.

Load-Area Method
The load-area method is the most accurate and can be used for most types of manure handling. This method consists of determining the amount (volume or weight) of manure in a spreader and the total area over which it is applied. The most accurate method to determine the amount of manure in a spreader is to weigh the spreader when it is full of manure and again when it is empty (portable pad scales work well for this). The difference is the quantity of manure applied over the area covered. Spreaders capacities listed by the manufacturers can be used to determine the amount of manure in the spreader. However care must be taken when using manufactures spreader capacities. Heaped loads, loading methods and manure type may vary considerably from what is listed by manufacturers of box and side delivery manure spreaders. Spreader capacities for liquid tankers are accurate provided the tanker is filled to the manufactures recommended levels, and no foam is present in the tank.

The area of spread is determined from measuring the length and width of the spread pattern. Measuring can be done with a measuring wheel, measuring tape or by pacing.

The application rate is calculated by dividing the amount of manure in the spreader (Tons or gallons) by the area it is spread over (square feet) times 43,560 sq. ft./acre.

Formula:  \[ \text{Spreader capacity (tons or gallons)} \times 43560 \text{ sq. ft/acre} = \text{Application Rate tons or Gallons/Acre} \]

Distance traveled \times \text{Spreading width}

Plastic Sheet Method
The plastic sheet method can only be used with solid or semi-solid manure. This method of calibrating spreader application rates involves 1) cutting a plastic sheet to the specified dimensions (56 inches X 56 inches), 2) weighing the clean plastic sheet, 3) laying out the plastic sheet on the ground and driving the manure spreader (applying manure at a recorded speed and spreader setting) over the sheet, 4) weighing the plastic sheet with the manure on it, and 4) determine the net weight of the manure on the sheet (weight of manure and sheet - weight of the clean sheet), and 5) the net pounds of manure equals tons per acre applied.

When calibrating manure spreaders, all details regarding tractor speed and manure spreader settings and date(s) of each calibration should be recorded with manure application information, and directly on the equipment. Mark equipment to ensure a known application rate is applied each time the referenced tractor speed and spreader settings are used. Manure spreader settings can include such things as: fast and slow settings on some box spreaders, gate position on side delivery spreaders and splash plate position and fill levels on liquid tankers.