NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION GUIDE SHEET

NUTRIENT MANAGEMENT
(ACRE)
CODE 590

CNMPs

When writing a CNMP (Comprehensive Nutrient Management Plan), utilize Maine's MMP program template when it becomes available. In the interim, Maine's CNMP Template located in the eFOTG, Sec. IV, Tools shall be used. This document serves as guidance for items that need to be included in a CNMP, in accordance with NRCS CNMP policy. It may be edited as needed.

Soils Testing

Soils testing procedures at the University of Maine Analytical Lab are done using a Modified Morgan Extract procedure. This test was chosen due to its effectiveness in Maine's acidic soils. Likewise, nutrient recommendations from the U Maine Lab are based upon years of trials and experience in Maine. Recommendations from other labs outside of the state may differ from the UME Lab. For this reason, soils test results and recommendations from the Lab are preferred. However, they are not required if a qualified lab is used. The Nutrient Management Standard, Code 590 requires that labs conform to procedures outlined in "Soil Testing Procedures for the Northeastern United States". http://extension.udel.edu/lawngarden/lawn-garden/soil-health-composting/recommended-soil-testing-procedures-for-the-northeastern-united-states .

Known Qualified Soils and Manure Testing Labs that are commonly used in Maine:

- University of Maine Analytical Lab
- A&L Laboratories
- Spectrum Lab

Regardless of the laboratory used for testing, all soils tests must be completed using the *Modified Morgan extraction method.*

Risk Assessment Tools:

Excessive Soil Potassium

There are no known deleterious effects of **potassium** (K) on fresh or saline waters except to increase the salt content and electric conductivity. At this time, no risk assessment tool is utilized.

However, excessive soil potassium (K) poses several threats to animal health. First, soils excessive in K will produce hay with a high K content. Feeding hay high in K increases the risk of milk fever in dry cows that are within 4 weeks of calving. (Forage testing must be done to determine K levels.) Hay harvested from low K fields should be reserved for feeding to dry cows, especially to those within 4 weeks of calving. Second, lactating animals grazing on lush grass in fields with high soil K levels are at risk from grass tetany. Providing magnesium

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard visit electronic Field Office Technical Guide Contact Alice Begin, Resource Conservationist at 207-990-9568 or email alice.begin@me.usda.gov
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supplements or feeding supplemental dry hay reduces the risk. A livestock nutrition consultant or a Cooperative Extension Educator with a background in animal nutrition can give detailed recommendations.

Excessive Nitrogen and Phosphorus

Both Nitrogen and Phosphorus pose potential risks to ground and surface water quality. For this reason, risk assessments may be performed to assess risk and for the purpose of planning conservation measures to protect water quality. In Maine there is now the Phosphorus Index and the Leaching Index. In addition, RUSLE2 is used to assess the risk of erosion, and associated nutrient loss.

Phosphorus Index

1. The new Maine Phosphorus Index now super cedes the state's N&P Matrix. This tool is used whenever P2O5 application rates will exceed soil test fertility recommendations at P Index

Leaching Index (for Nitrogen and other soluble nutrients)

This section provides a way to determine the degree to which water percolates below the root zone in certain soils. Percolating water containing dissolved nitrates or other soluble nutrients can be a hazard to ground water. The Method is based on a Leaching Index (LI)1/. The LI uses annual precipitation, hydrologic soil group, and rainfall distribution data.

A leaching index has been developed for each hydrologic soil group. Soils in dual hydrologic groups (C/D) should use the hydrologic group that gives the highest leaching index.

The LI does not account for irrigation. If irrigation is applied only to supply plant needs, there will be little additional loss below root zone. The additional loss would be relative to the precipitation events after the soil profile is saturated or nearly saturated due to irrigation.

Procedure

Follow these steps to determine the Leaching Index of a certain soil:

1. Determine the soil hydrologic group for the field(s).
2. Determine Leaching Index from table below.
3. For fields with Leaching Index Rating:
   Moderate – consider implementing BMPs that apply.
   High – implement BMPs as applicable.

Hydrologic Group	County	Leaching Index	Rating
A	All Counties	>10 inches	High
B	No. Aroostook (Ft. Kent and PI)	2 to 10 inches	Moderate
B	All Other Counties	>10 inches	High
C	Washington, Hancock, Knox, Lincoln	>10 inches	High
C	All Other Counties	2 to 10 inches	Moderate
D	All Counties	2 to 10 inches	Moderate
Soils with less than 20 inches to bedrock	All Counties		High
Glacial outwash and well-drained alluvial soils	All Counties		High

Leaching Index (LI) Ratings:

1. An LI less than 2 inches (Low) indicates that the potential for leaching below the root zone is low.
2. An LI between 2 and 10 inches (Moderate) may contribute to soluble nutrient leaching below the root zone.
3. An LI greater than 10 inches (High) will contribute to soluble nutrient leaching below the root zone.

Nitrate Leaching BMPs:

- Do not apply N in excess of soils test recommendations.
- Utilize tissue testing, chlorophyll meters, and spectral analysis technologies to determine the need for N.
- Use slow- or controlled-release fertilizers.
- Use nitrification inhibitors when making broadcast applications of commercial nitrogen.
- Use plants to hold N over winter:
    a. Plant winter-hardy cover crops, especially to fields that receive manure in fall.
    b. Do not incorporate sods in the fall.
    c. For fall-killing of sods (chemical): wait until the soil temperature at 4 inches is 45 degrees or less.
- Manure:
    a. Do not fall-apply manure to bare ground. Make fall manure applications only to a growing sod or winter-hardy cover crop. Do not exceed 50 lbs N/ac.
    b. When legumes comprise more than 50% of a stand, limit manure application to less than 150 lbs of available N.
    c. Minimize or avoid use of manure on sod fields that will be rotated to annual crops in spring.
- Starter N:
    a. If N must be broadcast rather than side dressed, apply within three days of planting.
    b. For row and cereal crops, including corn, starter fertilizer N rates should be below 40 lbs/ac under normal conditions.
- Corn N sidedress:
    a. Make applications when corn has at least 4 true leaves.

b. Use the Pre-sidedress Nitrogen Test (PSNT) to determine sidedress rate.

- Other University-recommended technologies that improve N use efficiency. (Adapt-N)

1/ The method to calculate the Leaching Index was developed by J.R. Williams and D.E. Kissel in “Water Percolation: An indicator of N Leaching Potential “from Managing Nitrogen for Groundwater Quality and Farm Profitability, Edited by R.F. Follet, 1991.

Crop Nutrient Uptake Values

Crop (units)	N	P2O5	K2O	Typical yield/Ac	N	P2O5	K2O	P*
Corn (bu)	.75	0.4	0.3	120 (bu)	90	50	35	22
Corn silage (T)[4]	9	5	11.	20 (T)	180	100	220	37
Grain sorghum (bu)	0.5	0.6	0.8	120 (bu)	60	70	95	20
Forage sorghum (T)[4]	9	3	10	15 (T)	135	45	150	46
Sorghum/sudangrass[4]	8	7	7	15 (T)	120	105	105	33
Alfalfa (T)2,[5]	50[1]	15	50	5 (T)	250	75	250	24
Red clover (T)[2,5]	40[1]	15	40	3.5 (T)	140	55	140	30
Trefoil (T)[2,5]	50[1]	15	40	3.5 (T)	175	55	140	26
Cool-season grass (T)[2,5]	40	15	50	4 (T)	150	60	200	26
Bluegrass (T)[2,5]	30	10	30	2.5 (T)	75	25	75	26
Wheat/rye(bu)[3]	1.5	1	1.8	60 (bu)	90	60	110	30
Oats (bu)[3]	1.1	0.9	1.5	80 (bu)	90	70	120	20
Barley (bu)[3]	1.4	0.6	1.5	75 (bu)	105	45	110	17
Soybeans (bu)	3.21	1	1.4	40 (bu)	130	40	56	24
Small grain silage (T)[4]	17.0	7.0	26	6 (T)	100	40	160	13

Note: Adapted from Beegle, 2003.
[1]Legumes fix all their required nitrogen. However, they also are able to use nitrogen as indicated.
[2] For legume-grass mixtures, use the predominant species in the mixture.
[3] Includes straw.
[4] 65% moisture.
[5] 10% moisture.
*Elemental P removed

****For vegetable crops**, refer to the most recent version of the New England Vegetable Management Guide. http://www.nevegetable.org/