NITROGEN GUIDELINES FOR FIELD CROPS IN NEW YORK

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1. INTRODUCTION

Nitrogen (N) is an essential and often growth-limiting plant nutrient. Crops take up N that is released to the soil solution as a result of atmospheric deposition, soil organic matter mineralization, crop residue decomposition and animal manure and inorganic fertilizer addition. Furthermore, N may become available through biological fixation.

Only inorganic N, principally nitrate (NO_3^-) and ammonium (NH_4^+) is available for plant growth. Nitrite (NO_2^-) can be taken up but this N form is toxic to plants and is generally present in trace quantities only.

A deficiency in nitrogen leads to yield declines or even a complete crop failure. An excess of nitrogen may lead to excessive vegetative growth, lodging, delayed maturity, increased disease susceptibility, low crop quality, and nitrate accumulation. Excesses may contribute to acid rain, destruction of the ozone layer in the stratosphere, the greenhouse effect, eutrophication of surface waters, contamination of ground water, and fish and other marine life kills, as well as blue baby syndrome in infants and amphibian mortality and deformations. The nitrate concentration in ground and surface waters is an important water-quality index. The U.S. Environmental Protection Agency (EPA) has set the Federal Standard for the maximum permitted amount of nitrate N in drinking water at 10 mg N per L or 43 mg NO_3^- per L.

It is important from both an economic and an environmental standpoint to manage N optimally. Thus, the two primary objectives of N management are: (1) to have adequate inorganic N available during the growing season; and (2) to minimize the availability of inorganic N during the fall, winter, or early spring, when N may be transported to surface and groundwater.

2. NITROGEN REACTIONS IN SOIL

2.1 Fixation

The atmosphere is about 78% N_2 by volume. This gaseous N is chemically stable and unavailable to most biological organisms. However, some species of bacteria can convert N_2 to N containing organic compounds. This process is called biological fixation and it is the primary mechanism by which atmospheric N_2 is added to the soil. Legumes such as alfalfa and clover have root nodules that contain N-fixing bacteria that convert atmospheric N_2 to protein. The legume, upon its death, will increase the amount of organic N in the soil as decomposition proceeds.

$$\underset{\text{(nitrogen gas)}}{N_2} \rightarrow \underset{\text{(ammonia)}}{NH_3} \rightarrow \underset{\text{(organic nitrogen)}}{R\text{-}NH_2}$$

2.2 Mineralization

Organic N exists in plants, soil organic matter, soil microorganisms, animal manure, etc. When organic N decomposes, it is converted into ammonium. This process, facilitated by microorganisms, is called mineralization. Because ammonium is positively charged, it is generally adsorbed by the negatively charged soil particles that dominate soils. Thus, the ammonium leaching potential is minimal.

R-NH_2	→	NH_3	→	NH_4^+
(organic nitrogen)		*(ammonia)*		*(ammonium)*

2.3 Nitrification

Certain microorganisms in the soil convert ammonium to nitrite and then to nitrate by a process called nitrification. Nitrification occurs rapidly when the soil is moist, warm, and well aerated. These conditions coordinate well with early summer when crop N needs are on the rise. Nitrification will significantly increase soil acidity (decrease pH) by producing H^+ ions. Liming materials may be needed to counteract the added acidity. Nitrification is affected by soil temperature: nitrification rates are virtually zero below 41^oF and above 122^oF. Optimum temperature range for nitrification is $67\text{-}86^oF$. The nitrifying bacteria require oxygen. Thus, soil drainage and aeration stimulate nitrification. Although ammonium is not very prone to leaching losses, fertilizer-ammonium applications may still lead to large leaching losses because of rapid nitrification.

NH_4^+	→	NO_2^-	→	NO_3^-
(ammonium)		*(nitrite)*		*(nitrate)*

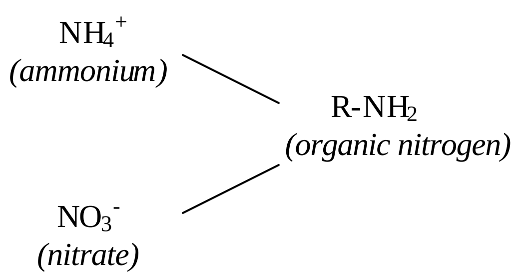
2.4 Denitrification

When there is a depletion of oxygen in the soil, anaerobic bacteria can convert nitrate into gaseous forms of N including nitric oxide gas, nitrous oxide gas, and dinitrogen gas. This process, called denitrification, results in a loss of plant available N from the soil and its return to the atmosphere. Denitrification is accelerated in poorly aerated (<10% oxygen), and/or waterlogged soils. The optimum temperature for denitrification is between 77 and 95^oF. Denitrification ceases to take place at temperatures $<33^oF$ and $>122^oF$. Dinitrogen gas is environmentally harmless. However, NO and N_2O can contribute to the formation of nitric acid (an important component of acid rain) and are also contributors to the greenhouse effect. N_2O, in addition, contributes to the destruction of ozone.

NO_3^-	→	NO_2^-	→	NO	→	N_2O	→	N_2
(nitrate)		*(nitrite)*		*(nitric oxide)*		*(nitrous oxide)*		*(dinitrogen gas)*

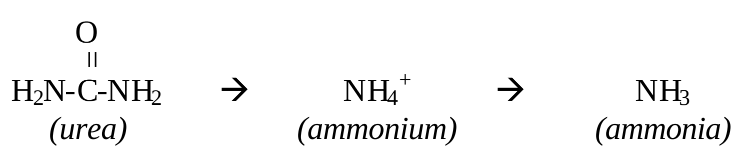
2.5 Immobilization

Soil microbes compete with plants for available ammonium and nitrate. Immobilization refers to the process by which inorganic N is bound in the microbial biomass, thus making it unavailable to plants until the microbes die and decompose, in which case the N re-enters the mineralization process. Immobilization and mineralization occur simultaneously in the soil. Whether the net effect is an increase or a decrease in inorganic N depends on which process dominates. A high (>25) carbon to nitrogen ratio of the organic material that is being decomposed may result in a (temporary) net immobilization of N. This may be observed when large amounts of straw or sawdust bedding are included with manure applications. It may also occur when low N containing stubble is tilled into the soil.



2.6 Ammonia volatilization

Nitrogen can be lost to the atmosphere by volatilization, a process whereby a substance is converted from a solid or liquid to a gas. Typically, N is lost by volatilization of ammonia when urea-containing fertilizers or manure are applied on the soil surface and not incorporated. Little or no ammonia loss occurs from surface applications of acidic fertilizers such as ammonium nitrate or ammonium sulfate, unless the soil pH is very high. Ammonia volatilization increases with increasing soil pH and decreasing moisture content. High temperatures also stimulate volatilization. As much as 50% of the total amount of manure N may be lost if the manure is not incorporated after application.



3. SOURCES OF NITROGEN

There are four main sources of N: (1) native soil organic matter; (2) organic amendments (animal and green manure, compost, plowed under sods); (3) biologically fixed N; and (4) inorganic fertilizer N. To calculate the inorganic N requirement for optimum economic yield, adjustments need to be made for biologically fixed N and/or N released from one or more of the organic sources. Procedures used to estimate N release from plowed under sods and from manure applications are discussed below.

3.1 Soil organic matter

Soil organic matter consists of plant and animal residues, living soil organisms, and substances synthesized by these organisms. Organic matter is decomposed by soil microorganisms and results in the release of many essential plant nutrients. Soils in New York can typically supply 40 to 80 pounds of N per acre annually depending on soil type, organic matter content, and previous management. In spite of its variable nature, soil organic matter is an important source of available N and must be accounted for when determining fertilizer requirements.

The soil's nitrogen supplying capacity (SoilN in lbs N/acre) is a function of soil type and artificial drainage class:

$$SoilN = N\_sup\_ud + ((N\_sup\_dr - N\_sup\_ud) * (ArtificialDrainage/3)) \quad [1]$$

Where:

N_sup_ud is the amount of N supplied by an undrained soil (lbs N/acre).

N_sup_dr is the amount of N supplied by the same soil with excellent rated artificial drainage (lbs N/acre).

ArtificialDrainage is a factor to adjust soil N supply for field artificial drainage conditions:

If artificial drainage = "none" then ArtificialDrainage = 0
If artificial drainage = "inadequate" then ArtificialDrainage = 1
If artificial drainage = "adequate" then ArtificialDrainage = 2
If artificial drainage = "excellent" then ArtificialDrainage = 3

Table 1 in the Appendix lists estimates of soil N supply for each New York soil type.

3.2 Legumes and grass sods

Legumes can, through biological N fixation, acquire enough N to meet their requirements, assuming that proper inoculation and nodulation occur. Grasses, including corn, cannot fix atmospheric N and therefore require N addition either supplied by companion legumes, animal or green manures, soil organic matter mineralization, or fertilizer application. Sod crops that are credited for N in the nitrogen recommendations are listed in Table 1. Nitrogen is bound in the roots and above ground biomass of grasses and legumes. When the legume, grass, or legume/grass sod is killed, the organic N will become available to subsequent crop(s) through mineralization. The amount of N available from these crop residues is a function of the sod density and quality, the percent legume, and time since the sod crop was plowed or killed. If a good quality sod is 100% grass, the amount of organic N is estimated to approach 150 lbs/acre. Legumes contribute a greater amount of N because of their greater N content; for good stands with 1-25% legume, the total amount of organic N may reach 200 lbs N/acre. A stand with 26-50% legume will yield approximately 250 lbs N/acre while a >50% legume containing sod is estimated to contain about 300 lbs N/acre (Table 2).

Table 1: Cornell crop codes and descriptions of "sod" crops.

Crop Codes*	Crop Description	Crop Codes*	Crop Description
ABE & ABT	Alfalfa Trefoil Grass	CLE & CLT	Clover
AGE & AGT	Alfalfa Grass	CSE & CST	Clover Seed Production
ALE & ALT	Alfalfa	CVE & CVT	Crownvetch
BCE & BCT	Birdsfoot Trefoil Clover	GIE & GIT	Grasses Intensively Managed
BGE & BGT	Birdsfoot Trefoil Grass	GRE & GRT	Grasses
BSE & BST	Birdsfoot Trefoil Seed	PGE & PGT	Pasture with Improved Grasses
BTE & BTT	Birdsfoot Trefoil	PIT	Pasture Intensively Grazed
CGE & CGT	Clover Grass	PLE & PLT	Pasture with Legumes

* A crop with a crop code ending with an "E" is in its establishment year while a crop code ending with a "T" implies an established sod.

Table 2: Expected N credits from plowed down sods.

		Available N		
Legume in sod %	Total N pool lbs N/acre	Year 1* lbs N/acre	Year 2 lbs N/acre	Year 3 lbs N/acre
0	150	83	18	8
1-25	200	110	24	10
26-50	250	138	30	13
50 or more	300	165	36	15

* First year following plow down.

The N contribution from sod is discounted depending on the number of years since the sod crop was plowed down. Of the total amount of organic N contained in the sod, 55% is expected to be available to the first crop after plowdown, 12% to the next crop and 5% to the third crop or year. This N contribution reduces the N requirement of subsequent crops accordingly. Thus, 55% or 83 lbs N/acre of an estimated 150 lbs N/acre in a good grass sod is expected to be available to the next crop. No N credits are expected for crops planted more than three years after sod plowdown.

3.3 Manure

There are primarily two forms of N in manure: inorganic (ammonium) N and organic N (Figure 1). The ammonium N is initially present in urine as urea and may account for about 50% of the total N. Urea in manure is no different from urea in commercial fertilizer. It hydrolyzes rapidly to ammonium. In principle, all of the ammonium from urea in manure is available for plant growth. However, parts or all of it may be lost because ammonium is rapidly converted to ammonia as the pH increases and the manure begins to dry. Atmospheric exposure of manure on the barn floor, in the feedlot, in storage, or after spreading increases N loss. Thus, an analysis of the manure is useful to determine how much inorganic N may be conserved before spreading. Table 3 shows the fraction of the ammonium N remaining for plant use from various livestock manures given alternative application methods and timing of application.

Table 3: Estimated ammonia-N losses as affected by manure application method.

Manure Application Method	Ammonium N Utilized by the Crop (%)
Injected during growing season	100
Incorporated within 1 day	65
Incorporated within 2 days	53
Incorporated within 3 days	41
Incorporated within 4 days	29
Incorporated within 5 days	17
No conservation/Injected in fall	0

The more stable organic N is present in the feces and is only slowly released. The decomposition of stable organic N to a plant-available inorganic form occurs at different rates. The less resistant organic N decomposes during the year of application, and the more resistant organic N decomposes very slowly in future years. Repeated application to the same field results in an accumulation of a slow release manure N source.

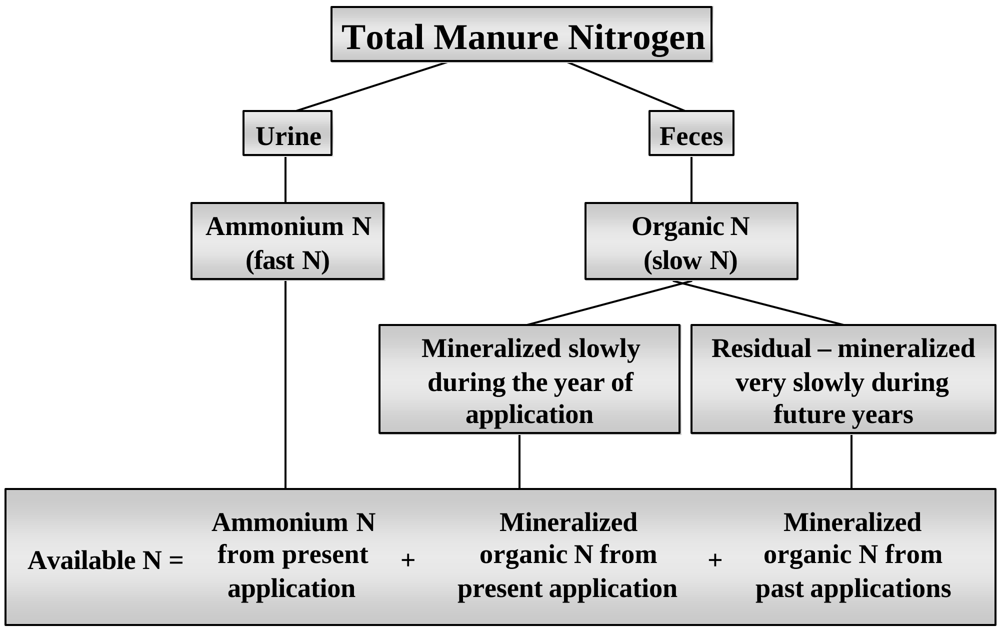


Figure 1: Manure N consists of ammonium and organic N (modified from Klausner, 1997).

Table 4: Decay series for stable organic N in manure by animal type. A "last year release rate" of 12% indicates that an estimated 12% of the organic N applied in the manure is expected to be utilized by the crop a year after application.

		Release rate for organic N in manure (%)		
Source	Dry Matter Content (%)	Present Year "Decay_current"	Last Year "Decay_lastyr"	Two Years Ago "Decay_2yrs"
Cows	<18	35	12	5
Cows	≥18	25	12	5
Poultry	<18	55	12	5
Poultry	≥18	55	12	5
Swine	<18	35	12	5
Swine	≥18	25	12	5
Horses	<18	30	12	5
Horses	≥18	25	12	5
Sheep	<18	35	12	5
Sheep	≥18	25	12	5

A decay or mineralization series is commonly used to estimate the rate of N availability from stable organic N. A decay series of 35, 12, and 5% is used to estimate the rate of decomposition of organic N in liquid (<18% dry matter) dairy manures in New York. This sequence of numbers means that 35% of the organic N is mineralized and potentially taken up by the growing crop during the year the manure was applied, 12% of the initial organic N application is mineralized and taken up during the second year, and 5% is mineralized and taken up in the third year. There is evidence that manure containing large amounts of bedding may mineralize at a slower rate than fresh manure. Therefore, the estimated availability of N during the year applied is reduced from 35 to 25% when the dry matter content of bedded manure exceeds 18%. These decay series and those for other animal manures are listed in Table 4.

Fertilizer recommendations from Cornell University are adjusted for the release of N from previous years' applications. The following calculations are used to determine the residual manure N contribution (ResidualN_manure):

ResidualN_manure = ResidN1 + ResidN2
ResidN1 = Decay_lastyr/100 * (Organic N/100) * ManureRate_lastyr
ResidN2 = Decay_2yrs/100 * (Organic N/100) * ManureRate_2yrs [2]

Where:

ResidualN_manure is the total residual N from manure (lbs N/acre).
ResidN1 is the residual N from manure applied last year (lbs N/acre).
ResidN2 is the residual N from manure applied two years ago (lbs N/acre).
Decay_lastyr is the organic N decay last year (%, see Table 4).
Decay_2yrs is the organic N decay 2 years ago (%, see Table 4).
ManureRate_lastyr is the amount of manure applied last year (lbs/acre).
ManureRate_2yrs is the amount of manure applied 2 years ago (lbs/acre).
Organic N is the organic N content of the applied manure on an as sampled basis.

4. CALCULATING NITROGEN RECOMMENDATIONS FOR SPECIFIC FIELD CROPS

There is currently no reliable soil test for N other than the Pre-Sidedress Nitrogen Test (see section 6). Research efforts in the past have focused on the major agronomic crops in New York State (including corn) leading to more site-specific recommendations for these crops than for minor ones (such as buckwheat). Recommendations can be met by inorganic N application or a combination of inorganic and manure application. Independent of how much of the requirement is satisfied with manure or other organic sources that need to be mineralized, for some crops, a minimum inorganic N requirement is recommended for optimal economic yields (Table 5). In the following section, the approach and specific equations for several agronomic crops are outlined.

Table 5: Recommended minimum inorganic N application.

Crop	Recommended minimum inorganic N application (lbs/acre)
Triticale peas (TRP)	40
Grasses:	
Topdressing (GRT)	50
Topdressing intensively managed (GIT)	100
Pastures:	
Native and improved grasses (PNT, PGT)	50
Intensively managed grass (PIT)	90

4.1 Grain corn and corn silage

The N requirements for corn silage (COS) and grain corn (COG) are identical. Requirements depend on the corn yield potential, nitrogen content of the soil, and nitrogen content of sod crops on the field in the past three years adjusted for the soil's specific nitrogen uptake efficiency (ability of that soil to actually deliver N to the crop). For grain corn the equation is:

NetRequiredN = (YP_corngrain*1.2 – SoilN - SodN)/(N_eff/100) [3]

Where:

NetRequiredN is the total amount of N (lbs N/acre) from any source required for optimum crop production.

YP_corngr is the yield potential of corn grain in bushels (85% dry matter) per acre (see Appendix Table 1).

SoilN and SodN are the amounts of N (lbs N/acre) released from mineralization of soil organic matter and a plowed-down sod, respectively (see sections 3.1 and 3.2 on soil organic matter and sods).

N_eff is the soil type and drainage dependent uptake efficiency (listed for each soil type in Appendix Table 1).

The yield potential for corn is soil type and artificial drainage specific:

YP_corngr = Corngr_ud + (Corngr_dr – Corngr_ud) * (ArtificialDrainage/3)

[4]

Where:

Corngr_ud is the expected yield of grain corn (an average over a ten year period in bushels of 85% dry matter grain per acre) grown on this undrained soil under excellent management (see Appendix Table 1).

Corngr_dr is the expected yield of grain corn (bushel/acre) grown on the same soil that has excellent artificial drainage (see Appendix Table 1).

ArtificialDrainage is an adjustment factor for artificial drainage identical to those reported in section 3.1 on soil organic matter.

Estimated yields are converted to total N per acre assuming that 100 bushels of grain (85% dry matter) equals 10,000 lbs of dry matter (5,000 lbs in grain and 5,000 lbs in stover) and that the average N content at optimum yield is 1.2%. For corn silage, the net N requirement is calculated assuming that 17 tons of silage (35% dry matter) equals 100 bushels of grain (85% dry matter). Silage yield potential in tons per acre (35% dry matter) is converted to yield potential in bushels of grain per acre by multiplying by 5.9 prior to estimation of N requirements:

$$1 \text{ ton silage (35\% dry matter)} = 5.9 \text{ bushels of corn (85\% dry matter)} \qquad [5]$$

Plants are not able to take up 100% of the inorganic N supplied to the soil, although 100% efficiency for fertilizer additions and inorganic N from manure can be approached when small quantities are directly delivered to the growing crop (e.g., as sidedress). The percentage of applied fertilizer that does become part of the plant is called the uptake efficiency. The estimates for New York State soils range from 50 to 75 percent (Appendix Table 1). In general, N uptake efficiencies (N_eff in percentage, see Appendix Table 1) are soil type and artificial drainage class specific:

$$N\_eff = N\_eff\_ud + (N\_eff\_dr - N\_eff\_ud) * (ArtificialDrainage/3) \qquad [6]$$

Where:

N_eff_ud is the estimated percentage of inorganic fertilizer N that is taken up by the corn crop when the soil is left in its original, undrained state.

N_eff_dr is the expected percentage of applied N that is taken up by the plant when the soil is artificially drained.

The amount of N required to obtain the desired yield potential (NetRequiredN in lbs N/acre) can be supplied in the form of inorganic N or a combination of inorganic and manure N. The N requirement is increased by 20 lbs/acre for a no-till crop production system due to slower soil warming in the spring. The N requirement of corn grain and corn silage on soil management group 6 soils (mucks) is 95 lbs/acre.

4.2 Grain sorghum, sorghum forage, sudangrass, sorghum sudan hybrid, and millet

The N requirements for grain sorghum (SOG), sorghum forage (SOF), sudangrass (SUD), sorghum sudan hybrid (SSH), and millet (MIL) are equal to or a fraction of the N requirement for a grain corn crop:

NetRequiredN = (YP_corngr*1.2 – SodN – SoilN)/(N_eff/100)
If NetRequiredN > 50 lbs N/acre then NetRequiredN = NetRequiredN * 0.8

[7]

The latter equation indicates that if the net N requirement calculated using the corn yield potential is >50 lbs/acre, it is adjusted to 80% of the corn requirement. The N requirement is increased by 20 lbs/acre for a no-till crop production system.

4.3 Stands of alfalfa, alfalfa grass, birdsfoot trefoil, birdsfoot trefoil-clover, and clover-grass

To establish a legume or legume-grass sod, no N is required. Thus, the N recommendation for establishment of alfalfa (ALE), alfalfa grass (AGE), birdsfoot trefoil (BTE), birdsfoot trefoil-clover (BCE), and clover-grass (CGE) is zero. Nitrogen requirements for topdressing of legume stands (ALT, BTT, BST, CLT, CST, and CVT) are also zero. Nitrogen requirements for topdressing of legume-grass stands (AGT, ABT, BCT, BGT, and CGT) depend on the percentage of legume in the sod:

If the stand is 100% grass:	NetRequiredN = 75 lbs/acre	
1 to 25 % legume:	NetRequiredN = 40 lbs/acre	
If the stand is more than 25% legume:	NetRequiredN = 0 lbs/acre	[8]

In the current recommendations, these requirements are not adjusted for N releases from previous sods or soil organic matter.

4.4 Establishment and topdressing of grass

To establish a grass stand (GIE and GRE), 50 lbs N/acre is recommended. For topdressing, the recommendation depends on the intensity of management of the grass. Recommended N rate for topdressing of intensively managed grass is 225 lbs N/acre. For grass that is not managed intensively (1-2 cut system) this recommendation is reduced to 75 lbs N/acre.

Establishment of a grass sod (GIE< GRE):	50 lbs N/acre	
Topdressing of an intensively managed grass (GIT):	225 lbs N/acre	
Topdressing of grass in a 1-2 cut system (GRT):	75 lbs N/acre	[9]

4.5 Wheat, wheat seeded with legume, winter barley, and winter barley with legume

The nitrogen recommendations for wheat (WHT), wheat seeded with legume (WHS), winter barley (BWI), and winter barley seeded with legume (BWS) depend on the number of years since sod was grown on this field and the soil management group. If it is less than 1 year ago that a sod was plowed under, the recommended N rate is 20 lbs/acre independent of soil management group because N residual from sod is built into these recommendations. If it was two years or more ago that a sod was plowed down, the recommendations increase (see Table 6). Unlike corn, the recommendations for these crops do not consider the % legume or soil N contributions. Soil_group is the soil management group determined by clay content, the soil rooting depth and the soil structure (Appendix Table 2). Clayey soils tend to fall in group 1, while sandy soils tend to be in group 5. Most of the silt loam soils of the central plains are group 2's and the silt loam soils of the southern tier are group 3's. Soils in management group 6 are muck soils.

Table 6: N recommendations for wheat, wheat seeded with legume, winter barley, and winter barley with legume following sods.

Soil_group	Sod plowed under <1 year ago	Sod plowed under 1-2 year ago	Sod plowed under >2 years ago
1-4	20	50	60
5	20	60	70
6	20	70	80

4.6 Oats, oats with legume, barley-spring, barley-spring with legume and rye seed production

Similar to wheat and wheat/barley crops described above, the nitrogen recommendations for oats (OAT), oats with legume(OAS), barley-spring (BSP), barley-spring with legume (BSS) and Rye Seed Production (RYS) depend on the number of years since sod was grown on this field and the soil management group (see Table 7). Unlike corn, the recommendations for these crops do not consider the % legume or soil N contributions.

Table 7: N recommendations for oats, oats with legume, barley-spring, barley-spring with legume and rye seed production following sods.

Soil_group	Sod plowed under <1 year ago	Sod plowed under 1-2 year ago	Sod plowed under >2 years ago
1-4	20	40	60
5	20	50	70
6	20	60	80

4.7 Sunflowers

The N requirement for sunflowers is estimated as 66% of the corn N requirement, given an average corn yield potential of 120 bushels (85% dry matter) per acre. The N requirement increases by 20 pounds per acre for a no-till crop production system. The minimum nitrogen requirement for sunflowers is 20 lbs N/acre.

$$NetRequiredN = \{(YP\_corngr * 1.2 - SodN - SoilN) / (N\_eff/100)\} * 0.66 \quad [10]$$

4.8 Christmas trees

The nitrogen requirement for Christmas tress (TRE and TRT) increases with each year of growth from establishment to 5 years (Table 8).

Table 8: N recommendations for Christmas trees (TRE and TRT).

Crop code	Years since planting	N recommendation
TRE	establishment year	0
TRT	1	30
TRT	2	40
TRT	3	50
TRT	4+	60

4.9 Other field crops

Nitrogen requirements for all other field crops are constant values (Table 9).

Table 9: Nitrogen requirements for selected field crops.

Crop Name	Crop Code	N Requirement (lbs/acre)
Buckwheat	BUK	20
Idle land	IDL	0
Pasture with improved grasses, establishment phase	PGE	50
Pasture with improved grasses, established (top-dress)	PGT	75
Pasture-rotational grazing, establishment phase	PIE	50
Pasture-rotational grazing, established (top-dress)	PIT	150
Pasture with legumes, establishment phase	PLE	40
Pasture with legumes, established (top-dress)	PLT	40
Pasture with native grasses, established (top-dress)	PNT	75
Rye-cover crop	RYC	20
Soybeans	SOY	0
Triticale/peas	TRP	80
Waterways, pond dikes, establishment phase	WPE	50
Waterways, pond dikes, established (top-dress)	WPT	70

5. NITROGEN FERTILIZERS

Inorganic N requirements can be met using a variety of N containing fertilizers. Table 10 lists common fertilizer materials and their N, P_2O_5, K_2O, S, Ca, and Mg contents as well as their salt hazards, acid-forming tendency, and additional notes.

Table 10: N, P_2O_5, K_2O, S, Ca, and Mg contents as well as the salt hazard and acid forming tendency of commonly used N containing fertilizers (adapted from Brady and Weil, 1996; Jokela et al., 1999; Beegle, 1996; Cornell Field Crops and Soils Handbook, 1987).

	N	P_2O_5	K_2O	S	Ca	Mg	Salt hazard	CCE*	Additional notes
Ammonium nitrate (NH_4NO_3)	33-34	0	0	0	0	0	high	-59	Dry material. Can be left on surface or incorporated into soil. Absorbs moisture from the air. It can be blended but not with urea. High risk of fire or explosions if mixed with oxidizable forms of C (e.g., fuel oil).
Ammonium sulfate ($[NH_4]_2S0_4$)	20-21	0	0	24	0	0	high	-110	Dry material. Used for direct application and blended fertilizers. Can be left on surface or in-corporated into soil. Rapidly lowers the soil pH.
Urea - ammonium nitrate (UAN)	28-32	0	0	0	0	0	medium	-52	Liquid fertilizer. Urea N comprises about 50% of the N. Once applied, UAN behaves as dry urea and NH_4NO_3. To minimize N loss, incorporate into soil. May cause leaf burn. UAN weighs 11-12 lbs per gallon.
Potassium nitrate (KNO_3)	13	0	36	0.2	0.4	0.3	very high	+26	Dry crystalline material. A specialty fertilizer used for direct application or as blended fertilizer.
Anhydrous ammonia (NH_3)	82	0	0	0	0	0	low	-148	A high-pressure liquid. It turns into a gas when released. The gas is toxic. Needs pressurized equipment. Must be injected 6-8 inches deep on friable, moist soil to avoid N losses. Weighs about 5 lbs per gallon. Rapidly lowers the soil pH.

	N	P_2O_5	K_2O	S	Ca	Mg	Salt hazard	CCE*	Additional notes
Urea (NH_2-CO-NH_2)	45-46	0	0	0	0	0	medium	-84	Dry material that should be incorporated. Urea-N rapidly hydrolyzes to NH_4^+. Used for direct application, in mixed fertilizers, and in liquid nitrogen. Not recommended as a starter.
Sulfur coated urea	30-40	0	0	13-16	0	0	low	-110	Dry material. Variable slow rate of release. Rapidly lowers soil pH.
Mono-ammonium phosphate (MAP) ($NH_4H_2PO_4$)	11-13	48-52	0	1-2			low	-65	A dry material. Used for direct application and in blended fertilizers. Makes an excellent starter fertilizer, either alone or with a small amount of potash although the N:P ratio may be to low for high P soils.
Di-ammonium phosphate (DAP) ($[NH_4]_2HP0_4$)	18-21	46-53	0	0-1			medium	-70	A dry material. Used for direct application and in blended fertilizers. Produces free ammonia and is hence not a good starter fertilizer.

* Acid forming tendency expressed as kg $CaCO_3$/100 kg of fertilizer. A positive number indicates an increase in pH upon application. A negative number implies a fertilizer induced decrease in pH.

6. PRE-SIDEDRESS NITROGEN TEST (PSNT)

The pre-sidedress nitrogen test (PSNT) provides a way to determine if there will be enough available nitrogen in the soil from organic sources for maximum economic yield of corn. Thus, in certain circumstances, PSNT results can help a producer decide whether or not to add extra N at sidedress time. The PSNT result is a measure of the nitrate level in the top 12 inches of soil based on a sample taken when corn is 6 to 12 inches tall (measured from the soil surface to the whorl). The test is calibrated for corn fields (second year or more) assuming the following:

- Fertilizer N at planting is limited to 40 lbs N/acre in the band.
- Pre-plant or early post-plant broadcast N is *NOT* used.
- Sampling is done no earlier than 2-3 days after significant rainfall.

On the other hand, the PSNT is not relevant when:

- Fields are in continuous corn and manure or other organic amendments are not used.
- PSNT samples are collected when corn is less than 6” or more than 12” tall at the whorl.

- Soil samples are taken from less than 12 inch depth.
- More than 40 lbs of N is band applied at planting.
- Pre-plant or early post plant broadcast N is applied.
- Sampling took place too soon after rainfall.

The PSNT is a great tool to use when there is uncertainty as to the actual amount of manure applied or when there is uncertainty as to whether enough manure was actually applied to meet expected corn crop N requirements. The PSNT provides an indication of the pool of readily mineralizable organic N in the soil. This is why the presence of broadcast N can cause the PSNT to overestimate the readiliy mineralizable organic N pool, rending the test useless.

To obtain a representative soil sample for the PSNT, 10 to 20 soil cores per field should be taken to a depth of 12 inches when the corn is 6-12 inches tall. Samples should be taken between rows to avoid sampling the starter fertilizer band. The samples should be mixed thoroughly and a subsample dried immediately following sampling to stop further nitrification. Drying can be done in an oven at about 200^{o}F or in a microwave. Samples can also be air dried if spread out thinly. It will reduce drying time if a fan is used to enhance air circulation above the thinly spread sample. It is important not to put wet samples on top of absorbent materials as those materials will absorb nitrate.

Samples should be sent to the Cornell Nutrient Analysis Laboratory along with the information sheet that is supplied with the purchase of the sample bag. Soil test bags can be obtained from the laboratory (804 Bradfield Hall, Ithaca, NY 14853, phone: (607) 255-4540, fax: (607) 255-7656, or e-mail: soiltest@cornell.edu). Information sheets can also be downloaded from the laboratory's website (http://www.css.cornell.edu/soiltest/).

The interpretations of the PSNT in New York are based on 115 field experiments conducted between 1986 and 1995 (Klausner, 1996). These experiments showed with an 80% accuracy that fields with a PSNT value of 25 ppm nitrate or greater did not need additional N. Fields testing below 21 ppm needed additional N for maximum economic yield and PSNT values between 21 and 24 ppm were borderline. A disadvantage of the PSNT is its inability to estimate *how much* fertilizer N needs to be applied for optimum economic yield if the test results indicate a response to additional N can be expected. This is due to the large amount of variation in relative yield for any given PSNT value below the critical level of 25 ppm. However, for fields with PSNT values of 21-24 ppm, there is a reasonable probability of a response to some N, and the recommendation for these fields is to add 25-50 lbs N per acre as a sidedress application. For fields with PSNT values less than 21 ppm, the standard N recommendations as outlined in section 4.1 should be used to determine how much N to apply (Table 11).

Table 11: Interpretation of the pre-sidedress nitrogen test (PSNT) for New York.

PSNT (ppm)	Probability of an economic response	N recommendation
<21	High	Follow Cornell N recommendations for corn
21-24	About 10%	Consider sidedressing 25-50 lbs N/acre
25 or more	Very low	No extra N needed

7. NITRATE LEACHING INDEX[1]

The Nitrate Leaching Index (LI) is an indicator of the potential for nitrate to reach groundwater. Nitrate, because it is water soluble, moves downward as water percolates through the soil. The extent of percolation depends on permeability, pore-size distribution, soil depth to a restrictive layer, artificial drainage, and precipitation amount and distribution over the year. For a given precipitation pattern, excessively well drained soils such as Howard, Adams, Hoosic and Tunkhannock, or even well drained soils such as Madrid, Palmyra, Honeoye and Ontario have a significantly greater leaching potential than less well drained soils such as Vergennes, Swanton, Rhinebeck, Lordstown or Volusia. The current LI rates leaching potential based on soil hydrologic group (Table 12) and 10 year average precipitation data from weather stations around NY. Until recently, rainfall data were county-based. The latest version of the LI uses township-based precipitation data, which more accurately reflects precipitation patterns than the previously used county-based data. The effect of township-based data on LI score varies: some areas have significantly higher scores, some significantly lower, while other areas are essentially unchanged.

Table 12: Soil hydrologic groups. See Appendix Table 1 for the hydrologic groups of New York State soils.

Soil hydrologic group	Type	Infiltration capacity/ permeability	Leaching potential	Runoff potential
A	Deep, well-drained sands and gravels.	High	High	Low
B	Moderately drained, moderately fine to moderately coarse texture.	Moderate	Moderate	Moderate
C	Impeding layer, or moderately fine to fine texture.	Low	Low	High
D	Clay soils, soils with high water table.	Very low	Very low	Very high

The Nitrate Leaching Index is the product of the Percolation Index and the Seasonal Index (Williams and Kissel, 1991): LI=Percolation Index*Seasonal Index. The Percolation Index (PI) is a function of the annual average precipitation (PA) and soil

[1] The Leaching Index section was taken from the Department of Crop and Soil Sciences Extension Publication E03-2 "The New York Nitrate Leaching Index" by Czymmek, Ketterings, Van Es and DeGloria (2003).

hydrologic group. The hydrologic group for each New York soil series can be found in Appendix Table 1. Under identical precipitation levels, soils with a hydrologic group "A" have the greatest percolation potential while soils of hydrologic group "D" have the least percolation and therefore are least conducive to leaching. Equations are shown below for users who wish to build these into their own software applications:

Hydrologic Group A: $PI = (P_A - 10.28)^2 / (P_A + 15.43)$
Hydrologic Group B: $PI = (P_A - 15.05)^2 / (P_A + 22.57)$
Hydrologic Group C: $PI = (P_A - 19.53)^2 / (P_A + 29.29)$
Hydrologic Group D: $PI = (P_A - 22.67)^2 / (P_A + 34.00)$

These equations were derived from Williams and Kissel (1991) and reported by Pierce et al. (1991). Precipitation data can be found in Appendix Table 3. For soils with a hydrologic group that consists of more than one letter (e.g., "A/D", "A/C", "C/D"), its hydrologic group is determined by the presence or absence of adequate artificial drainage. If the field is artificially drained ("adequate" or "excellent"), the hydrologic group moves to the first of the two classes. If the field is inadequately drained or not drained at all ("none" or "inadequate"), the second of the two classes is assigned. For example, a Halcott soil has a hydrologic class of "C/D". If this soil has adequate or excellent artificial drainage, the hydrologic group used is "C". If the soil is not drained or inadequately artificially drained, the hydrologic group "D" is assigned. For soils with a single hydrologic group, artificial drainage does not influence the hydrologic group used.

> Box 1: What is the leaching index for a corn field near Auburn NY that is classified as a Lima soil type?
>
> - Step 1:
>   - Task: Look up the hydrologic group (Appendix A).
>   - Answer: Lima has a hydrologic group B.
> - Step 2:
>   - Task: Look up the annual precipitation (P_A) for Auburn in Cayuga County (Appendix B).
>   - Answer: P_A = 36.4 inches.
> - Step 3:
>   - Task: Look up the formula for the Percolation Index (PI) for a hydrologic group B soil.
>   - Answer: $PI = (P_A - 15.05)^2 / (P_A + 22.57)$
> - Step 4:
>   - Task: Calculate the PI.
>   - Answer: $PI = (36.4-15.05)^2 / (36.4 + 22.57) = 7.73$.
> - Step 5:
>   - Task: Look up the winter precipitation (P_W) for Auburn.
>   - Answer: P_W = 16.0 inches.
> - Step 6:
>   - Task: Calculate the seasonal index (SI).
>   - Answer: $SI = (2 * P_W/P_A)^{1/3} = (2 * 16.0/36.4)^{1/3} = 0.96$
> - Step 7:
>   - Task: Multiply the PI and the SI to obtain the LI.
>   - Answer: LI = PI * SI = 7.73 * 0.96 = 7.4.

The Seasonal Index (SI) is determined by the annual precipitation (PA in inches) and the sum of the fall and winter precipitation (PW, from October through March in inches): $SI = (2 * PW / PA)^{1/3}$.

Average township-based precipitation as well as the N Leaching Index values for soils with hydrologic groups A, B, C, or D can be found in Appendix Table 3. An example of an N Leaching Index calculation is given in Box 1. Fortunately, no manual calculations are necessary: LI scores for each hydrologic group in each New York State township are reported in Appendix Table 3. Use Appendix Table 1 to identify soil hydrologic group and Appendix Table 3 to look up LI scores.

An LI below 2 indicates that the potential for nitrate leaching below the root zone is low. An LI greater than 10 inches indicates that the potential for soluble nutrient leaching below the root zone is large while LI's between 2 and 10 are considered intermediate. In order to meet the N leaching requirements of the NRCS nutrient management standard (590), producers are expected to *implement* best management practices if the LI score for a field is high (>10). Producers are expected to *consider* the same practices on a case-by-case basis if the LI score for a field is intermediate (2-10). Best management practices recommended for soils with medium to high N leaching indices include those listed below. These recommendations are based on research done, among others, by Sogbedji and coworkers (2000) and Van Es and coworkers (2002).

- Unless the New York Phosphorus Index identifies the need for P based fertility management, manure and fertilizer application rates should be based on Cornell guidelines for meeting crop N needs.
- For corn, pre-plant (other than starter fertilizer) and early post plant *broadcast* applications of commercial nitrogen without the use of nitrification inhibitors are not recommended.
- Sidedress applications should be made after the corn has at least four true leaves.
- If starter N must be broadcast (e.g., for small grains or new seedings of grass), apply fertilizer as close to expected planting date as possible (ideally within 3 days or less).
- For row and cereal crops, including corn, maintain starter fertilizer N rates below 50 lbs/acre actual N under normal conditions.
- Manure and fertilizer applications should be adjusted based on information provided in this document.
- Evaluate the need for sidedress N applications based on PSNT or other soil nitrate-nitrogen tests.
- Sod crops should not be incorporated in the fall. Chemical sod killing may be carried out when the soil temperature at four-inch depth is approaching 45^{o}F. Depending on location, this will not likely take place until early October.
- Minimize fall and/or winter manure application on good grass and/or legume sod fields that are to be rotated the following spring.
- Appropriate ammonia conservation is encouraged. Losses can either be reduced by immediately incorporating manure or eliminated by directly injecting manure as a sidedress application to growing crops.
- Plant winter hardy cover crops whenever possible, especially when fall manure is applied (e.g., rye, winter wheat, or interseed ryegrass in summer).
- Manure may be applied in the fall where there is a growing crop. Judicious amounts of manure can be applied to or in conjunction with perennial crops or winter hardy cover crops. Applications should generally not exceed the greater of 50 lbs/acre of first year available N or 50% of the expected N requirement of next year's crop.

- Frost incorporation/injection is acceptable when soil conditions are suitable, but winter applications should be made in accordance with the New York Phosphorus Index.
- Manure N application on legumes is acceptable to satisfy agronomic requirements when legumes represent less than 50% of the stand. When legumes represent more than 50% of the stand, manure may be applied at a rate not exceeding 150 lbs of available N/acre.

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APPENDIX

TABLE 1: SOIL MANAGEMENT GROUP (SMG), HYDROLOGIC GROUP (HG), INORGANIC NITROGEN UPTAKE EFFICIENCIES (N-EFF IN %), SOIL N SUPPLY (N-SUP, IN LBS N/ACRE) AND CORN YIELD POTENTIAL (YP IN BUSHELS/ACRE) FOR UNDRAINED (UD) AND ARTIFICIALLY DRAINED (DR) NEW YORK STATE SOILS.

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
ACTON	4	C	65	70	65	65	120	125
ADAMS	5	A	70	70	40	40	95	95
ADIRONDACK	4	D	75	75	70	70	75	75
ADJIDAUMO	1	D	55	60	65	75	75	105
ADRIAN	6	A/D	55	65	90	120	60	120
AGAWAM	4	B	75	75	65	65	140	140
ALBIA	3	C	60	65	60	70	100	120
ALBRIGHTS	2	C	70	70	75	75	110	120
ALDEN	3	D	50	60	65	80	65	90
ALLAGASH	5	B	75	75	65	65	105	105
ALLARD	3	B	75	75	70	70	135	135
ALLENDALE	3	D	55	60	60	70	80	100
ALLIS	3	D	60	65	65	75	80	100
ALLUVIAL LAND	3	C	60	65	70	75	75	100
ALMOND	3	C	60	65	65	75	90	95
ALPS	3	C	70	70	75	75	110	115
ALTMAR	5	B	65	70	50	60	100	115
ALTON	5	A	75	75	65	65	125	125
AMBOY	4	C	75	75	60	60	140	140
AMENIA	4	B	70	70	65	65	135	140
ANGOLA	2	C	60	65	70	80	95	110
APPLETON	2	C	60	65	65	75	105	125
ARKPORT	4	B	75	75	50	50	125	125
ARMAGH	2	D	55	60	70	80	80	100
ARNOT	3	C/D	70	70	70	70	90	100
ASHVILLE	3	D	50	55	65	75	75	95
ATHERTON	3	B	55	60	55	75	90	105
ATKINS	3	D	50	60	65	75	70	105
ATSION	5	C	60	65	60	70	70	95
AU GRES	5	B	55	65	60	65	90	100
AURELIE	3	D	55	60	70	80	75	95
AURORA	2	C	70	70	70	70	110	115
BARBOUR	3	B	75	75	75	75	140	140
BARCELONA	3	C	60	65	65	75	90	115
BARRE	1	D	55	65	70	80	80	105

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
BASH	3	C	60	65	65	75	105	130
BASHER	3	B	70	70	70	70	140	140
BATH	3	C	75	75	75	75	125	125
BECKET	4	C	75	75	60	60	100	100
BECRAFT	3	B	70	70	75	75	150	150
BELGRADE	3	B	70	70	80	80	140	145
BENSON	4	D	70	70	65	65	80	80
BERKSHIRE	5	B	75	75	65	65	125	125
BERNARDSTON	4	C	75	75	65	65	135	135
BERRIEN	5	C	70	70	55	55	120	120
BERRYLAND	5	B	50	60	70	75	60	90
BESEMAN	6	A	50	65	90	130	60	130
BICE	5	B	75	75	65	65	130	130
BIDDEFORD	2	D	50	60	70	75	65	95
BIRDSALL	3	D	50	55	70	75	70	90
BLASDELL	3	A	75	75	70	70	125	125
BOMBAY	4	B	70	70	65	65	135	135
BONAPARTE	4	A	70	70	50	50	100	100
BONO	1	D	50	60	70	80	60	100
BOOTS	6	A	55	65	90	130	60	130
BOROSAPRISTS	6	A/D	55	65	90	140	60	150
BOYNTON	3	D	55	65	70	75	80	100
BRACEVILLE	4	C	70	70	75	75	115	120
BRAYTON	4	C	60	65	70	70	90	105
BRIDGEHAMPTON	3	B	70	70	70	70	150	150
BRIDPORT	2	D	60	65	65	75	105	120
BRIGGS	4	A	75	75	60	60	100	100
BRINKERTON	2	D	55	65	70	80	80	100
BROADALBIN	4	C	75	75	65	65	130	130
BROCKPORT	1	D	60	65	70	80	95	120
BROOKFIELD	3	B	75	75	75	75	130	130
BUCKLAND	3	C	70	70	70	70	90	90
BUCKSPORT	6	D	55	65	90	140	60	150
BUDD	4	B	75	75	40	40	105	105
BURDETT	2	C	60	65	70	80	100	120
BURNHAM	3	D	60	65	70	80	70	95
BUSTI	3	C	60	65	60	70	100	120
BUXTON	2	C	70	70	70	70	120	120
CAMBRIA	2	D	55	60	65	75	80	105
CAMBRIDGE	3	C	70	70	70	70	120	125
CAMILLUS	3	B	70	70	75	75	120	125

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
CAMRODEN	3	C	60	65	70	75	100	110
CANAAN	4	C	70	70	65	65	75	75
CANAAN-ROCK OUTCROP	4	C	70	70	65	65	75	75
CANADICE	2	D	55	65	60	70	80	110
CANANDAIGUA	3	D	55	65	70	80	90	110
CANASERAGA	3	C	70	70	80	80	125	125
CANASTOTA	2	C	70	70	75	75	120	125
CANEADEA	2	D	60	65	65	75	105	120
CANFIELD	3	C	70	70	75	75	115	120
CANTON	4	B	75	75	60	60	130	130
CARBONDALE	6	A	55	65	90	130	60	130
CARLISLE	6	A/D	55	65	90	130	60	130
CARROLLTON	3	C	75	75	75	75	105	105
CARVER	5	A	70	70	40	40	75	75
CARVER-PLYMOUTH	5	A	70	70	40	40	75	75
CASTILE	4	B	75	75	75	75	135	135
CATHRO	6	A	55	65	90	140	60	150
CATHRO-GREENWOOD	6	A	55	65	90	140	60	150
CATTARAUGUS	3	C	75	75	75	75	125	125
CAVODE	2	C	60	65	70	75	105	120
CAYUGA	2	C	70	70	75	75	135	135
CAZENOVIA	2	B	70	75	75	75	135	135
CERESCO	3	B	70	70	75	75	145	145
CHADAKOIN	3	B	75	75	75	75	130	130
CHAGRIN	3	B	75	75	75	75	140	140
CHAMPLAIN	5	A	70	70	50	50	75	75
CHARLES	3	C	55	60	70	80	75	90
CHARLTON	4	B	75	75	65	65	130	130
CHATFIELD	4	B	70	70	50	50	100	100
CHATFIELD	4	B	70	70	65	65	100	100
CHAUMONT	1	D	55	65	65	75	80	100
CHAUTAUQUA	3	C	70	70	75	75	125	125
CHEEKTOWAGA	5	D	55	65	55	75	80	105
CHENANGO	3	A	70	70	70	70	130	130
CHESHIRE	4	B	75	75	75	75	125	125
CHIPPENY	6	D	55	65	90	130	60	130
CHIPPEWA	3	D	55	65	70	75	80	100
CHURCHVILLE	2	D	60	65	70	80	105	120
CICERO	2	C	60	65	70	75	100	115

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
CLARKSON	2	B	70	70	75	75	135	140
CLAVERACK	4	C	70	70	70	70	120	120
CLYMER	4	B	75	75	70	70	110	120
COHOCTAH	4	B	55	65	70	80	80	100
COLLAMER	3	C	70	70	75	75	140	140
COLONIE	5	A	70	70	50	50	105	105
COLOSSE	4	A	70	70	50	50	70	70
COLRAIN	4	A	75	75	65	65	130	130
COLTON	5	A	70	70	50	50	85	85
COLWOOD	3	D	55	65	70	80	90	110
CONESUS	2	B	70	70	75	75	135	140
CONOTTON	3	A	75	75	70	70	125	125
CONSTABLE	5	A	70	70	50	50	75	75
COOK	5	D	50	60	70	80	70	90
COPAKE	4	B	75	75	65	65	135	135
CORNISH	3	C	60	65	65	75	95	110
COSAD	4	C	60	70	60	70	105	120
COSSAYUNA	4	C	75	75	65	65	135	135
COVERT	4	A	70	70	60	60	115	120
COVEYTOWN	4	C	65	70	65	75	90	110
COVINGTON	1	D	55	60	70	75	75	95
CRARY	4	C	65	70	60	70	110	120
CROGHAN	5	B	70	70	50	50	100	100
CULVERS	3	C	70	70	75	75	115	125
DALBO	3	C	70	70	75	75	95	115
DALTON	3	C	60	65	70	75	95	105
DANLEY	2	C	70	70	75	75	120	125
DANNEMORA	4	D	55	65	65	75	75	90
DARIEN	2	C	60	65	70	75	100	115
DAWSON	6	A	55	65	90	140	60	150
DEERFIELD	5	B	70	70	60	65	105	110
DEFORD	4	A	55	60	65	75	75	100
DEKALB	4	A	75	75	70	70	100	100
DEPEYSTER	3	C	70	70	75	75	140	140
DEPOSIT	3	B	70	70	75	75	125	130
DERB	3	C	60	65	70	75	95	115
DIXMONT	5	C	70	70	65	65	115	120
DORVAL	6	A	55	65	90	140	60	150
DOVER	4	B	75	75	70	70	125	125
DUANE	4	B	70	70	60	60	95	95
DUNKIRK	3	B	75	75	75	75	140	140

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
DUTCHESS	4	B	75	75	65	65	135	135
DUXBURY	4	A	75	75	65	65	95	95
EDWARDS	6	B	55	65	90	130	60	130
EEL	2	B	65	70	75	75	140	140
EELWEIR	4	C	70	70	50	50	130	135
ELKA	4	C	75	75	70	70	115	115
ELLERY	3	D	55	65	70	75	80	100
ELMRIDGE	5	C	70	70	60	60	135	135
ELMWOOD	4	C	70	70	60	60	130	130
ELNORA	5	B	70	70	50	50	110	110
EMPEYVILLE	4	C	70	70	60	60	100	105
ENFIELD	3	B	75	75	75	75	150	150
ENSLEY	3	B	55	60	65	75	75	95
ERIE	3	C	60	65	65	75	95	115
ERNEST	3	C	75	75	75	75	75	75
ESSEX	5	C	75	75	70	70	95	95
FAHEY	5	B	70	70	55	65	100	100
FARMINGTON	3	C	75	75	65	65	90	90
FARNHAM	4	C	70	70	70	70	120	125
FERNLAKE	4	A	70	70	60	60	75	75
FONDA	2	D	50	60	70	80	70	100
FREDON	4	C	55	65	70	75	90	115
FREETOWN	6	D	50	65	90	130	60	130
FREMONT	2	C	60	65	65	75	100	110
FRENCHTOWN	3	D	55	60	65	75	70	105
FREWSBURG	3	C	60	65	65	75	80	95
FRYEBURG	3	B	75	75	70	70	95	95
GAGE	3	D	55	60	65	75	90	95
GALEN	4	B	70	70	60	60	130	130
GALESTOWN	5	A	70	70	40	40	90	90
GALOO	4	C	70	70	50	50	75	75
GALOO-ROCK OUTCROP	4	C	70	70	50	50	75	75
GALWAY	4	B	75	75	70	70	130	130
GENESEE	2	B	75	75	80	80	155	155
GEORGIA	4	C	70	70	75	75	135	140
GETZVILLE	3	D	55	60	65	75	75	90
GILPEN	3	C	75	75	75	75	120	120
GILPIN	3	C	75	75	70	70	110	110
GLEBE	4	C	70	70	70	70	75	75
GLEBE-SADDLEBACK	4	C	70	70	70	70	75	75

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
GLENDORA	4	A/D	75	75	70	70	75	75
GLENFIELD	3	B	50	60	65	75	90	110
GLOUCESTER	4	A	70	70	50	50	120	120
GLOVER	4	D	70	70	60	60	90	90
GOUGEVILLE	5	A	50	60	65	75	75	100
GRANBY	5	A/D	55	60	60	65	75	100
GRATTAN	5	A	70	70	50	50	105	105
GREENE	3	C	60	65	65	75	90	110
GREENWOOD	6	A	50	65	90	140	60	150
GRENVILLE	4	B	75	75	75	75	140	140
GRETOR	3	C	60	65	65	75	75	90
GROTON	4	A	70	70	70	70	105	110
GROVETON	4	A	70	70	65	65	95	95
GUFF	1	D	50	55	60	75	75	90
GUFFIN	1	D	50	60	60	65	60	75
GULF	4	B	55	60	65	75	75	90
HADLEY	3	B	75	75	70	70	140	140
HAIGHTS	3	B	60	70	50	60	95	100
HAIGHTS-GULF	3	B	60	70	50	60	95	100
HAILESBORO	3	C	60	65	65	75	110	125
HALCOTT	2	C/D	70	70	75	75	75	80
HALSEY	4	C/D	50	60	70	75	90	100
HAMLIN	2	B	75	75	80	80	155	155
HAMPLAIN	2	B	75	75	80	80	150	150
HANNAWA	4	D	55	60	60	70	85	100
HARTLAND	4	B	75	75	75	75	155	155
HAVEN	4	B	75	75	65	65	150	150
HAWKSNEST	3	C/D	70	70	75	75	75	80
HEMPSTEAD	4	B	75	75	65	65	150	150
HENRIETTA	6	B	55	65	90	130	60	150
HERKIMER	3	B	70	70	75	75	130	130
HERMON	4	A	70	70	50	50	105	105
HERO	4	B	70	70	70	70	130	135
HEUVELTON	2	C	70	70	75	75	115	135
HILTON	2	B	70	70	75	75	135	140
HINCKLEY	5	A	70	70	50	50	95	95
HINESBURG	4	C	75	75	60	60	105	105
HOGANSBURG	4	B	70	70	75	75	135	140
HOGBACK	5	C	75	75	50	50	75	75
HOGBACK-RICKER	5	C	75	75	50	50	75	75

Appendix Table 1(Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
HOLDERTON	3	B	60	65	65	75	105	115
HOLLIS	4	C	60	65	50	60	75	95
HOLLY	2	C/D	55	60	60	75	70	95
HOLYOKE	3	C	70	70	70	70	75	75
HOLYOKE-ROCK OUTCR	3	C	70	70	70	70	75	75
HOMER	2	B	60	65	65	75	105	125
HONEOYE	2	B	75	75	75	75	140	140
HOOSIC	4	A	75	75	60	60	105	105
HORNELL	2	D	65	70	70	75	95	105
HORNELLSVILLE	3	D	60	65	65	75	85	95
HOUGHTONVILLE	5	C	75	75	65	65	105	105
HOUGHTONVILLE -RAWSON	5	C	75	75	65	65	105	105
HOUSATONIC	3		55	65	70	75	80	115
HOUSEVILLE	2	C	60	65	65	75	105	125
HOWARD	3	A	75	75	70	70	135	135
HUDSON	2	C	70	70	80	80	135	135
HULBERTON	2	C	60	65	70	80	105	125
ILION	2	D	60	65	70	80	90	105
INSULA	4	B	75	75	60	65	90	90
IPSWICH	6	D	50	65	90	99	60	130
IRA	4	C	70	70	65	65	115	120
ISCHUA	3	B	70	70	75	75	100	105
IVORY	2	C	60	65	65	75	90	100
JEBAVY	5	A	55	60	60	70	75	95
JOLIET	4	D	55	65	65	75	60	100
JUNIUS	5	C	55	65	50	60	80	100
KALURAH	4	B	70	70	75	75	135	140
KANONA	2	D	55	65	60	70	77	95
KARS	4	A	70	70	65	65	125	125
KEARSARGE	3	B	70	70	70	70	90	90
KENDAIA	2	C	60	65	65	75	105	125
KIBBIE	3	B	60	65	65	75	110	125
KINGSBURY	1	D	60	65	65	75	95	110
KINZUA	3	B	75	75	75	75	130	130
KNICKERBOCKER	5	A	70	70	65	65	105	105
LACKAWANNA	3	C	75	75	75	75	125	125
LAGROSS	3	A	75	75	75	75	115	115
LAGROSS-HAIGHTS	3	A	75	75	75	75	115	115

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
LAIRDSVILLE	2	D	70	70	75	75	120	120
LAKEMONT	1	D	55	60	65	75	80	105
LAKEWOOD	5	A	70	70	40	40	75	75
LAMSON	4	B/D	55	65	65	75	75	110
LANESBORO	3	C	70	70	75	75	75	75
LANGFORD	3	C	70	70	75	75	120	120
LANSING	2	B	75	75	75	75	140	140
LECK KILL	3	B	75	75	75	75	115	115
LEICESTER	4	C	55	65	65	75	75	105
LEON	5	C	60	65	60	70	70	95
LEWBATH	3	C	75	75	75	75	95	95
LEWBEACH	3	C	75	75	75	75	125	125
LEYDEN	2	C	70	70	75	75	120	125
LIMA	2	B	70	70	75	75	135	140
LIMERICK	3	C	55	65	70	75	80	115
LINDEN	4	B	75	75	75	75	135	135
LINLITHGO	3	B	65	65	70	75	105	115
LIVINGSTON	1	D	50	55	65	75	65	85
LOBDELL	3	B	65	70	75	75	135	135
LOCKPORT	2	D	60	65	70	80	95	120
LORDSTOWN	3	C	75	75	70	70	105	105
LOVEWELL	2	B	70	70	75	75	130	140
LOWVILLE	4	B	75	75	75	75	135	135
LOXLEY	6	A	50	65	90	130	60	130
LUCAS	2	C	70	70	80	80	135	135
LUDLOW	4	C	70	70	75	75	115	120
LUPTON	6	A	55	65	90	140	60	150
LYMAN	4	C	70	70	60	60	75	75
LYMAN-BECKET-BERKSHI	4	C	70	70	60	60	75	75
LYME	5	C	55	65	60	70	75	100
LYONS	2	D	55	60	65	75	80	105
MACHIAS	4	B	70	70	70	70	115	115
MACOMBER	4	C	75	75	75	75	85	85
MACOMBER-TACONIC	4	C	75	75	75	75	85	85
MADALIN	1	D	55	60	65	75	75	105
MADAWASKA	5	B	70	70	60	60	115	115
MADRID	4	B	75	75	65	65	135	135
MALONE	4	C	60	65	65	75	105	125
MANAHAWKIN	6	D	55	65	90	130	60	130

Appendix Table 1 (Continued)

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
MANDY	3	C	75	75	75	75	105	105
MANHEIM	2	C	60	65	65	75	105	125
MANHONING	2	D	60	65	65	75	90	115
MANLIUS	3	C	70	70	70	70	105	105
MANSFIELD	3	D	50	60	65	75	65	90
MAPLECREST	2	B	75	75	75	75	130	130
MARCY	3	D	55	60	65	75	90	95
MARDIN	3	C	70	70	75	75	115	120
MARILLA	3	C	70	70	75	75	120	120
MARKEY	6	A/D	55	65	90	130	60	150
MARLOW	4	C	75	75	60	60	120	120
MARTISCO	6	B	50	65	90	120	60	120
MASSENA	4	C	60	65	65	75	105	125
MATOON	1	D	60	60	65	75	100	120
MATUNUCK	6	D	50	65	90	130	60	130
MEDIHEMISTS	6	A/D	55	65	90	130	60	150
MEDOMAK	3	D	50	55	65	75	60	80
MELROSE	4	C	75	75	50	50	120	120
MENLO	4	D	55	60	60	70	80	95
MENTOR	4	B	75	75	60	60	125	125
MERRIMAC	4	A	70	70	75	75	105	105
MIDDLEBROOK	3	C	70	70	75	75	105	110
MIDDLEBROOK-MONGAUP	3	C	70	70	75	75	105	110
MIDDLEBURY	3	B	65	70	75	75	135	135
MILLIS	4	C	75	75	60	60	120	120
MILLSITE	4	C	70	70	65	65	100	100
MINEOLA	4	A	70	70	75	75	125	130
MINER	1	D	55	60	65	75	75	105
MINO	4	C	60	65	50	60	100	125
MINOA	4	C	60	65	50	60	100	125
MOHAWK	2	B	70	70	75	75	140	140
MOIRA	4	C	70	70	70	70	100	110
MONADNOCK	4	B	75	75	60	60	95	95
MONARDA	4	D	60	65	65	70	95	115
MONGAUP	3	C	75	75	70	70	105	105
MONTAUK	4	C	70	70	65	65	135	135
MOOERS	5	B	70	70	60	60	95	100
MOROCCO	4	C	55	65	60	65	90	115
MORRIS	3	C	60	65	65	75	95	105
MOSHERVILLE	4	C	60	65	60	70	100	125

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
MUCK	6	D	55	65	90	130	60	150
MUCK-PEAT	6	D	55	65	90	130	60	150
MUNDAL	4	C	75	75	60	60	65	65
MUNDALITE	3	C	75	75	70	70	105	105
MUNDALITE-RAWSONVILL	3	C	75	75	70	70	105	105
MUNSON	2	D	60	65	65	75	105	120
MUNUSCONG	4	B	55	65	60	65	60	95
MUSKEGO	6	A/C	55	65	90	130	60	150
MUSKELLUNGE	3	D	60	65	65	75	90	115
NAPOLEON	6	A	55	65	90	130	60	150
NAPOLI	3	C	60	65	65	75	80	90
NASSAU	4	C	70	70	50	50	85	85
NAUMBURG	5	C	55	65	60	65	90	100
NEHASNE	4	B	75	75	70	70	130	130
NELLIS	4	B	75	75	70	70	140	140
NEVERSINK	4	D	55	60	60	70	75	90
NEWFANE	4	B	75	75	50	50	125	125
NEWSTEAD	4	C	55	65	60	70	95	115
NEWTON	5	A/D	50	60	50	60	80	90
NIAGARA	3	C	60	65	65	75	110	125
NICHOLVILLE	4	C	70	70	70	70	105	110
NINIGRET	4	B	70	70	70	70	130	135
NORCHIP	3	D	55	60	70	80	60	80
NORWELL	5	C	60	65	60	70	100	120
NORWICH	3	D	55	60	60	70	70	90
NUNDA	2	C	70	70	75	75	125	130
OAKVILLE	5	A	70	70	50	50	90	100
OCCUM	4	B	75	75	75	75	140	140
ODESSA	2	D	60	65	75	75	105	115
OGDENSBURG	4	C	55	65	60	70	95	115
OLEAN	2	B	70	70	75	80	125	130
ONDAWA	4	B	75	75	75	75	135	135
ONEIDA	4	C	60	65	65	75	105	125
ONOVILLE	3	C	70	70	70	75	105	115
ONTARIO	2	B	75	75	75	75	140	140
ONTEORA	3	C	60	65	65	75	90	115
ONTUSIA	3	C	60	65	60	70	95	105
OQUAGA	3	C	70	70	65	65	100	100
ORAMEL	2	C	70	70	75	75	130	130
ORGANIC	6	A/D	50	65	90	130	60	130

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
ORPARK	2	C	60	65	65	75	100	110
ORWELL	2	D	55	60	65	75	90	100
OSSIPEE	6	D	55	65	90	130	60	150
OTEGO	2	B	70	70	70	75	140	150
OTISVILLE	4	A	70	70	50	50	95	95
OTSEGO	3		70	70	75	75	115	120
OTTAWA	5	A	70	70	50	50	115	115
OVID	2	C	65	70	70	75	105	125
PALATINE	2	B	65	70	65	70	100	100
PALMS	6	A/D	50	65	90	140	60	150
PALMYRA	3	B	75	75	70	70	140	140
PANTON	1	D	55	65	65	75	90	105
PAPAKATING	2	D	55	60	60	75	70	95
PARISHVILLE	4	C	70	70	70	70	100	110
PARSIPPANY	1	D	50	60	60	75	80	105
PATCHIN	3	D	55	60	65	75	65	85
PAWCATUCK	6	D	50	65	90	130	60	130
PAWLING	4	B	70	70	75	75	140	140
PAXTON	4	C	75	75	65	65	125	125
PEACHAM	3	D	55	60	70	80	60	75
PEAT	6	A/D	55	65	90	130	60	150
PEAT-MUCK	6	A/D	55	65	90	130	60	150
PERU	4	C	70	70	60	60	115	120
PETOSKEY	4	A	75	75	50	50	125	125
PHELPS	3	B	70	70	70	70	140	140
PHILO	3	B	70	70	75	75	135	135
PILLSBURY	4	C	60	65	65	75	70	100
PINCKNEY	3	C	70	70	75	75	115	120
PIPESTONE	5	B	60	65	55	65	70	100
PITTSFIELD	4	B	75	75	75	75	140	140
PITTSTOWN	4	C	65	70	70	70	125	135
PLAINBO	5	A	70	70	50	50	80	80
PLAINFIELD	5	A	70	70	30	30	90	90
PLESSIS	3	D	60	65	65	75	80	95
PLYMOUTH	4	A	70	70	50	50	75	75
PODUNK	4	B	70	70	75	75	130	130
POLAND	2	B	75	75	75	75	140	140
POMPTON	4	B	70	70	50	50	115	115
POOTATUCK	4	B	70	70	65	65	130	130
POPE	4	B	75	75	75	75	140	140
POTSDAM	4	C	70	70	70	70	120	120

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
POYGAN	1	D	50	60	60	70	70	90
PUNSIT	3	C	60	65	65	75	95	110
PYRITIES	4	B	75	75	75	75	140	140
QUETICO	4	D	70	70	50	50	65	65
QUETICO-ROCK OUTCRO	4	D	70	70	50	50	65	65
RAQUETTE	4	B	60	70	60	70	105	120
RAWSONVILLE	5	C	75	75	50	50	75	75
RAWSONVILLE-BESEMAN-	5	C	75	75	50	50	75	75
RAYNE	3	B	75	75	75	75	130	130
RAYNHAM	3	C	55	65	65	75	95	125
RAYPOL	3	C	55	60	60	75	75	90
RED HOOK	4	C	60	65	65	75	105	125
REDWATER	3	B	65	70	75	75	135	135
REMSEN	2	D	60	65	65	75	90	115
RETSOF	2	C	60	65	65	75	95	115
REXFORD	4	C	50	65	65	75	90	110
RHINEBECK	2	D	60	65	65	75	105	120
RICKER	4	A	70	70	60	60	75	75
RICKER-LYMAN	4	A	70	70	60	60	75	75
RIDGEBURY	4	C	55	65	60	70	90	110
RIFLE	6	A	50	65	90	130	60	130
RIGA	2	D	70	70	75	75	120	120
RIPPOWAM	4	C	55	65	60	70	80	105
RIVERHEAD	4	B	75	75	40	40	105	105
ROCKAWAY	2	C	75	75	75	75	125	125
ROMULUS	2	D	55	60	60	75	80	100
ROSS	2	B	75	75	75	75	155	155
ROUNDABOUT	3	C	60	60	60	70	95	110
RUMNEY	2	C	55	65	65	75	85	115
RUNEBERG	4	C	50	55	60	70	70	90
RUSE	4	D	55	60	55	65	75	90
RUSHFORD	3	B	70	70	75	75	120	125
SACO	3	D	50	55	65	75	65	95
SALAMANCA	3	B	70	70	75	75	100	105
SALMON	4	B	75	75	70	70	115	115
SAPRISTS	6	A/D	55	65	90	130	60	150
SAUGATUCK	5	C	60	65	60	70	70	95
SCANTIC	2	D	55	60	65	75	90	100
SCARBORO	4	D	55	65	60	70	75	105

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
SCHOHARIE	1	C	70	70	75	75	135	135
SCHROON	5	B	70	70	50	50	130	130
SCHUYLER	3	B	70	70	75	75	115	115
SCIO	3	B	70	70	75	75	135	140
SCITUATE	4	B	70	70	75	75	115	115
SCRIBA	4	C	60	65	65	75	94	105
SEARSPORT	4	D	55	65	60	70	75	105
SHAKER	2	C	60	65	65	75	105	125
SHOREHAM	2	D	50	60	70	70	65	95
SISK	4	C	55	60	65	75	60	85
SKERRY	5	C	60	65	65	75	95	100
SLOAN	3	B	50	55	65	75	70	90
SODUS	4	C	75	75	75	75	120	120
SOMERSET	5	C	60	65	65	75	90	105
ST JOHNS	4	D	55	65	60	70	75	105
STAATSBURG	3	C	75	75	70	70	90	90
STAFFORD	4	C	60	65	50	60	95	110
STEAMBURG	3	B	70	70	75	75	100	105
STETSON	5	B	75	75	70	70	110	110
STISSING	4	C	60	65	60	70	90	115
STOCKBRIDGE	3	C	75	75	75	75	140	140
STOCKHOLM	5	C	60	60	60	70	90	100
STOWE	4	B	75	75	65	65	110	110
SUDBURY	4	B	60	65	65	65	105	110
SUFFIELD	2	B	70	70	80	80	135	135
SUMMERVILLE	4	D	70	70	50	50	80	80
SUN	4	D	55	60	60	70	75	100
SUNAPEE	4	B	70	70	65	65	95	110
SUNCOOK	5	A	70	70	40	40	90	90
SUNY	4	D	50	55	60	70	70	110
SURPLUS	4	C	55	60	65	75	60	90
SURPLUS-SISK	4	C	55	60	65	75	60	90
SUTTON	4	B	70	70	70	70	130	130
SWANTON	4	C	60	65	50	60	95	125
SWARTSWOOD	4	C	75	75	70	70	120	120
SWORMVILLE	1	C	60	65	65	75	90	115
TACONIC	3	C	75	75	75	75	75	90
TACONIC-MACOMBER	3	C	75	75	75	75	75	90
TAWAS	6	A	50	65	90	130	60	130
TEEL	2	B	65	70	75	75	140	140

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
TOLEDO	2	D	50	60	70	80	70	100
TONAWANDA	2	D	60	65	65	75	105	120
TOR	4	D	60	60	65	75	60	85
TORULL	3	D	60	65	65	75	90	110
TOWERVILLE	3	B	70	70	75	75	115	115
TRESTLE	3	B	75	75	75	75	145	145
TROUT RIVER	5	A	70	70	50	50	95	95
TROY	3	C	70	70	70	70	120	125
TRUMBULL	1	D	55	60	65	75	75	105
TUGHILL	4	D	50	55	55	65	60	85
TULLER	3	D	60	65	65	75	80	95
TUNBRIDGE	4	C	75	75	70	70	90	90
TUNBRIDGE-ADIRONDACK	4	C	75	75	70	70	90	90
TUNKHANNOCK	3	A	75	75	75	75	120	120
TURIN	2	C	60	65	70	80	105	125
TUSCARORA	4	C	70	70	50	50	125	125
UNADILLA	3	B	75	75	75	75	140	140
VALOIS	3	B	75	75	75	75	130	130
VARICK	2	D	55	60	75	75	80	100
VARYSBURG	2	B	70	70	75	75	130	130
VENANGO	3	C	60	65	60	70	100	120
VERGENNES	1	C	70	70	75	75	115	120
VLY	3	C	75	75	75	75	90	90
VOLUSIA	3	C	60	65	60	70	95	105
WADDINGTON	4	A	75	75	60	60	125	125
WAINOLA	5	B	60	65	60	70	85	125
WAKELAND	3	C	60	65	75	75	90	115
WAKEVILLE	3	B	60	65	65	75	95	110
WALLACE	5	B	70	70	40	40	90	100
WALLINGTON	3	C	60	65	65	75	105	115
WALLKILL	3	C	50	60	65	80	65	125
WALPOLE	4	C	65	68	55	60	80	105
WALTON	3	C	75	75	75	75	125	125
WAMPSVILLE	3	B	75	75	75	75	140	140
WAPPINGER	3	B	75	75	75	75	140	140
WAREHAM	5	C	60	65	65	75	90	105
WARNERS	3	C	50	60	70	75	75	90
WASSAIC	4	B	70	70	65	65	120	120
WATCHAUG	4	B	70	70	70	70	120	120
WAUMBECK	4	B	70	70	65	65	95	105

Appendix Table 1 (Continued).

Soil Name	SMG	HG	N_Eff UD (%)	N_Eff DR (%)	N_Sup UD (lbs N/a)	N_Sup DR (lbs N/a)	YP UD (bu/a)	YP DR (bu/a)
WAYLAND	2	C/D	55	60	60	75	70	95
WEAVER	3	C	70	70	75	75	120	130
WEGATCHIE	3	D	55	65	70	80	90	110
WELLSBORO	3	C	70	70	75	75	115	125
WENONAH	4	C	75	75	65	65	130	130
WESTBURY	4	B	60	65	60	70	80	100
WESTLAND	2	C	50	55	60	75	90	110
WETHERSFIELD	4	C	75	75	75	75	120	120
WHARTON	2	C	70	70	75	75	120	120
WHATELY	4	D	50	60	60	70	60	105
WHIPPANY	2	C	60	65	65	75	105	115
WHITELAW	4	B	75	75	65	65	135	135
WHITMAN	4	D	50	60	60	75	76	90
WILBRAHAM	4	C	60	65	60	65	95	110
WILLDIN	3	C	70	70	75	75	115	120
WILLETTE	6	A	50	65	90	130	60	130
WILLIAMSON	4	C	70	70	70	70	115	120
WILLOWEMOC	3	C	70	70	75	75	115	125
WILMINGTON	4	D	55	60	60	70	75	110
WILPOINT	1	D	70	70	80	80	105	110
WINDSOR	5	A	70	70	40	40	90	90
WINOOSKI	4	B	70	70	75	75	135	135
WOLCOTTSBURG	1	D	55	60	65	75	75	105
WONSQUEAK	6	D	55	65	90	130	60	150
WOODBRIDGE	4	C	70	70	75	75	120	125
WOODLAWN	4	B	75	75	75	75	80	80
WOODSTOCK	4	D	70	70	60	60	75	75
WOODSTOCK-ROCK OUTCR	4	D	70	70	60	60	75	75
WOOSTER	3	C	75	75	75	75	125	125
WOOSTERN	3	C	75	75	75	75	130	130
WOOSTERN-BATH-VALOIS	3	C	75	75	75	75	130	130
WORDEN	4	C	60	60	65	75	60	75
WORTH	4	C	75	75	70	70	105	105
WURTSBORO	4	C	70	70	70	70	115	120
WYALUSING	3	D	55	60	65	75	75	95
YALESVILLE	4	C	75	75	60	60	105	105
YORKSHIRE	3	C	70	70	75	75	100	110

APPENDIX TABLE 2: SOIL MANAGEMENT GROUPS FOR NEW YORK STATE.

Soil Management Group	General Description
I (1)	Fine-textured soils developed from clayey lake sediments and medium- to fine-textured soils developed from lake sediments.
II (2)	Medium- to fine-textured soils developed from calcareous glacial till and medium-textured to moderately fine-textured soils developed from slightly calcareous glacial till mixed with shale and medium-textured soils developed in recent alluvium.
III (3)	Moderately coarse textured soil developed from glacial outwash and recent alluvium and medium-textured acid soil developed on glacial till.
IV (4)	Coarse- to medium-textured soils formed from glacial till or glacial outwash.
V (5)	Coarse- to very coarse-textured soils formed from gravelly or sandy glacial outwash or glacial lake beach ridges or deltas.
VI (6)	Organic or muck lands.

APPENDIX TABLE 3: NEW YORK TOWNSHIP-BASED NITRATE LEACHING INDEX FOR SOILS WITH HYDROLOGICAL GROUPS A, B, C AND D.

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Albany	Berne	39.4	18.1	15.0	9.3	5.6	3.7
Albany	Bethlehem	36.4	16.0	12.6	7.4	4.1	2.6
Albany	Coeymans	37.7	16.4	13.5	8.1	4.7	3.0
Albany	Colonie	36.8	15.9	12.9	7.6	4.3	2.7
Albany	Guilderland	37.5	16.5	13.4	8.0	4.6	3.0
Albany	Knox	40.6	18.5	15.9	10.0	6.2	4.2
Albany	New Scotland	37.8	16.5	13.6	8.2	4.8	3.1
Albany	Rensselaerville	38.2	17.0	14.0	8.5	5.0	3.2
Albany	Westerlo	39.0	17.4	14.6	9.0	5.3	3.5
Allegany	Alfred	37.0	16.3	13.1	7.8	4.4	2.8
Allegany	Allen	36.9	15.3	12.7	7.5	4.3	2.7
Allegany	Alma	38.8	16.5	14.2	8.7	5.2	3.4
Allegany	Almond	35.3	14.5	11.6	6.6	3.6	2.2
Allegany	Amity	35.5	14.3	11.6	6.7	3.7	2.2
Allegany	Andover	37.4	16.4	13.3	8.0	4.6	2.9
Allegany	Angelica	36.0	14.8	12.1	7.0	3.9	2.4
Allegany	Belfast	35.7	14.5	11.8	6.8	3.8	2.3
Allegany	Birdsall	36.9	15.6	12.8	7.6	4.3	2.7
Allegany	Bolivar	38.9	16.4	14.3	8.8	5.2	3.4
Allegany	Burns	34.2	13.8	10.7	6.0	3.2	1.8
Allegany	Caneadea	35.0	14.8	11.5	6.6	3.5	2.1
Allegany	Centerville	38.4	15.9	13.8	8.4	4.9	3.2
Allegany	Clarksville	39.0	16.5	14.3	8.8	5.3	3.5
Allegany	Cuba	38.4	16.2	13.9	8.5	5.0	3.2
Allegany	Friendship	36.9	15.1	12.7	7.5	4.3	2.7
Allegany	Genesee	39.0	16.5	14.3	8.8	5.2	3.5
Allegany	Granger	36.7	15.5	12.6	7.5	4.2	2.6
Allegany	Grove	36.4	15.3	12.4	7.3	4.1	2.5
Allegany	Hume	35.5	14.8	11.7	6.8	3.7	2.2
Allegany	Independence	37.0	15.6	12.9	7.7	4.4	2.7
Allegany	New Hudson	37.8	15.4	13.3	8.0	4.6	3.0
Allegany	Rushford	36.4	15.0	12.4	7.3	4.1	2.5
Allegany	Scio	36.9	15.1	12.7	7.5	4.3	2.7
Allegany	Ward	37.3	16.3	13.2	7.9	4.5	2.9
Allegany	Wellsville	36.2	14.8	12.2	7.1	4.0	2.4

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Allegany	West Almond	37.2	16.2	13.1	7.8	4.5	2.8
Allegany	Willing	36.7	15.2	12.6	7.4	4.2	2.6
Allegany	Wirt	38.9	16.5	14.2	8.7	5.2	3.4
Broome	Barker	37.0	16.1	13.0	7.7	4.4	2.7
Broome	Binghamton	38.8	17.5	14.5	8.9	5.3	3.4
Broome	Chenango	37.0	16.0	13.0	7.7	4.4	2.8
Broome	Colesville	40.0	18.0	15.4	9.6	5.9	3.9
Broome	Conklin	38.4	16.7	14.0	8.5	5.0	3.3
Broome	Dickinson	36.7	16.0	12.8	7.5	4.3	2.6
Broome	Fenton	37.8	16.6	13.6	8.2	4.8	3.1
Broome	Kirkwood	38.3	16.6	13.9	8.4	5.0	3.2
Broome	Lisle	37.2	16.6	13.3	7.9	4.5	2.9
Broome	Maine	36.3	16.0	12.5	7.3	4.1	2.5
Broome	Nanticoke	37.0	16.1	13.0	7.7	4.4	2.8
Broome	Sanford	44.2	20.5	18.8	12.4	8.1	5.8
Broome	Triangle	37.5	16.6	13.4	8.0	4.6	2.9
Broome	Union	35.4	15.9	12.0	6.9	3.8	2.3
Broome	Vestal	37.0	16.2	13.1	7.8	4.4	2.8
Broome	Windsor	40.9	18.6	16.1	10.2	6.3	4.3
Cattaraugus	Allegany	42.8	18.5	17.3	11.2	7.1	5.0
Cattaraugus	Ashford	43.6	19.8	18.2	11.9	7.7	5.5
Cattaraugus	Carrollton	43.0	18.6	17.5	11.4	7.3	5.1
Cattaraugus	Cold Spring	44.2	19.8	18.6	12.3	8.0	5.7
Cattaraugus	Conewango	43.5	19.7	18.1	11.9	7.6	5.4
Cattaraugus	Dayton	42.9	19.8	17.7	11.5	7.4	5.2
Cattaraugus	East Otto	43.9	20.1	18.5	12.2	7.9	5.6
Cattaraugus	Ellicottville	46.3	21.2	20.4	13.8	9.2	6.7
Cattaraugus	Farmersville	40.6	17.5	15.6	9.8	6.0	4.1
Cattaraugus	Franklinville	42.6	18.7	17.2	11.1	7.1	5.0
Cattaraugus	Freedom	42.0	18.3	16.7	10.7	6.7	4.7
Cattaraugus	Great Valley	45.1	20.2	19.3	12.9	8.5	6.1
Cattaraugus	Hinsdale	40.5	17.4	15.5	9.8	6.0	4.0
Cattaraugus	Humphrey	43.6	19.1	18.0	11.8	7.6	5.4
Cattaraugus	Ischua	41.0	17.7	15.9	10.1	6.3	4.3
Cattaraugus	Leon	43.6	19.8	18.2	11.9	7.7	5.4
Cattaraugus	Little Valley	48.5	22.9	22.4	15.4	10.6	7.9

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Cattaraugus	Lyndon	40.1	17.5	15.3	9.6	5.9	3.9
Cattaraugus	Machias	42.9	18.8	17.5	11.3	7.2	5.1
Cattaraugus	Mansfield	47.1	22.0	21.2	14.4	9.8	7.2
Cattaraugus	Napoli	47.3	22.0	21.3	14.5	9.8	7.3
Cattaraugus	New Albion	45.7	20.8	19.9	13.4	8.9	6.5
Cattaraugus	Olean	40.8	17.4	15.7	9.9	6.1	4.2
Cattaraugus	Otto	43.0	19.4	17.7	11.5	7.3	5.2
Cattaraugus	Perrysburg	40.1	18.3	15.5	9.7	5.9	4.0
Cattaraugus	Persia	42.3	19.2	17.2	11.1	7.0	4.9
Cattaraugus	Portville	39.6	16.9	14.8	9.2	5.6	3.7
Cattaraugus	Randolph	44.4	20.4	18.9	12.5	8.2	5.9
Cattaraugus	Red House	45.0	20.2	19.2	12.8	8.4	6.1
Cattaraugus	Salamanca	44.7	20.2	19.0	12.6	8.3	5.9
Cattaraugus	South Valley	44.3	20.1	18.8	12.4	8.1	5.8
Cattaraugus	Yorkshire	42.5	18.9	17.2	11.1	7.1	5.0
Cayuga	Auburn	36.4	16.0	12.6	7.4	4.2	2.6
Cayuga	Aurelius	34.9	15.1	11.4	6.5	3.5	2.1
Cayuga	Brutus	37.0	17.0	13.2	7.9	4.5	2.8
Cayuga	Cato	37.6	17.3	13.7	8.2	4.7	3.0
Cayuga	Conquest	36.8	16.9	13.1	7.8	4.4	2.8
Cayuga	Fleming	36.8	15.9	12.9	7.6	4.3	2.7
Cayuga	Genoa	35.9	14.9	12.0	7.0	3.9	2.3
Cayuga	Ira	39.0	18.0	14.7	9.1	5.4	3.5
Cayuga	Ledyard	34.0	14.3	10.8	6.0	3.1	1.8
Cayuga	Locke	37.9	16.2	13.6	8.2	4.8	3.0
Cayuga	Mentz	35.4	15.9	12.0	6.9	3.8	2.3
Cayuga	Montezuma	35.0	15.3	11.6	6.6	3.6	2.1
Cayuga	Moravia	37.8	15.9	13.5	8.1	4.7	3.0
Cayuga	Niles	38.6	17.3	14.3	8.7	5.2	3.4
Cayuga	Owasco	37.7	17.0	13.6	8.2	4.7	3.0
Cayuga	Scipio	37.0	15.5	12.8	7.6	4.3	2.7
Cayuga	Sempronius	40.1	18.0	15.4	9.6	5.9	3.9
Cayuga	Sennett	37.3	17.0	13.4	8.0	4.6	2.9
Cayuga	Springport	34.4	14.8	11.1	6.2	3.3	1.9
Cayuga	Sterling	39.5	19.5	15.4	9.6	5.8	3.8
Cayuga	Summerhill	40.4	17.9	15.6	9.8	6.0	4.1
Cayuga	Throop	35.0	15.5	11.7	6.7	3.6	2.1

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Cayuga	Venice	37.3	15.3	13.0	7.7	4.4	2.8
Cayuga	Victory	37.9	17.2	13.9	8.4	4.9	3.1
Chautauqua	Arkwright	46.2	21.9	20.5	13.8	9.2	6.8
Chautauqua	Busti	45.2	20.8	19.5	13.0	8.6	6.2
Chautauqua	Carroll	44.6	20.3	19.0	12.6	8.2	5.9
Chautauqua	Charlotte	47.5	22.9	21.7	14.8	10.1	7.5
Chautauqua	Chautauqua	46.8	21.9	21.0	14.2	9.6	7.1
Chautauqua	Cherry Creek	45.9	21.7	20.3	13.6	9.1	6.6
Chautauqua	Clymer	47.2	22.3	21.4	14.5	9.8	7.3
Chautauqua	Dunkirk	39.0	18.3	14.8	9.1	5.4	3.6
Chautauqua	Ellery	46.4	22.1	20.8	14.0	9.4	6.9
Chautauqua	Ellicott	45.5	21.4	19.9	13.3	8.8	6.4
Chautauqua	Ellington	45.9	21.6	20.3	13.6	9.1	6.6
Chautauqua	French Creek	47.1	21.9	21.1	14.4	9.7	7.2
Chautauqua	Gerry	46.8	22.3	21.1	14.3	9.6	7.1
Chautauqua	Hanover	41.3	19.0	16.5	10.5	6.5	4.5
Chautauqua	Harmony	47.0	21.7	21.0	14.3	9.6	7.1
Chautauqua	Kiantone	44.3	20.0	18.7	12.3	8.0	5.8
Chautauqua	Mina	47.0	21.9	21.1	14.3	9.7	7.1
Chautauqua	North Harmony	46.4	21.9	20.7	14.0	9.4	6.9
Chautauqua	Poland	44.2	20.3	18.8	12.4	8.1	5.8
Chautauqua	Pomfret	43.0	19.9	17.9	11.6	7.4	5.2
Chautauqua	Portland	43.2	19.6	17.9	11.7	7.5	5.3
Chautauqua	Ripley	45.6	20.7	19.8	13.2	8.8	6.4
Chautauqua	Sheridan	40.9	18.7	16.2	10.2	6.3	4.3
Chautauqua	Sherman	47.1	22.1	21.2	14.4	9.8	7.2
Chautauqua	Stockton	46.4	22.0	20.7	14.0	9.4	6.9
Chautauqua	Villenova	45.3	21.5	19.8	13.2	8.7	6.3
Chautauqua	Westfield	45.6	20.7	19.8	13.2	8.8	6.4
Chemung	Ashland	34.8	15.0	11.4	6.5	3.5	2.0
Chemung	Baldwin	35.5	15.4	11.9	6.9	3.8	2.3
Chemung	Big Flats	33.1	13.7	10.1	5.5	2.8	1.5
Chemung	Catlin	34.4	14.0	10.9	6.1	3.2	1.9
Chemung	Chemung	35.4	15.6	11.9	6.9	3.8	2.3
Chemung	Elmira	33.5	14.2	10.4	5.8	2.9	1.7
Chemung	Erin	36.4	16.1	12.6	7.4	4.1	2.6
Chemung	Horseheads	33.8	14.1	10.6	5.9	3.0	1.7

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Chemung	Southport	34.0	14.4	10.8	6.0	3.1	1.8
Chemung	Van Etten	37.7	16.8	13.6	8.2	4.7	3.0
Chemung	Veteran	34.4	14.6	11.0	6.2	3.3	1.9
Chenango	Afton	40.7	18.1	15.9	10.0	6.2	4.2
Chenango	Bainbridge	40.8	17.5	15.8	10.0	6.2	4.2
Chenango	Columbus	39.0	17.5	14.6	9.0	5.4	3.5
Chenango	Coventry	40.3	17.5	15.4	9.7	5.9	4.0
Chenango	German	42.3	19.0	17.2	11.1	7.0	4.9
Chenango	Greene	38.8	17.0	14.3	8.8	5.2	3.4
Chenango	Guilford	39.9	17.3	15.1	9.4	5.7	3.8
Chenango	Lincklaen	41.0	18.4	16.1	10.2	6.3	4.3
Chenango	Mcdonough	41.4	18.4	16.4	10.4	6.5	4.5
Chenango	New Berlin	39.2	17.5	14.7	9.1	5.4	3.6
Chenango	North Norwich	38.1	16.9	13.9	8.4	4.9	3.2
Chenango	Norwich	39.6	17.5	15.0	9.3	5.6	3.7
Chenango	Otselic	41.1	18.1	16.1	10.2	6.3	4.3
Chenango	Oxford	39.4	17.5	14.9	9.2	5.5	3.7
Chenango	Pharsalia	42.8	19.6	17.7	11.5	7.3	5.1
Chenango	Pitcher	41.9	18.6	16.8	10.8	6.8	4.7
Chenango	Plymouth	40.1	17.5	15.3	9.6	5.8	3.9
Chenango	Preston	40.2	17.6	15.4	9.7	5.9	4.0
Chenango	Sherburne	37.7	16.6	13.6	8.2	4.7	3.0
Chenango	Smithville	39.5	17.5	14.9	9.2	5.6	3.7
Chenango	Smyrna	39.3	17.3	14.8	9.1	5.5	3.6
Clinton	Altona	32.9	13.6	9.9	5.4	2.7	1.5
Clinton	Ausable	31.8	13.2	9.2	4.8	2.3	1.2
Clinton	Beekmantown	32.7	13.5	9.8	5.3	2.6	1.4
Clinton	Black Brook	35.8	15.2	12.0	7.0	3.8	2.3
Clinton	Champlain	32.6	13.0	9.6	5.2	2.5	1.4
Clinton	Chazy	32.4	13.0	9.5	5.1	2.5	1.3
Clinton	Clinton	34.9	14.7	11.4	6.5	3.5	2.1
Clinton	Dannemora	37.8	16.6	13.6	8.2	4.8	3.1
Clinton	Ellenburg	36.9	15.9	12.9	7.7	4.4	2.7
Clinton	Mooers	32.1	13.0	9.3	4.9	2.4	1.2
Clinton	Peru	32.2	13.5	9.5	5.1	2.5	1.3
Clinton	Plattsburgh	32.4	13.6	9.6	5.2	2.5	1.3
Clinton	Saranac	36.4	15.5	12.5	7.3	4.1	2.5

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Clinton	Schuyler Falls	32.3	13.3	9.6	5.1	2.5	1.3
Columbia	Ancram	43.8	19.7	18.3	12.0	7.8	5.6
Columbia	Austerlitz	46.0	21.2	20.2	13.6	9.0	6.6
Columbia	Canaan	45.3	20.5	19.5	13.0	8.6	6.2
Columbia	Chatham	41.3	18.5	16.4	10.4	6.5	4.5
Columbia	Claverack	41.3	18.5	16.4	10.4	6.5	4.5
Columbia	Clermont	41.4	19.1	16.6	10.6	6.6	4.5
Columbia	Copake	44.4	20.1	18.8	12.5	8.1	5.8
Columbia	Gallatin	42.3	19.0	17.2	11.1	7.0	4.9
Columbia	Germantown	41.0	18.8	16.2	10.3	6.4	4.4
Columbia	Ghent	41.0	18.4	16.1	10.2	6.3	4.3
Columbia	Greenport	39.5	17.5	14.9	9.2	5.6	3.7
Columbia	Hillsdale	45.2	20.8	19.6	13.1	8.6	6.3
Columbia	Kinderhook	39.2	17.5	14.7	9.1	5.4	3.6
Columbia	Livingston	41.0	18.5	16.2	10.2	6.3	4.3
Columbia	New Lebanon	42.3	18.9	17.1	11.0	7.0	4.9
Columbia	Stockport	39.0	17.5	14.6	9.0	5.4	3.5
Columbia	Stuyvesant	38.4	17.0	14.1	8.6	5.1	3.3
Columbia	Taghkanic	42.4	19.0	17.2	11.1	7.0	4.9
Cortland	Cincinnatus	42.1	18.8	16.9	10.9	6.9	4.8
Cortland	Cortlandville	39.5	18.5	15.2	9.4	5.7	3.8
Cortland	Cuyler	41.1	18.3	16.1	10.2	6.3	4.3
Cortland	Freetown	41.2	18.0	16.2	10.3	6.4	4.4
Cortland	Harford	39.0	17.4	14.6	9.0	5.3	3.5
Cortland	Homer	40.7	18.8	16.0	10.1	6.2	4.2
Cortland	Lapeer	39.0	17.5	14.6	9.0	5.4	3.5
Cortland	Marathon	39.1	17.3	14.7	9.0	5.4	3.6
Cortland	Preble	40.9	18.6	16.1	10.2	6.3	4.3
Cortland	Scott	41.0	18.8	16.3	10.3	6.4	4.4
Cortland	Solon	41.3	18.8	16.5	10.5	6.5	4.5
Cortland	Taylor	42.1	18.9	17.0	10.9	6.9	4.8
Cortland	Truxton	41.0	18.0	16.0	10.1	6.3	4.3
Cortland	Virgl	39.7	17.8	15.1	9.4	5.7	3.8
Cortland	Willet	40.4	17.7	15.6	9.8	6.0	4.1
Delaware	Andes	41.3	17.9	16.1	10.3	6.4	4.4
Delaware	Bovina	40.1	17.0	15.2	9.5	5.8	3.9
Delaware	Colchester	44.3	19.9	18.7	12.4	8.1	5.8

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Delaware	Davenport	39.5	16.9	14.8	9.1	5.5	3.7
Delaware	Delhi	41.3	18.1	16.2	10.3	6.4	4.4
Delaware	Deposit	43.4	19.8	18.1	11.8	7.6	5.4
Delaware	Franklin	42.2	18.8	17.0	10.9	6.9	4.8
Delaware	Hamden	43.1	19.2	17.7	11.5	7.4	5.2
Delaware	Hancock	43.7	20.1	18.4	12.1	7.8	5.5
Delaware	Harpersfield	39.0	16.9	14.5	8.9	5.3	3.5
Delaware	Kortright	39.4	17.0	14.7	9.1	5.5	3.6
Delaware	Masonville	43.3	19.4	17.9	11.7	7.5	5.3
Delaware	Meredith	41.3	18.3	16.3	10.4	6.4	4.4
Delaware	Middletown	39.1	16.9	14.5	8.9	5.3	3.5
Delaware	Roxbury	41.1	18.1	16.1	10.2	6.3	4.3
Delaware	Sidney	41.0	18.1	16.0	10.1	6.3	4.3
Delaware	Stamford	40.7	17.8	15.8	9.9	6.1	4.2
Delaware	Tompkins	43.7	20.1	18.3	12.0	7.8	5.5
Delaware	Walton	45.2	20.6	19.5	13.0	8.6	6.2
Dutchess	Amenia	42.0	18.7	16.9	10.8	6.8	4.7
Dutchess	Beekman	45.2	21.2	19.7	13.1	8.7	6.3
Dutchess	Clinton	43.1	19.4	17.8	11.6	7.4	5.2
Dutchess	Dover	44.7	21.0	19.3	12.8	8.4	6.0
Dutchess	East Fishkill	44.5	20.5	19.0	12.6	8.2	5.9
Dutchess	Fishkill	44.5	20.4	19.0	12.5	8.2	5.9
Dutchess	Hyde Park	43.7	20.1	18.4	12.0	7.8	5.5
Dutchess	La Grange	42.9	19.1	17.5	11.4	7.3	5.1
Dutchess	Milan	42.4	19.1	17.2	11.1	7.0	4.9
Dutchess	Northeast	43.9	19.8	18.4	12.1	7.8	5.6
Dutchess	Pawling	46.1	22.0	20.5	13.8	9.2	6.7
Dutchess	Pine Plains	41.8	18.9	16.8	10.8	6.8	4.7
Dutchess	Pleasant Val'y	43.0	19.0	17.6	11.4	7.3	5.1
Dutchess	Poughkeepsie	41.7	19.0	16.7	10.7	6.7	4.6
Dutchess	Red Hook	42.6	19.6	17.5	11.4	7.2	5.1
Dutchess	Rhinebeck	44.1	20.6	18.8	12.4	8.0	5.8
Dutchess	Stanford	41.0	18.2	16.1	10.2	6.3	4.3
Dutchess	Union Vale	44.2	19.7	18.6	12.2	8.0	5.7
Dutchess	Wappinger	41.9	19.0	16.9	10.8	6.8	4.7
Dutchess	Washington	41.9	18.7	16.8	10.8	6.8	4.7
Erie	Alden	37.9	17.5	14.0	8.4	4.9	3.2

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Erie	Amherst	37.9	18.0	14.1	8.5	4.9	3.2
Erie	Aurora	42.8	20.5	17.9	11.6	7.4	5.2
Erie	Boston	45.1	21.9	19.8	13.2	8.7	6.3
Erie	Brant	38.2	17.1	14.0	8.5	5.0	3.2
Erie	Cheektowaga	39.0	18.5	14.9	9.2	5.5	3.6
Erie	Clarence	37.4	17.3	13.6	8.1	4.7	3.0
Erie	Colden	47.1	22.8	21.5	14.6	9.9	7.3
Erie	Collins	39.9	18.4	15.5	9.6	5.9	3.9
Erie	Concord	44.8	21.2	19.4	12.9	8.4	6.1
Erie	Eden	40.7	18.7	16.0	10.1	6.2	4.2
Erie	Elma	39.6	18.6	15.3	9.5	5.7	3.8
Erie	Evans	37.9	17.0	13.8	8.3	4.8	3.1
Erie	Hamburg	38.5	17.7	14.3	8.7	5.1	3.4
Erie	Holland	43.7	20.4	18.5	12.1	7.8	5.6
Erie	Lackawana	37.1	17.6	13.5	8.0	4.6	2.9
Erie	Lancaster	39.0	18.5	14.9	9.2	5.5	3.6
Erie	Marilla	39.8	18.4	15.4	9.6	5.8	3.9
Erie	Newstead	36.4	15.9	12.6	7.4	4.1	2.6
Erie	North Collins	42.2	20.0	17.4	11.2	7.1	4.9
Erie	Orchard Park	41.3	19.5	16.7	10.6	6.6	4.5
Erie	Sardinia	43.9	20.1	18.5	12.2	7.9	5.6
Erie	Tonawanda	37.6	18.3	13.9	8.4	4.8	3.1
Erie	Wales	42.5	20.1	17.6	11.4	7.2	5.1
Erie	West Seneca	39.0	18.5	14.9	9.2	5.5	3.6
Essex	Chesterfield	34.7	14.6	11.2	6.4	3.4	2.0
Essex	Crown Point	37.6	16.5	13.5	8.1	4.7	3.0
Essex	Elizabethtown	37.6	16.6	13.5	8.1	4.7	3.0
Essex	Essex	34.4	14.3	11.0	6.2	3.3	1.9
Essex	Jay	35.8	15.5	12.1	7.0	3.9	2.3
Essex	Keene	42.2	18.1	16.8	10.8	6.8	4.7
Essex	Lewis	36.6	15.9	12.7	7.5	4.2	2.6
Essex	Minerva	42.5	19.2	17.3	11.2	7.1	5.0
Essex	Moriah	37.5	16.4	13.4	8.0	4.6	2.9
Essex	Newcomb	43.4	19.2	17.9	11.7	7.5	5.3
Essex	North Elba	41.4	18.1	16.3	10.3	6.4	4.4
Essex	North Hudson	41.3	18.3	16.3	10.4	6.5	4.4
Essex	Schroon	40.6	18.2	15.8	10.0	6.1	4.2

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Essex	St. Armand	39.5	17.4	14.9	9.2	5.5	3.7
Essex	Ticonderoga	38.2	16.8	13.9	8.5	5.0	3.2
Essex	Westport	35.7	15.2	12.0	6.9	3.8	2.3
Essex	Willsboro	33.2	13.8	10.1	5.5	2.8	1.5
Essex	Wilmington	38.8	16.7	14.2	8.7	5.2	3.4
Franklin	Altamont	41.7	18.1	16.5	10.5	6.6	4.6
Franklin	Bangor	36.4	15.6	12.5	7.3	4.1	2.5
Franklin	Bellmont	43.0	18.7	17.5	11.4	7.3	5.1
Franklin	Bombay	35.0	14.8	11.5	6.5	3.5	2.1
Franklin	Brandon	40.9	17.7	15.9	10.0	6.2	4.2
Franklin	Brighton	40.0	17.5	15.2	9.5	5.8	3.9
Franklin	Burke	36.6	15.6	12.6	7.4	4.2	2.6
Franklin	Chateaugay	37.3	16.0	13.2	7.9	4.5	2.9
Franklin	Constable	35.1	14.9	11.5	6.6	3.6	2.1
Franklin	Dickinson	37.9	16.1	13.5	8.2	4.7	3.0
Franklin	Duane	41.6	17.9	16.4	10.4	6.5	4.5
Franklin	Fort Covington	35.0	14.5	11.4	6.5	3.5	2.1
Franklin	Franklin	39.5	17.2	14.8	9.2	5.5	3.7
Franklin	Harrietstown	40.8	17.9	15.9	10.0	6.2	4.2
Franklin	Malone	40.3	17.5	15.5	9.7	5.9	4.0
Franklin	Moira	35.1	15.0	11.6	6.6	3.6	2.1
Franklin	Santa Clara	41.0	17.7	15.9	10.1	6.2	4.3
Franklin	Waverly	40.9	17.8	15.9	10.1	6.2	4.3
Franklin	Westville	35.0	14.7	11.4	6.5	3.5	2.1
Fulton	Bleeker	50.3	24.7	24.2	17.0	11.8	9.0
Fulton	Broadalbin	43.0	20.4	18.0	11.7	7.5	5.3
Fulton	Caroga	50.6	24.5	24.4	17.1	11.9	9.1
Fulton	Ephratah	45.0	20.7	19.4	12.9	8.5	6.1
Fulton	Johnstown	44.2	20.6	18.8	12.4	8.1	5.8
Fulton	Mayfield	45.6	21.7	20.1	13.5	8.9	6.5
Fulton	Northampton	43.6	20.6	18.5	12.1	7.8	5.5
Fulton	Oppenheim	44.6	20.3	19.0	12.6	8.2	5.9
Fulton	Perth	42.3	19.6	17.3	11.2	7.1	4.9
Fulton	Stratford	49.8	23.3	23.4	16.3	11.3	8.6
Genesee	Alabama	35.0	14.6	11.4	6.5	3.5	2.1
Genesee	Alexander	36.0	15.0	12.1	7.0	3.9	2.4
Genesee	Batavia	35.0	14.5	11.4	6.5	3.5	2.1

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Genesee	Bergen	32.1	13.9	9.6	5.1	2.5	1.3
Genesee	Bethany	35.9	15.0	12.0	7.0	3.9	2.4
Genesee	Byron	33.0	14.4	10.2	5.5	2.8	1.5
Genesee	Darien	36.9	16.1	13.0	7.7	4.4	2.7
Genesee	Elba	33.5	14.5	10.5	5.8	3.0	1.7
Genesee	Le Roy	33.7	14.4	10.6	5.8	3.0	1.7
Genesee	Oakfield	34.7	14.5	11.2	6.3	3.4	2.0
Genesee	Pavilion	35.6	15.2	11.9	6.9	3.8	2.3
Genesee	Pembroke	35.4	14.7	11.6	6.7	3.6	2.2
Genesee	Stafford	34.8	14.5	11.3	6.4	3.4	2.0
Greene	Ashland	38.9	17.6	14.6	9.0	5.3	3.5
Greene	Athens	39.2	17.8	14.8	9.1	5.5	3.6
Greene	Cairo	38.6	17.6	14.4	8.8	5.2	3.4
Greene	Catskill	40.8	18.8	16.1	10.2	6.3	4.3
Greene	Coxsackie	38.8	16.9	14.3	8.8	5.2	3.4
Greene	Durham	37.9	17.1	13.8	8.3	4.9	3.1
Greene	Greenville	38.7	17.0	14.3	8.7	5.2	3.4
Greene	Halcott	45.2	21.0	19.7	13.1	8.7	6.3
Greene	Hunter	45.9	21.4	20.2	13.6	9.0	6.6
Greene	Jewett	41.8	19.2	16.9	10.8	6.8	4.7
Greene	Lexington	46.0	21.9	20.4	13.7	9.2	6.7
Greene	New Baltimore	37.7	16.3	13.5	8.1	4.7	3.0
Greene	Prattsville	37.0	16.3	13.0	7.7	4.4	2.8
Greene	Windham	41.6	19.2	16.8	10.7	6.7	4.6
Hamilton	Arietta	55.3	27.4	28.5	20.7	15.0	11.9
Hamilton	Benson	51.6	25.7	25.5	18.0	12.7	9.8
Hamilton	Hope	47.2	22.9	21.5	14.7	9.9	7.3
Hamilton	Indian Lake	43.7	20.3	18.4	12.1	7.8	5.6
Hamilton	Inlet	50.1	24.1	23.9	16.7	11.6	8.9
Hamilton	Lake Pleasant	52.4	25.8	26.0	18.5	13.2	10.2
Hamilton	Long Lake	46.1	21.1	20.2	13.6	9.1	6.6
Hamilton	Morehouse	54.7	27.1	28.0	20.3	14.7	11.5
Hamilton	Wells	48.7	23.7	22.8	15.7	10.8	8.1
Herkimer	Columbia	42.9	18.7	17.5	11.3	7.2	5.1
Herkimer	Danube	41.3	18.7	16.4	10.5	6.5	4.5
Herkimer	Fairfield	44.0	19.7	18.4	12.1	7.9	5.6
Herkimer	Frankfort	43.0	18.8	17.5	11.4	7.3	5.1

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Herkimer	German Flatts	42.5	19.0	17.2	11.1	7.1	4.9
Herkimer	Herkimer	42.4	19.1	17.2	11.1	7.0	4.9
Herkimer	Litchfield	42.8	18.9	17.4	11.3	7.2	5.0
Herkimer	Little Falls	42.0	19.0	17.0	10.9	6.9	4.8
Herkimer	Manheim	42.5	19.5	17.4	11.2	7.1	5.0
Herkimer	Newport	46.3	21.3	20.4	13.8	9.2	6.8
Herkimer	Norway	49.8	23.1	23.3	16.3	11.3	8.6
Herkimer	Ohio	53.0	25.9	26.5	18.9	13.5	10.5
Herkimer	Russia	51.5	24.5	24.9	17.6	12.4	9.5
Herkimer	Salisbury	49.5	22.9	23.1	16.1	11.1	8.4
Herkimer	Schuyler	44.7	20.1	19.0	12.6	8.2	5.9
Herkimer	Stark	42.6	19.0	17.3	11.2	7.1	5.0
Herkimer	Warren	43.0	19.0	17.6	11.4	7.3	5.1
Herkimer	Webb	48.4	22.9	22.3	15.4	10.5	7.9
Herkimer	Winfield	41.4	18.5	16.4	10.5	6.5	4.5
Jefferson	Adams	38.2	19.0	14.5	8.8	5.2	3.3
Jefferson	Alexandria	37.0	17.3	13.3	7.9	4.5	2.8
Jefferson	Antwerp	37.5	17.1	13.6	8.1	4.7	3.0
Jefferson	Brownville	33.3	16.3	10.8	5.9	3.0	1.7
Jefferson	Cape Vincent	35.0	17.4	12.1	6.9	3.7	2.2
Jefferson	Champion	43.9	21.9	19.0	12.5	8.1	5.8
Jefferson	Clayton	35.3	17.3	12.3	7.1	3.8	2.3
Jefferson	Ellisburg	39.9	20.3	16.0	10.0	6.0	4.0
Jefferson	Henderson	36.3	17.9	13.0	7.6	4.2	2.6
Jefferson	Hounsfield	33.4	16.5	10.9	6.0	3.1	1.7
Jefferson	Le Ray	38.6	19.0	14.8	9.0	5.3	3.5
Jefferson	Lorraine	48.0	24.8	22.7	15.6	10.6	7.9
Jefferson	Lyme	34.1	16.9	11.4	6.4	3.3	1.9
Jefferson	Orleans	36.2	17.5	12.8	7.5	4.2	2.6
Jefferson	Pamelia	36.0	17.7	12.8	7.5	4.1	2.5
Jefferson	Philadelphia	38.8	18.4	14.7	9.0	5.4	3.5
Jefferson	Rodman	46.6	23.8	21.4	14.5	9.7	7.1
Jefferson	Rutland	45.4	23.0	20.4	13.6	9.0	6.6
Jefferson	Theresa	37.9	17.8	14.0	8.5	4.9	3.2
Jefferson	Watertown	40.7	20.3	16.5	10.4	6.4	4.4
Jefferson	Wilna	39.1	18.3	14.9	9.2	5.5	3.6
Jefferson	Worth	54.6	29.0	28.6	20.7	15.0	11.8

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Lewis	Croghan	40.8	19.1	16.2	10.2	6.3	4.3
Lewis	Denmark	43.4	21.3	18.6	12.1	7.8	5.5
Lewis	Diana	39.7	18.4	15.3	9.5	5.8	3.8
Lewis	Greig	47.4	22.9	21.6	14.8	10.0	7.4
Lewis	Harrisburg	53.9	28.1	27.9	20.0	14.4	11.3
Lewis	Lewis	55.7	28.2	29.1	21.2	15.5	12.2
Lewis	Leyden	53.2	26.8	26.9	19.3	13.8	10.7
Lewis	Lowville	43.4	21.4	18.6	12.1	7.8	5.5
Lewis	Lyonsdale	49.4	24.2	23.5	16.3	11.3	8.5
Lewis	Martinsburg	53.9	27.6	27.7	19.9	14.3	11.2
Lewis	Montague	59.5	32.1	33.2	24.7	18.5	14.9
Lewis	New Bremen	40.4	19.1	15.9	10.0	6.1	4.1
Lewis	Osceola	55.7	28.7	29.3	21.3	15.5	12.3
Lewis	Pickney	53.8	28.3	27.8	20.0	14.4	11.2
Lewis	Turin	50.0	24.4	23.9	16.7	11.6	8.8
Lewis	Watson	44.7	21.3	19.4	12.9	8.4	6.1
Lewis	West Turin	55.2	27.0	28.4	20.6	15.0	11.8
Livingston	Avon	31.1	12.5	8.7	4.5	2.1	1.0
Livingston	Caledonia	31.6	13.2	9.1	4.8	2.3	1.1
Livingston	Conesus	34.2	13.8	10.7	6.0	3.2	1.8
Livingston	Geneseo	31.5	12.8	9.0	4.7	2.2	1.1
Livingston	Groveland	31.4	12.6	8.8	4.6	2.2	1.1
Livingston	Leicester	30.4	12.3	8.3	4.2	1.9	0.9
Livingston	Lima	32.3	13.1	9.5	5.0	2.5	1.3
Livingston	Livonia	33.1	13.4	10.0	5.5	2.8	1.5
Livingston	Mount Morris	31.2	12.7	8.8	4.5	2.1	1.0
Livingston	N. Dansville	32.5	12.8	9.5	5.1	2.5	1.3
Livingston	Nunda	35.0	14.5	11.4	6.5	3.5	2.1
Livingston	Ossian	34.4	14.0	10.9	6.2	3.3	1.9
Livingston	Portage	34.7	14.5	11.2	6.4	3.4	2.0
Livingston	Sparta	33.3	13.3	10.1	5.5	2.8	1.5
Livingston	Springwater	34.9	13.6	11.1	6.3	3.4	2.0
Livingston	West Sparta	32.6	13.1	9.6	5.2	2.6	1.4
Livingston	York	32.2	13.5	9.5	5.1	2.5	1.3
Madison	Brookfield	40.6	17.8	15.7	9.9	6.1	4.1
Madison	Cazenovia	41.7	19.0	16.7	10.7	6.7	4.6
Madison	De Ruyter	41.0	17.8	15.9	10.1	6.3	4.3

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Madison	Eaton	39.4	17.6	14.9	9.2	5.6	3.7
Madison	Fenner	43.2	19.6	17.9	11.6	7.5	5.3
Madison	Georgetown	41.0	18.1	16.0	10.2	6.3	4.3
Madison	Hamilton	39.1	17.4	14.6	9.0	5.4	3.5
Madison	Lebanon	39.6	17.5	15.0	9.3	5.6	3.7
Madison	Lenox	41.0	18.1	16.0	10.2	6.3	4.3
Madison	Lincoln	41.8	19.3	16.9	10.8	6.8	4.7
Madison	Madison	40.4	17.7	15.6	9.8	6.0	4.1
Madison	Nelson	41.4	18.6	16.4	10.5	6.5	4.5
Madison	Oneida	41.3	19.0	16.5	10.5	6.5	4.5
Madison	Smithfield	41.5	18.6	16.5	10.5	6.6	4.5
Madison	Stockbridge	40.7	18.2	15.9	10.0	6.2	4.2
Madison	Sullivan	41.0	18.4	16.1	10.2	6.3	4.3
Monroe	Brighton	32.9	15.0	10.3	5.6	2.8	1.5
Monroe	Chili	31.1	14.0	9.0	4.6	2.1	1.0
Monroe	Clarkson	30.2	12.4	8.2	4.1	1.8	0.8
Monroe	E.Rochester	33.0	14.5	10.2	5.6	2.8	1.5
Monroe	Gates	31.1	14.4	9.1	4.7	2.2	1.1
Monroe	Greece	32.0	14.5	9.6	5.1	2.5	1.3
Monroe	Hamlin	31.0	13.8	8.9	4.6	2.1	1.0
Monroe	Henrietta	32.1	14.1	9.6	5.1	2.5	1.3
Monroe	Irondequoit	33.0	15.5	10.4	5.7	2.9	1.6
Monroe	Mendon	31.7	13.7	9.3	4.9	2.3	1.2
Monroe	Ogden	31.0	13.6	8.9	4.5	2.1	1.0
Monroe	Parma	31.1	13.8	8.9	4.6	2.1	1.0
Monroe	Penfield	33.3	15.1	10.5	5.8	2.9	1.6
Monroe	Perinton	33.0	14.5	10.2	5.6	2.8	1.5
Monroe	Pittsford	33.0	14.5	10.2	5.6	2.8	1.5
Monroe	Riga	31.3	13.6	9.0	4.7	2.2	1.1
Monroe	Rush	31.0	13.1	8.8	4.5	2.1	1.0
Monroe	Sweden	30.9	13.1	8.7	4.4	2.0	1.0
Monroe	Webster	34.5	16.1	11.5	6.5	3.4	2.0
Monroe	Wheatland	31.5	13.5	9.1	4.8	2.2	1.1
Montgomery	Amsterdam	40.0	18.7	15.6	9.7	5.9	4.0
Montgomery	Canajoharie	41.0	18.4	16.1	10.2	6.3	4.3
Montgomery	Charleston	43.1	19.7	17.8	11.6	7.4	5.2
Montgomery	Florida	40.1	18.7	15.7	9.8	6.0	4.0

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Montgomery	Glen	40.0	18.6	15.5	9.7	5.9	4.0
Montgomery	Minden	41.1	18.5	16.2	10.3	6.4	4.4
Montgomery	Mohawk	39.8	18.5	15.4	9.6	5.8	3.9
Montgomery	Palatine	41.3	18.8	16.5	10.5	6.5	4.5
Montgomery	Root	40.9	18.7	16.1	10.2	6.3	4.3
Montgomery	St Johnsville	42.5	19.5	17.4	11.3	7.2	5.0
Nassau	Glen Cove	45.4	21.7	20.0	13.4	8.8	6.4
Nassau	Hempstead	44.2	21.3	19.0	12.5	8.2	5.8
Nassau	Long Beach	43.0	21.0	18.2	11.8	7.6	5.3
Nassau	N Hempstead	45.0	21.7	19.7	13.1	8.6	6.2
Nassau	Oyster Bay	45.1	21.8	19.8	13.2	8.7	6.3
Niagara	Cambria	35.4	16.1	12.0	6.9	3.8	2.3
Niagara	Hartland	34.8	15.8	11.6	6.6	3.5	2.1
Niagara	Lewiston	34.4	15.4	11.2	6.3	3.3	1.9
Niagara	Lockport	36.7	16.9	13.0	7.7	4.4	2.7
Niagara	Newfane	33.3	14.9	10.5	5.7	2.9	1.6
Niagara	Niagara	37.0	16.9	13.2	7.8	4.5	2.8
Niagara	Pendleton	37.0	17.0	13.2	7.9	4.5	2.8
Niagara	Porter	32.1	14.4	9.7	5.1	2.5	1.3
Niagara	Royalton	36.5	16.3	12.8	7.5	4.2	2.6
Niagara	Somerset	33.2	14.6	10.3	5.6	2.9	1.6
Niagara	Wheatfield	37.0	17.0	13.2	7.9	4.5	2.8
Niagara	Wilson	31.6	13.9	9.3	4.9	2.3	1.2
Oneida	Annsville	49.7	24.4	23.7	16.5	11.4	8.7
Oneida	Augusta	42.0	18.8	16.9	10.8	6.8	4.7
Oneida	Ava	57.7	29.9	31.1	22.9	16.9	13.5
Oneida	Boonville	56.0	28.9	29.6	21.6	15.7	12.5
Oneida	Bridgewater	42.2	18.5	16.9	10.9	6.9	4.8
Oneida	Camden	48.7	24.0	22.9	15.8	10.9	8.2
Oneida	Deerfield	47.4	22.2	21.5	14.6	9.9	7.3
Oneida	Florence	52.9	27.2	26.8	19.2	13.7	10.6
Oneida	Floyd	46.8	22.4	21.1	14.3	9.6	7.1
Oneida	Forestport	53.8	26.9	27.3	19.6	14.1	11.0
Oneida	Kirkland	43.1	20.2	18.0	11.7	7.5	5.3
Oneida	Lee	49.0	23.9	23.1	16.0	11.0	8.3
Oneida	Marcy	45.3	21.2	19.7	13.2	8.7	6.3
Oneida	Marshall	42.7	19.3	17.5	11.3	7.2	5.1

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Oneida	New Hartford	43.0	20.0	17.9	11.6	7.4	5.2
Oneida	Paris	43.0	19.5	17.7	11.5	7.4	5.2
Oneida	Remsen	52.9	25.6	26.3	18.8	13.4	10.4
Oneida	Rome	44.5	21.1	19.2	12.7	8.3	6.0
Oneida	Sangerfield	41.9	18.4	16.7	10.7	6.7	4.7
Oneida	Steuben	54.7	27.3	28.1	20.3	14.7	11.5
Oneida	Trenton	47.7	22.4	21.7	14.9	10.1	7.5
Oneida	Utica	43.0	19.4	17.7	11.5	7.4	5.2
Oneida	Vernon	43.1	20.2	18.0	11.7	7.5	5.3
Oneida	Verona	42.5	19.4	17.4	11.2	7.1	5.0
Oneida	Vienna	43.7	20.4	18.5	12.1	7.8	5.6
Oneida	Western	51.9	25.9	25.7	18.2	12.9	10.0
Oneida	Westmoreland	44.7	20.8	19.2	12.8	8.4	6.0
Oneida	Whitestown	43.8	20.7	18.6	12.2	7.9	5.6
Onondaga	Camillus	39.0	17.9	14.7	9.1	5.4	3.5
Onondaga	Cicero	40.9	18.5	16.1	10.2	6.3	4.3
Onondaga	Clay	41.2	19.5	16.6	10.5	6.5	4.5
Onondaga	Dewitt	40.4	17.8	15.6	9.8	6.0	4.1
Onondaga	Elbridge	38.4	17.4	14.2	8.6	5.1	3.3
Onondaga	Fabius	41.0	17.8	15.9	10.1	6.3	4.3
Onondaga	Geddes	39.3	18.1	15.0	9.2	5.5	3.7
Onondaga	Lafayette	40.0	17.6	15.3	9.5	5.8	3.9
Onondaga	Lysander	40.2	19.0	15.8	9.9	6.0	4.1
Onondaga	Manilus	41.0	18.3	16.1	10.2	6.3	4.3
Onondaga	Marcellus	39.0	17.9	14.7	9.0	5.4	3.5
Onondaga	Onondaga	39.6	17.7	15.1	9.4	5.6	3.8
Onondaga	Otisco	39.1	17.6	14.7	9.1	5.4	3.6
Onondaga	Pompey	41.0	18.2	16.1	10.2	6.3	4.3
Onondaga	Salina	39.4	17.8	15.0	9.3	5.6	3.7
Onondaga	Skaneateles	39.0	17.8	14.7	9.0	5.4	3.5
Onondaga	Spafford	39.3	17.9	14.9	9.2	5.5	3.7
Onondaga	Tully	40.0	17.5	15.3	9.5	5.8	3.9
Onondaga	Van Buren	39.7	18.5	15.3	9.5	5.8	3.8
Ontario	Bristol	34.3	14.3	10.9	6.1	3.2	1.9
Ontario	Canadice	34.7	13.9	11.0	6.3	3.3	2.0
Ontario	Canandaigua	33.1	13.7	10.1	5.5	2.8	1.5
Ontario	E. Bloomfield	33.0	13.5	10.0	5.4	2.7	1.5

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Ontario	Farmington	33.0	14.3	10.2	5.5	2.8	1.5
Ontario	Geneva	33.0	13.9	10.1	5.5	2.8	1.5
Ontario	Gorham	33.0	13.9	10.1	5.5	2.8	1.5
Ontario	Hopewell	33.0	14.1	10.1	5.5	2.8	1.5
Ontario	Manchester	33.3	14.8	10.5	5.7	2.9	1.6
Ontario	Naples	33.5	13.1	10.2	5.6	2.9	1.6
Ontario	Phelps	33.2	14.6	10.3	5.7	2.9	1.6
Ontario	Richmond	33.3	13.5	10.1	5.6	2.8	1.6
Ontario	Seneca	33.0	14.4	10.2	5.5	2.8	1.5
Ontario	South Bristol	34.5	14.0	11.0	6.2	3.3	1.9
Ontario	Victor	33.0	14.1	10.1	5.5	2.8	1.5
Ontario	W. Bloomfield	32.8	13.5	9.8	5.3	2.7	1.4
Orange	Blooming Grove	45.6	21.1	19.9	13.3	8.8	6.4
Orange	Chester	45.6	20.8	19.8	13.3	8.8	6.4
Orange	Cornwall	47.1	22.1	21.3	14.5	9.8	7.2
Orange	Crawford	43.3	19.6	18.0	11.7	7.5	5.3
Orange	Deerpark	44.4	20.1	18.8	12.5	8.1	5.8
Orange	Goshen	43.1	19.2	17.7	11.5	7.4	5.2
Orange	Greenville	43.5	19.6	18.1	11.8	7.6	5.4
Orange	Hamptonburgh	43.1	19.3	17.8	11.6	7.4	5.2
Orange	Highlands	48.6	22.7	22.4	15.5	10.6	8.0
Orange	Minisink	43.0	19.4	17.7	11.5	7.4	5.2
Orange	Monroe	47.9	22.2	21.8	15.0	10.2	7.6
Orange	Montgomery	43.1	19.7	17.9	11.7	7.5	5.3
Orange	Mount Hope	43.0	19.1	17.6	11.5	7.3	5.2
Orange	New Windsor	44.5	20.5	19.0	12.6	8.2	5.9
Orange	Newburgh	44.1	20.0	18.6	12.2	7.9	5.7
Orange	Tuxedo	49.6	23.3	23.3	16.2	11.2	8.5
Orange	Wallkill	43.0	19.0	17.6	11.4	7.3	5.2
Orange	Warwick	46.8	21.6	20.9	14.2	9.5	7.0
Orange	Wawayanda	43.0	19.0	17.6	11.4	7.3	5.2
Orange	Woodbury	48.6	22.6	22.4	15.5	10.6	8.0
Orleans	Albion	32.8	14.5	10.1	5.5	2.7	1.5
Orleans	Barre	33.3	14.5	10.4	5.7	2.9	1.6
Orleans	Carlton	32.5	14.5	9.9	5.3	2.6	1.4
Orleans	Clarendon	31.5	13.7	9.2	4.8	2.3	1.1
Orleans	Gaines	32.3	14.5	9.8	5.2	2.6	1.3

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Orleans	Kendall	31.0	14.2	9.0	4.6	2.1	1.0
Orleans	Murray	31.0	13.2	8.8	4.5	2.1	1.0
Orleans	Ridgeway	34.4	15.2	11.2	6.3	3.3	1.9
Orleans	Shelby	35.0	15.3	11.6	6.6	3.6	2.1
Orleans	Yates	33.1	14.6	10.3	5.6	2.8	1.6
Oswego	Albion	46.0	23.4	20.9	14.1	9.4	6.9
Oswego	Amboy	47.8	23.9	22.2	15.2	10.4	7.7
Oswego	Boylston	52.7	27.9	26.9	19.2	13.7	10.6
Oswego	Constantia	43.4	20.9	18.4	12.0	7.7	5.5
Oswego	Granby	40.7	19.8	16.4	10.3	6.4	4.3
Oswego	Hannibal	39.6	19.6	15.5	9.6	5.8	3.9
Oswego	Hastings	43.3	21.2	18.4	12.0	7.7	5.5
Oswego	Mexico	42.4	20.8	17.8	11.5	7.3	5.1
Oswego	Minetto	41.0	20.6	16.7	10.6	6.6	4.5
Oswego	New Haven	41.2	20.6	16.9	10.7	6.7	4.6
Oswego	Orwell	51.1	27.0	25.5	18.0	12.6	9.7
Oswego	Oswego	41.0	20.6	16.8	10.6	6.6	4.5
Oswego	Palermo	43.0	20.8	18.1	11.8	7.5	5.3
Oswego	Parish	45.7	22.9	20.5	13.8	9.1	6.7
Oswego	Redfield	53.2	27.9	27.3	19.5	14.0	10.8
Oswego	Richland	41.8	20.8	17.3	11.1	6.9	4.8
Oswego	Sandy Creek	41.8	21.2	17.5	11.2	7.0	4.9
Oswego	Schroeppel	42.2	20.4	17.5	11.2	7.1	4.9
Oswego	Scriba	41.0	20.9	16.8	10.7	6.6	4.5
Oswego	Volney	41.2	20.5	16.8	10.7	6.6	4.5
Oswego	West Monroe	43.6	21.3	18.6	12.2	7.9	5.6
Oswego	Williamstown	49.6	25.5	24.0	16.7	11.6	8.7
Otsego	Burlington	41.0	18.0	16.0	10.1	6.3	4.3
Otsego	Butternuts	39.5	17.4	14.9	9.2	5.5	3.7
Otsego	Cherry Valley	43.5	19.8	18.2	11.9	7.7	5.4
Otsego	Decatur	43.0	19.4	17.7	11.5	7.4	5.2
Otsego	Edmeston	39.7	17.6	15.1	9.4	5.7	3.8
Otsego	Exeter	41.9	18.5	16.7	10.7	6.7	4.7
Otsego	Hartwick	40.0	17.8	15.3	9.6	5.8	3.9
Otsego	Laurens	39.8	17.5	15.1	9.4	5.7	3.8
Otsego	Maryland	39.6	17.2	14.9	9.2	5.6	3.7
Otsego	Middlefield	40.9	18.2	16.0	10.1	6.3	4.3

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Otsego	Milford	39.2	17.3	14.7	9.1	5.4	3.6
Otsego	Morris	39.8	17.5	15.1	9.4	5.7	3.8
Otsego	New Lisbon	40.8	17.8	15.8	10.0	6.2	4.2
Otsego	Oneonta	39.3	17.3	14.8	9.1	5.5	3.6
Otsego	Otego	40.2	17.5	15.3	9.6	5.9	3.9
Otsego	Otsego	40.8	18.2	15.9	10.1	6.2	4.2
Otsego	Pittsield	40.2	17.7	15.4	9.6	5.9	4.0
Otsego	Plainfield	41.6	18.3	16.5	10.5	6.6	4.5
Otsego	Richfield	42.7	18.7	17.3	11.2	7.1	5.0
Otsego	Roseboom	43.5	19.6	18.1	11.8	7.6	5.4
Otsego	Springfield	42.5	18.7	17.2	11.1	7.0	4.9
Otsego	Unadilla	39.3	17.3	14.8	9.1	5.5	3.6
Otsego	Westford	41.7	18.5	16.6	10.6	6.6	4.6
Otsego	Worcester	40.2	17.6	15.4	9.6	5.9	4.0
Putnam	Carmel	48.8	23.3	22.8	15.7	10.8	8.1
Putnam	Kent	47.3	22.1	21.3	14.5	9.8	7.3
Putnam	Patterson	47.3	22.1	21.3	14.5	9.8	7.3
Putnam	Philipstown	47.8	22.1	21.7	14.9	10.1	7.5
Putnam	Putnam Valley	48.7	23.2	22.7	15.6	10.7	8.1
Putnam	Southeast	48.9	23.3	22.8	15.8	10.9	8.2
Rensselaer	Berlin	45.3	20.1	19.4	13.0	8.6	6.2
Rensselaer	Brunswick	38.8	16.6	14.2	8.7	5.2	3.4
Rensselaer	East Greenbush	37.3	16.2	13.2	7.9	4.5	2.9
Rensselaer	Grafton	45.0	19.3	19.0	12.6	8.3	6.0
Rensselaer	Hoosick	37.5	16.0	13.3	8.0	4.6	2.9
Rensselaer	Nassau	40.7	18.0	15.9	10.0	6.2	4.2
Rensselaer	No. Greenbush	37.5	16.2	13.3	8.0	4.6	2.9
Rensselaer	Petersburg	42.4	18.3	17.0	11.0	7.0	4.9
Rensselaer	Pittstown	37.1	15.9	13.0	7.7	4.4	2.8
Rensselaer	Poestenkill	42.5	18.3	17.0	11.0	7.0	4.9
Rensselaer	Sand Lake	41.2	18.0	16.2	10.3	6.4	4.4
Rensselaer	Schaghticoke	37.0	15.9	12.9	7.7	4.4	2.7
Rensselaer	Schodack	38.1	16.3	13.7	8.3	4.9	3.1
Rensselaer	Stephentown	42.3	18.7	17.1	11.0	7.0	4.9
Rockland	Clarkstown	47.3	22.0	21.3	14.5	9.8	7.3
Rockland	Haverstraw	48.9	22.7	22.6	15.6	10.8	8.1
Rockland	Orangetown	47.8	22.5	21.9	15.0	10.2	7.6

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Rockland	Ramapo	49.3	22.4	22.8	15.8	10.9	8.2
Rockland	Stoney Point	48.3	22.4	22.1	15.2	10.4	7.8
Saratoga	Ballston	39.6	18.4	15.2	9.4	5.7	3.8
Saratoga	Charlton	41.4	19.1	16.6	10.6	6.6	4.5
Saratoga	Clifton Park	36.8	16.2	12.9	7.6	4.3	2.7
Saratoga	Corinth	44.4	21.1	19.1	12.6	8.2	5.9
Saratoga	Day	46.3	22.6	20.8	14.1	9.4	6.9
Saratoga	Edinburg	46.1	22.5	20.7	13.9	9.3	6.8
Saratoga	Galway	43.1	20.3	18.0	11.7	7.5	5.3
Saratoga	Greenfield	43.1	20.1	18.0	11.7	7.5	5.3
Saratoga	Hadley	43.3	20.7	18.3	11.9	7.7	5.4
Saratoga	Halfmoon	37.0	16.0	12.9	7.7	4.4	2.7
Saratoga	Malta	39.5	18.4	15.2	9.4	5.6	3.8
Saratoga	Milton	41.3	19.0	16.5	10.5	6.5	4.5
Saratoga	Moreau	38.0	17.3	14.0	8.4	4.9	3.2
Saratoga	Northumberland	37.9	17.3	13.9	8.4	4.9	3.1
Saratoga	Providence	45.6	21.9	20.2	13.5	8.9	6.5
Saratoga	Saratoga	38.6	17.9	14.5	8.8	5.2	3.4
Saratoga	Saratoga Sprgs	40.6	18.7	16.0	10.1	6.2	4.2
Saratoga	Stillwater	38.4	17.5	14.3	8.7	5.1	3.3
Saratoga	Waterford	37.0	15.5	12.8	7.6	4.3	2.7
Saratoga	Wilton	39.6	18.5	15.3	9.5	5.7	3.8
Schenectady	Duanesburg	42.3	19.5	17.3	11.2	7.1	4.9
Schenectady	Glenville	39.5	18.2	15.1	9.4	5.6	3.8
Schenectady	Niskayuna	36.9	16.1	12.9	7.6	4.3	2.7
Schenectady	Princetown	41.7	19.4	16.9	10.8	6.8	4.7
Schenectady	Rotterdam	38.9	17.7	14.6	9.0	5.3	3.5
Schenectady	Schenectady	37.0	16.1	13.0	7.7	4.4	2.8
Schoharie	Blenheim	37.5	16.4	13.4	8.0	4.6	2.9
Schoharie	Broome	38.4	16.9	14.1	8.6	5.1	3.3
Schoharie	Carlisle	41.0	18.5	16.2	10.2	6.3	4.3
Schoharie	Cobleskill	40.7	18.4	15.9	10.0	6.2	4.2
Schoharie	Conesville	37.3	16.3	13.2	7.9	4.5	2.9
Schoharie	Esperance	40.4	18.5	15.8	9.9	6.1	4.1
Schoharie	Fulton	38.0	16.9	13.9	8.4	4.9	3.1
Schoharie	Gilboa	37.2	16.2	13.1	7.8	4.5	2.8
Schoharie	Jefferson	39.0	17.1	14.5	8.9	5.3	3.5

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Schoharie	Middleburg	38.8	17.5	14.5	8.9	5.3	3.5
Schoharie	Richmondville	39.9	18.0	15.3	9.5	5.8	3.9
Schoharie	Schoharie	39.5	18.1	15.1	9.3	5.6	3.7
Schoharie	Seward	41.6	18.5	16.6	10.6	6.6	4.6
Schoharie	Sharon	42.4	18.6	17.1	11.0	7.0	4.9
Schoharie	Summit	39.8	17.7	15.2	9.5	5.7	3.8
Schoharie	Wright	39.9	18.3	15.4	9.6	5.8	3.9
Schuyler	Catherine	37.2	16.4	13.2	7.8	4.5	2.8
Schuyler	Cayuta	37.3	16.6	13.3	7.9	4.6	2.9
Schuyler	Dix	33.9	13.8	10.6	5.9	3.1	1.7
Schuyler	Hector	35.9	15.1	12.1	7.0	3.9	2.4
Schuyler	Montour	33.5	13.9	10.4	5.7	2.9	1.6
Schuyler	Orange	33.8	13.8	10.5	5.8	3.0	1.7
Schuyler	Reading	33.9	13.6	10.5	5.9	3.0	1.7
Schuyler	Tyrone	33.6	13.7	10.4	5.7	2.9	1.7
Seneca	Covert	34.7	14.5	11.2	6.4	3.4	2.0
Seneca	Fayette	33.0	13.9	10.1	5.5	2.8	1.5
Seneca	Junius	33.9	14.8	10.8	6.0	3.1	1.8
Seneca	Lodi	34.4	14.2	11.0	6.2	3.3	1.9
Seneca	Ovid	33.9	14.3	10.7	6.0	3.1	1.8
Seneca	Romulus	33.1	14.0	10.1	5.5	2.8	1.5
Seneca	Seneca Falls	33.1	14.4	10.2	5.6	2.8	1.5
Seneca	Tyre	34.7	15.1	11.3	6.4	3.4	2.0
Seneca	Varick	33.0	14.0	10.1	5.5	2.8	1.5
Seneca	Waterloo	33.0	13.6	10.0	5.4	2.7	1.5
St Lawrence	Brasher	35.0	15.1	11.5	6.6	3.5	2.1
St Lawrence	Canton	35.8	15.2	12.1	7.0	3.9	2.4
St Lawrence	Clare	40.6	17.9	15.7	9.9	6.1	4.1
St Lawrence	Clifton	43.2	18.7	17.6	11.5	7.4	5.2
St Lawrence	Colton	42.0	18.6	16.8	10.8	6.8	4.7
St Lawrence	De Peyster	35.7	16.0	12.2	7.0	3.9	2.3
St Lawrence	Dekalb	36.8	16.5	13.0	7.7	4.4	2.7
St Lawrence	Edwards	39.0	17.1	14.5	8.9	5.3	3.5
St Lawrence	Fine	42.5	19.1	17.3	11.2	7.1	5.0
St Lawrence	Fowler	37.8	17.0	13.7	8.3	4.8	3.1
St Lawrence	Gouverneur	37.0	17.0	13.2	7.9	4.5	2.8
St Lawrence	Hammond	37.0	17.0	13.2	7.9	4.5	2.8

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
St Lawrence	Hermon	37.2	17.0	13.3	8.0	4.5	2.9
St Lawrence	Hopkinton	40.2	17.4	15.3	9.6	5.9	3.9
St Lawrence	Lawrence	35.4	15.0	11.7	6.8	3.7	2.2
St Lawrence	Lisbon	33.9	14.7	10.8	6.0	3.1	1.8
St Lawrence	Louisville	35.0	15.2	11.6	6.6	3.6	2.1
St Lawrence	Macomb	37.0	16.9	13.2	7.8	4.5	2.8
St Lawrence	Madrid	35.3	15.0	11.7	6.7	3.6	2.2
St Lawrence	Massena	35.0	15.6	11.7	6.7	3.6	2.1
St Lawrence	Morristown	35.9	16.3	12.4	7.2	4.0	2.4
St Lawrence	Norfolk	35.4	15.2	11.8	6.8	3.7	2.2
St Lawrence	Ogdensburg	33.0	14.0	10.1	5.5	2.8	1.5
St Lawrence	Oswegathcie	34.5	15.3	11.3	6.4	3.4	2.0
St Lawrence	Parishville	40.2	17.7	15.5	9.7	5.9	4.0
St Lawrence	Piercefield	41.9	18.2	16.6	10.7	6.7	4.6
St Lawrence	Pierrepont	38.9	17.2	14.5	8.9	5.3	3.5
St Lawrence	Pitcairn	39.5	18.0	15.1	9.3	5.6	3.7
St Lawrence	Potsdam	37.0	15.8	12.9	7.7	4.4	2.7
St Lawrence	Rossie	37.0	17.0	13.2	7.9	4.5	2.8
St Lawrence	Russell	38.2	16.9	14.0	8.5	5.0	3.2
St Lawrence	Stockholm	36.1	15.6	12.3	7.2	4.0	2.5
St Lawrence	Waddington	35.0	15.0	11.5	6.6	3.5	2.1
Steuben	Addison	31.9	13.5	9.3	4.9	2.4	1.2
Steuben	Avoca	32.6	13.3	9.7	5.2	2.6	1.4
Steuben	Bath	31.2	13.3	8.9	4.6	2.1	1.1
Steuben	Bradford	32.8	13.4	9.8	5.3	2.6	1.4
Steuben	Cameron	32.3	13.5	9.5	5.1	2.5	1.3
Steuben	Campbell	31.6	13.5	9.2	4.8	2.3	1.2
Steuben	Canisteo	33.7	13.6	10.4	5.8	3.0	1.7
Steuben	Caton	32.9	13.6	9.9	5.4	2.7	1.5
Steuben	Cohocton	33.7	13.2	10.3	5.7	2.9	1.6
Steuben	Corning	32.5	13.5	9.7	5.2	2.6	1.4
Steuben	Dansville	33.7	13.5	10.4	5.8	3.0	1.7
Steuben	Erwin	31.0	13.5	8.8	4.5	2.1	1.0
Steuben	Fremont	34.1	13.7	10.6	6.0	3.1	1.8
Steuben	Greenwood	37.4	15.9	13.2	7.9	4.5	2.9
Steuben	Hartsville	36.1	15.2	12.2	7.2	4.0	2.4
Steuben	Hornby	33.3	13.8	10.2	5.6	2.8	1.6

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Steuben	Hornellsville	33.3	13.6	10.2	5.6	2.8	1.6
Steuben	Howard	33.7	13.5	10.3	5.7	2.9	1.7
Steuben	Jasper	34.0	14.1	10.7	5.9	3.1	1.8
Steuben	Lindley	31.3	13.5	9.0	4.7	2.2	1.1
Steuben	Prattsburg	34.7	13.5	10.9	6.2	3.3	1.9
Steuben	Pulteney	32.7	13.1	9.7	5.2	2.6	1.4
Steuben	Rathbone	31.0	13.5	8.9	4.6	2.1	1.0
Steuben	Thurston	31.9	13.5	9.3	4.9	2.4	1.2
Steuben	Troupsburg	33.4	14.0	10.3	5.7	2.9	1.6
Steuben	Tuscarora	32.5	13.5	9.7	5.2	2.6	1.4
Steuben	Urbana	31.3	13.0	8.9	4.6	2.2	1.1
Steuben	Wayland	34.0	13.6	10.6	5.9	3.1	1.8
Steuben	Wayne	32.0	13.0	9.3	4.9	2.4	1.2
Steuben	West Union	37.3	16.0	13.1	7.9	4.5	2.8
Steuben	Wheeler	33.0	13.2	9.9	5.4	2.7	1.5
Steuben	Woodhull	31.7	13.5	9.2	4.8	2.3	1.2
Suffolk	Babylon	45.0	22.0	19.8	13.2	8.7	6.3
Suffolk	Brookhaven	46.1	23.8	21.1	14.2	9.4	6.9
Suffolk	East Hampton	44.7	23.4	20.0	13.3	8.7	6.3
Suffolk	Huntington	45.2	22.7	20.2	13.5	8.9	6.4
Suffolk	Islip	46.2	23.4	21.1	14.2	9.5	7.0
Suffolk	Riverhead	45.0	23.5	20.2	13.5	8.9	6.4
Suffolk	Shelter Island	45.0	23.2	20.2	13.4	8.8	6.4
Suffolk	Smithtown	45.2	23.5	20.3	13.6	8.9	6.5
Suffolk	Southampton	45.0	23.6	20.3	13.5	8.9	6.4
Suffolk	Southold	45.2	23.5	20.3	13.6	8.9	6.5
Sullivan	Bethel	44.1	19.9	18.5	12.2	7.9	5.7
Sullivan	Callicoon	46.0	21.1	20.2	13.6	9.1	6.6
Sullivan	Cochecton	42.1	19.0	17.0	10.9	6.9	4.8
Sullivan	Delaware	42.6	19.0	17.3	11.2	7.1	5.0
Sullivan	Fallsburg	47.0	21.8	21.1	14.3	9.6	7.1
Sullivan	Forestburgh	46.1	21.2	20.3	13.7	9.1	6.7
Sullivan	Fremont	44.2	20.3	18.7	12.4	8.0	5.8
Sullivan	Highland	42.6	19.1	17.3	11.2	7.1	5.0
Sullivan	Liberty	47.9	22.0	21.7	14.9	10.1	7.5
Sullivan	Lumberland	43.8	19.7	18.3	12.0	7.8	5.5
Sullivan	Mamakating	45.2	20.8	19.6	13.0	8.6	6.2

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Sullivan	Neversink	48.5	22.2	22.2	15.3	10.5	7.9
Sullivan	Rockland	46.3	21.0	20.3	13.7	9.2	6.7
Sullivan	Thompson	46.5	21.4	20.6	13.9	9.3	6.9
Sullivan	Tusten	41.4	19.0	16.6	10.6	6.6	4.5
Tioga	Barton	36.3	16.1	12.6	7.4	4.1	2.5
Tioga	Berkshire	37.1	16.5	13.1	7.8	4.5	2.8
Tioga	Candor	37.1	16.5	13.2	7.9	4.5	2.8
Tioga	Newark Valley	37.0	16.4	13.1	7.8	4.4	2.8
Tioga	Nichols	35.0	15.0	11.5	6.6	3.5	2.1
Tioga	Owego	36.2	15.9	12.5	7.3	4.1	2.5
Tioga	Richford	38.8	17.3	14.4	8.8	5.2	3.4
Tioga	Spencer	37.2	16.5	13.2	7.9	4.5	2.8
Tioga	Tioga	36.0	15.9	12.3	7.2	4.0	2.4
Tompkins	Caroline	38.2	16.9	14.0	8.5	5.0	3.2
Tompkins	Danby	37.7	16.6	13.6	8.2	4.7	3.0
Tompkins	Dryden	37.6	16.0	13.3	8.0	4.6	2.9
Tompkins	Enfield	37.8	16.4	13.6	8.2	4.8	3.1
Tompkins	Groton	38.0	16.5	13.7	8.3	4.8	3.1
Tompkins	Ithaca	34.9	15.0	11.5	6.5	3.5	2.1
Tompkins	Lansing	34.8	14.7	11.3	6.4	3.4	2.0
Tompkins	Newfield	38.5	17.2	14.2	8.7	5.1	3.3
Tompkins	Ulysses	34.9	14.7	11.4	6.5	3.5	2.0
Ulster	Denning	53.1	25.3	26.3	18.8	13.4	10.4
Ulster	Esopus	45.4	21.6	19.9	13.3	8.8	6.4
Ulster	Gardiner	45.3	21.2	19.8	13.2	8.7	6.3
Ulster	Hardenburgh	46.9	21.6	20.9	14.2	9.6	7.0
Ulster	Hurley	47.0	22.1	21.1	14.4	9.7	7.1
Ulster	Kingston	46.1	21.9	20.5	13.8	9.2	6.7
Ulster	Lloyd	45.0	20.9	19.5	13.0	8.5	6.2
Ulster	Marbletown	46.7	21.9	20.9	14.2	9.5	7.0
Ulster	Marlborough	43.7	20.0	18.3	12.0	7.8	5.5
Ulster	New Paltz	45.5	21.5	20.0	13.4	8.9	6.4
Ulster	Olive	49.3	23.1	23.0	16.0	11.0	8.3
Ulster	Plattekill	45.8	21.3	20.2	13.5	9.0	6.6
Ulster	Rochester	46.9	21.8	21.0	14.2	9.6	7.1
Ulster	Rosendale	45.2	21.5	19.8	13.2	8.7	6.3
Ulster	Saugerties	43.6	20.3	18.3	12.0	7.7	5.5

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Ulster	Shandaken	49.1	23.8	23.1	16.0	11.0	8.3
Ulster	Shawangunk	44.8	21.0	19.3	12.8	8.4	6.1
Ulster	Ulster	44.8	21.4	19.5	13.0	8.5	6.1
Ulster	Wawarsing	46.3	21.6	20.6	13.9	9.3	6.8
Ulster	Woodstock	48.4	22.5	22.2	15.3	10.5	7.9
Warren	Bolton	40.7	18.7	16.0	10.1	6.2	4.2
Warren	Chester	41.1	19.0	16.4	10.4	6.5	4.4
Warren	Hague	40.6	18.5	15.9	10.0	6.2	4.2
Warren	Horicon	41.0	19.0	16.3	10.3	6.4	4.4
Warren	Johnsburg	44.1	20.5	18.7	12.3	8.0	5.7
Warren	Lake George	43.0	19.9	17.9	11.6	7.5	5.3
Warren	Lake Luzerne	42.9	20.0	17.8	11.6	7.4	5.2
Warren	Queensbury	39.9	18.3	15.4	9.6	5.8	3.9
Warren	Stony Creek	46.5	22.7	21.0	14.2	9.5	7.0
Warren	Thurman	45.4	21.5	19.9	13.3	8.8	6.4
Warren	Warrensburg	43.0	20.1	17.9	11.6	7.4	5.2
Washington	Argyle	38.5	17.0	14.2	8.6	5.1	3.3
Washington	Cambridge	37.3	16.0	13.2	7.9	4.5	2.9
Washington	Dresden	42.3	19.4	17.2	11.1	7.0	4.9
Washington	Easton	37.3	16.2	13.2	7.9	4.5	2.9
Washington	Fort Ann	40.8	18.6	16.1	10.2	6.3	4.3
Washington	Fort Edward	37.0	16.4	13.1	7.8	4.4	2.8
Washington	Granville	39.3	17.5	14.8	9.1	5.5	3.6
Washington	Greenwich	37.5	16.1	13.3	8.0	4.6	2.9
Washington	Hampton	39.2	17.2	14.6	9.0	5.4	3.6
Washington	Hartford	39.7	18.0	15.2	9.4	5.7	3.8
Washington	Hebron	38.9	17.0	14.4	8.9	5.3	3.5
Washington	Jackson	38.3	16.5	13.9	8.5	5.0	3.2
Washington	Kingsbury	38.0	17.3	13.9	8.4	4.9	3.1
Washington	Putnam	37.6	16.5	13.5	8.1	4.7	3.0
Washington	Salem	37.7	16.4	13.5	8.1	4.7	3.0
Washington	White Creek	39.6	17.3	14.9	9.2	5.6	3.7
Washington	Whitehall	38.0	17.0	13.8	8.4	4.9	3.1
Wayne	Arcadia	35.2	15.8	11.8	6.8	3.7	2.2
Wayne	Butler	37.3	17.1	13.5	8.0	4.6	2.9
Wayne	Galen	36.2	16.5	12.6	7.4	4.1	2.5
Wayne	Huron	38.8	18.2	14.7	9.0	5.3	3.5

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Wayne	Lyons	35.6	16.0	12.1	7.0	3.8	2.3
Wayne	Macedon	33.7	15.0	10.8	6.0	3.1	1.7
Wayne	Marion	35.9	16.4	12.4	7.2	4.0	2.4
Wayne	Ontario	36.4	16.7	12.8	7.5	4.2	2.6
Wayne	Palmyra	35.0	15.6	11.7	6.6	3.6	2.1
Wayne	Rose	37.1	17.3	13.4	8.0	4.5	2.9
Wayne	Savannah	36.2	16.4	12.6	7.3	4.1	2.5
Wayne	Sodus	37.0	17.6	13.4	8.0	4.5	2.8
Wayne	Walworth	35.1	16.2	11.9	6.8	3.7	2.2
Wayne	Williamson	37.0	17.3	13.3	7.9	4.5	2.8
Wayne	Wolcott	39.0	18.6	14.9	9.2	5.5	3.6
Westchester	Bedford	49.0	23.9	23.1	16.0	11.0	8.3
Westchester	Cortlandt	47.0	22.1	21.2	14.4	9.7	7.2
Westchester	Eastchester	47.0	22.1	21.2	14.4	9.7	7.2
Westchester	Greenburgh	48.8	23.5	22.8	15.7	10.8	8.1
Westchester	Harrison	47.8	23.2	22.0	15.1	10.2	7.6
Westchester	Lewisboro	49.4	24.2	23.4	16.3	11.2	8.5
Westchester	Mamaroneck	47.0	22.0	21.1	14.4	9.7	7.1
Westchester	Mount Pleasant	48.6	23.4	22.6	15.6	10.7	8.0
Westchester	Mount Vernon	47.0	22.0	21.1	14.4	9.7	7.1
Westchester	New Castle	48.9	23.9	23.0	15.9	10.9	8.2
Westchester	New Rochelle	47.0	22.0	21.1	14.4	9.7	7.1
Westchester	North Castle	49.0	24.0	23.1	16.0	11.0	8.3
Westchester	North Salem	48.9	23.8	23.0	15.9	10.9	8.2
Westchester	Ossining	47.3	22.8	21.6	14.7	9.9	7.4
Westchester	Pelham	47.0	22.0	21.1	14.4	9.7	7.1
Westchester	Pound Ridge	49.0	24.3	23.2	16.1	11.1	8.3
Westchester	Rye	47.6	23.2	21.9	14.9	10.1	7.5
Westchester	Scarsdale	47.0	22.4	21.2	14.4	9.7	7.2
Westchester	Somers	48.9	23.6	22.9	15.9	10.9	8.2
Westchester	White Plains	47.2	23.0	21.5	14.7	9.9	7.3
Westchester	Yonkers	47.3	22.4	21.4	14.6	9.9	7.3
Westchester	Yorktown	48.6	23.0	22.5	15.5	10.7	8.0
Wyoming	Arcade	42.2	18.4	16.9	10.9	6.9	4.8
Wyoming	Attica	38.4	17.0	14.1	8.6	5.0	3.3
Wyoming	Bennington	39.2	17.5	14.7	9.1	5.4	3.6
Wyoming	Castile	35.5	15.1	11.8	6.8	3.7	2.2

Appendix Table 3 (Continued).

County	Township	Precipitation		N Leaching Index			
		P_A	P_W	Soil Hydrologic Group			
		------Inches------		A	B	C	D
Wyoming	Covington	36.3	15.4	12.4	7.2	4.0	2.5
Wyoming	Eagle	40.6	17.9	15.7	9.9	6.1	4.1
Wyoming	Gainsville	39.4	17.5	14.9	9.2	5.5	3.7
Wyoming	Genesee Falls	35.3	14.9	11.7	6.7	3.7	2.2
Wyoming	Java	41.0	17.9	16.0	10.1	6.3	4.3
Wyoming	Middlebury	37.8	16.8	13.7	8.2	4.8	3.1
Wyoming	Orangeville	40.8	18.0	15.9	10.0	6.2	4.2
Wyoming	Perry	36.1	15.4	12.3	7.2	4.0	2.4
Wyoming	Pike	38.1	16.6	13.8	8.4	4.9	3.2
Wyoming	Sheldon	40.2	17.9	15.5	9.7	5.9	4.0
Wyoming	Warsaw	38.0	16.7	13.8	8.3	4.8	3.1
Wyoming	Wethersfield	41.6	18.6	16.5	10.6	6.6	4.5
Yates	Barrington	33.7	13.7	10.4	5.8	3.0	1.7
Yates	Benton	33.0	14.0	10.1	5.5	2.8	1.5
Yates	Italy	34.1	13.3	10.5	5.9	3.1	1.8
Yates	Jerusalem	33.1	13.2	10.0	5.4	2.7	1.5
Yates	Middlesex	33.0	13.2	9.9	5.4	2.7	1.5
Yates	Milo	33.0	13.7	10.0	5.5	2.7	1.5
Yates	Potter	33.0	13.7	10.0	5.4	2.7	1.5
Yates	Starkey	33.1	13.6	10.0	5.5	2.7	1.5
Yates	Torrey	33.0	14.0	10.1	5.5	2.8	1.5

Q.M. Ketterings, S.D. Klausner, and K.J. Czymmek (2003). Nitrogen Guidelines for Field Crops in New York. Second Release. Department of Crop and Soil Sciences Extension Series EO3-16. 70 pages.