

Section 1 Example: Animal Inventory

Current Meat Animal Inventory: Inventory of animals (in confinement housing or open lots) fed for meat production or replacements.

Information in Columns a-e is required for the permit application.					Information in Columns f-n will improve estimate of manure nutrient excretion.								
a. Species and Group	b. Describe Confinement and Location	c. Maximum One-Time Capacity (# of animals)	Average Weight (lbs.)		f. Average Days on Feed	g. Turns per Year	Daily Feed Intake		Feed Composition ¹				n. Fat Free Lean Index ²
			d. Begin	e. End			h. Feed (lbs./day) ¹	i. Moisture Basis	j. % CP	k. % P	l. % K	m. Moisture Basis	
<i>Example: Pigs/Finish</i>	<i>Slatted floor barn... Barn 1</i>	<i>1,000</i>	<i>45</i>	<i>250</i>	<i>110 days</i>	<i>3</i>	<i>5,350 lbs.</i>	<input checked="" type="checkbox"/> <i>As Fed</i> <input type="checkbox"/> <i>Dry</i>	<i>17%</i>	<i>0.6%</i>	<i>1%</i>	<input type="checkbox"/> <i>As Fed</i> <input checked="" type="checkbox"/> <i>Dry</i>	
1. <i>Beef Cattle</i>	<i>Open Lot</i>	<i>2,500</i>	<i>745</i>	<i>1250</i>	<i>163</i>	<i>2</i>	<i>385,000</i>	<input type="checkbox"/> <i>As Fed</i> <input checked="" type="checkbox"/> <i>Dry</i>	<i>18.7</i>	<i>0.49</i>	<i>1.3</i>	<input type="checkbox"/> <i>As Fed</i> <input checked="" type="checkbox"/> <i>Dry</i>	
2.								<input type="checkbox"/> <i>As Fed</i> <input type="checkbox"/> <i>Dry</i>				<input type="checkbox"/> <i>As Fed</i> <input type="checkbox"/> <i>Dry</i>	
3.								<input type="checkbox"/> <i>As Fed</i> <input type="checkbox"/> <i>Dry</i>				<input type="checkbox"/> <i>As Fed</i> <input type="checkbox"/> <i>Dry</i>	

- Both daily feed intake and feed composition should be measured on the same moisture basis (e.g. both on an "As Fed" basis).
- Fat Free Lean Index is needed only for market hog. This measure should be available for market hogs at the time of slaughter.

Future Expansion Plans: No current plans for expanding animal number or open lot size.

Section 2 Example: Land Resources Inventory

Field ID: Pivot Field Size: 128 useable acres

Location: _____ Pierce
 ¼ Section Township Range E or W County

Other Manure Sources: Is livestock manure from another facility applied to this site? YES NO
 If yes, attach manure production information from the other facility.

Ownership: Own Rent Neighbor Is there a site agreement? YES NO

Cropping Practices: Planned rotation: Corn Soybean _____
 Five year average yields: 170 60 _____
 Source of yield values: FSA verified yields or other _____

Environmental Considerations:

Is there a USDA approved conservation plan for this site? YES NO

Current Conservation Practices: Field is no-tilled planted following both corn and soybeans. Corn stalks are chopped in late winter.

Soil Type:	Series & texture	Slope (avg.)	Soil Phosphorus Levels ¹			
Primary Soil:	<u>Hord Hobbs Silt loam</u>	<u>0-7</u> %	Management Areas			
Secondary Soil ¹ :	<u>Crofton-Nora Silt Loam</u>	<u>7 to 11</u> %	Soil Test			
Irrigated ¹	<input type="checkbox"/> No <input type="checkbox"/> Flood <input checked="" type="checkbox"/> Sprinkler	<u>128</u> Acres	Name/ID	Acres	P (ppm)	Method*
Depth to groundwater: ¹	<u>80</u> feet		NE	35	27	Bray
Distance to Nearest Body of Water:	_____ feet		SE	35	89	Bray
Does field contain:	YES	NO	SW	35	60	Bray
Highly Erodible Land?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NW	35	21	Bray
Perennial Stream?	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Intermittent Stream?	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
Concentrated Flow?	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
Flooding/Overflow Potential?	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Designated Wetlands?	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Acres of wetlands:	<u>0</u> acres.					

Sample Depth 8 inches Taken 11/20/2005

* B =Bray I, weak acid
 M = Mehlich III
 O = Olsen (sodium bicarbonate).
 Write in test name if not one of these.

¹ Not required for NDEQ permit application.

Topographic map with 20 foot elevations (top map) and aerial map with soil types (bottom map) for available cropland managed by Beef Case Study Farm.

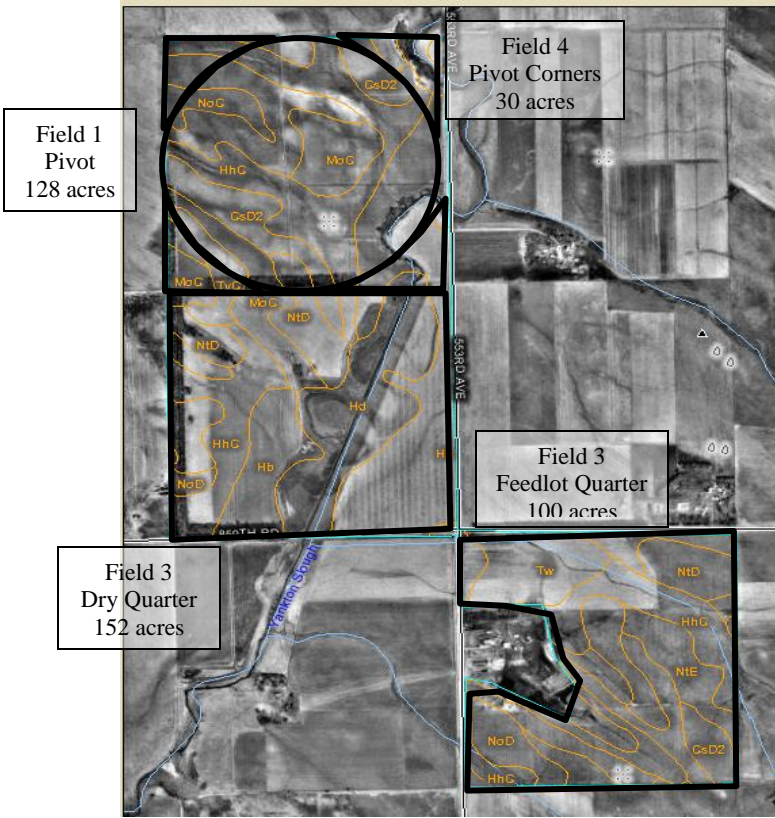
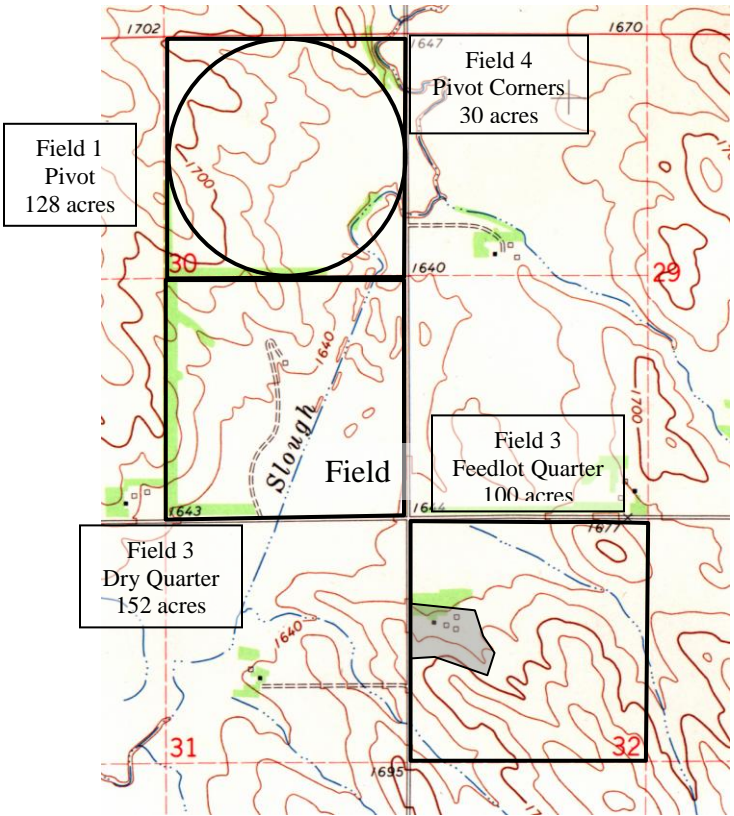


Table listing soil types, slope, acres and percentage in each soil type.

Pierce County, Nebraska (NE139)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BcC	Bazile soils, 1 to 7 percent slopes	18.4	4.0%
CsC2	Crofton-Nora silt loams, 1 to 7 percent slopes, eroded	2.0	0.4%
CsD2	Crofton-Nora silt loams, 7 to 11 percent slopes, eroded	79.6	17.2%
CsE2	Crofton-Nora silt loams, 11 to 17 percent slopes, eroded	0.7	0.2%
Hb	Hobbs silt loam	83.6	18.1%
Hd	Hobbs silt loam, occasionally flooded	42.2	9.1%
HhC	Hord-Hobbs silt loams, 0 to 7 percent slopes	91.4	19.8%
MoC	Moody silty clay loam, 1 to 7 percent slopes	41.8	9.0%
NoC	Nora silt loam, 1 to 7 percent slopes	7.1	1.5%
NoD	Nora silt loam, 7 to 11 percent slopes	22.9	5.0%
NtD	Nora-Thurman complex, 7 to 11 percent slopes	27.4	5.9%
NtE	Nora-Thurman complex, 11 to 17 percent slopes	12.2	2.6%
Sy	Silty alluvial land	4.4	0.9%
TnD	Thurman fine sandy loam, 7 to 11 percent slopes	0.8	0.2%
TvC	Thurman and Valentine soils, 1 to 7 percent slopes	7.6	1.6%
Tw	Trent silty clay loam	20.2	4.4%
W	Water	0.1	0.0%
Totals for Area of Interest (AOI)		462.3	100.0%

Section 3 Example: Land Application Equipment Inventory

Equipment Description

a. Equipment Description	b. Type of Equipment	c. Includes Incorporation Attachment?	d. Capacity	e. Typical Total Daily Application Rate	f. Time to haul or pump manure produced	g. Ownership of Land Application Equipment ¹	h. Manure Storage System Served by this Equipment
20 ton Truck mounted box spreader – rear discharge	<input checked="" type="checkbox"/> ST <input type="checkbox"/> SS <input type="checkbox"/> CP <input type="checkbox"/> OS <input type="checkbox"/> FI <input type="checkbox"/> TH	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	20 <input checked="" type="checkbox"/> tons/load <input type="checkbox"/> gallons/min. <input type="checkbox"/> gallons/load	600 <input checked="" type="checkbox"/> tons/day <input type="checkbox"/> gallons/day <input type="checkbox"/> acre-in./day	10 days	<input checked="" type="checkbox"/> O <input type="checkbox"/> L <input type="checkbox"/> CA	Solids from open lots and solids settling bass
Big Gun Applicator	<input type="checkbox"/> ST <input type="checkbox"/> SS <input type="checkbox"/> CP <input checked="" type="checkbox"/> OS <input type="checkbox"/> FI <input type="checkbox"/> TH	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	450 <input type="checkbox"/> tons/load <input checked="" type="checkbox"/> gallons/min. <input type="checkbox"/> gallons/load	324,000 <input type="checkbox"/> tons/day <input checked="" type="checkbox"/> gallons/day <input type="checkbox"/> acre-in./day	10 days for 25-yr, 24-hr storm event. 12 days for average annual runoff	<input checked="" type="checkbox"/> O <input type="checkbox"/> L <input type="checkbox"/> CA	Holding pond

Time Required for Land Application:

Solids: We collect between 5,000 and 6,000 tons of manure solids annually. With our current equipment, we spend approximately 10 days spreading manure solids. Manure is typically spread on corn land in December and on alfalfa immediately after first cutting in May.

Liquids: We collect less than 4 million gallons annually in our runoff holding pond. It requires approximately 20 days of 10-hour operating periods to land apply the liquids. Depending upon pond level, our preference is to use the water on alfalfa from April through September. However, if pond levels approach the marker level indicating that capacity needed for the 25-year, 24-hour storm, we apply liquid to alfalfa as soon as the soil has the ability to absorb the added liquid. At least part of the feedlot quarter is maintained in alfalfa in all years to provide a site for emergency application.

A 25-yr, 24-hr storm event is expected to produce approximately 3 million gallons of runoff. We can pump 324,000 gallons per day in a 12 hour per day pumping period. At this pumping rate, this storm event can be land applied in less than 10 days. If necessary, the 12 hour per day pumping period can be extended.

Type of Equipment: slurry tank...check "ST"; solids spreader...check "SS"; center pivot...check "CP"; other sprinkler...check "OS"; flood irrigation...check "FI"; towed hose tractor unit...check "TH"

Who owns this land application equipment? If Owned by livestock operation...check "O"; If Leased by livestock operation...check "L"; If equipment belongs to a Custom Applicator... check "CA"

Section 4 Example: Manure Nutrient Production and Land Needs

Animal Performance Inputs

		Units
Live Weight of Cattle....		
Entering Feedlot (lbs.):	745	lb
Exiting Feedlot (lbs.):	1,250	lb
Targeted Grade for Marketed Beef:	Choice	
Number of Cattle (Single Turn):	2,500	beef feeder
Number of Cattle Finished per Year:	5,000	beef feeder
Average Days on Feed	163	days
Average Daily Gain	3.1	lb gain/day
Feed Use Efficiency	7.1	lb feed / lb gain

Animal Ration Inputs

Days on Feed	Feed Intake (lb dry wt./head/day)	Dry Matter Digestibility (% DB)	Organic Matter Digestibility (% DB)	Ash ² (% Dry Basis)	Dietary Crude Protein (% Dry Basis)	Dietary Phosphorus (% Dry Basis)
163	22.00	80.0%	83.0%	4.0%	18.7%	0.49%

Nutrient Excretion by Livestock Summary						
Feedlot	488,874	lbs. N/yr		76,256	lbs. P/yr	
Nutrients Remaining After Storage Losses						
	Amount Retained		% Retained	Amount Retained		% Retained
Feedlot	244,437	lbs. N/yr	50%	72,444	lbs. P/yr	95%
Collected Runoff	24,444	lbs. N/yr	5%	3,813	lbs. P/yr	5%
Nutrients Remaining After Field Application Losses						
	Amount Retained		% Retained		Amount Retained	% Retained
			Org -N	NH ₄ -N		
Feedlot	100,281	lbs. N/yr	50%	5%	72,444	lbs. P/yr 100%
Collected Runoff	12,711	lbs. N/yr	70%	50%	3,813	lbs. P/yr 100%
Crop Land Requirements if Manure Nutrients are Distributed According to Crop Nutrient Removal Rates						
Land Base Identified	Available	Nitrogen		P ₂ O ₅		
		Utilized	Remaining	Available	Utilized	Remaining
3,670 ac	100,281 lb	100,281 lb	0 lb	165,896 lb	165,896 lb	0 lb
	850	acres to utilize N		3,670	acres to utilize P	
Crop Land Requirements if Runoff Nutrients are Distributed According to Crop Nutrient Removal Rates						
Land Base Identified	Available	Nitrogen		P ₂ O ₅		
		Utilized	Remaining	Available	Utilized	Remaining
111 ac	12,711 lb	12,711 lb	0 lb	8,731 lb	8,731 lb	0 lb
	111	acres to utilize N		161	acres to utilize P	

Conclusion: Farm currently owns/manages 400 acres of crop land and will need to identify at least 560 acres in manage manure nitrogen immediately and an up to 3400 acres to manage manure phosphorus.

Section 5 Example: Manure Transfer Plan

1. Manure nutrients to be transferred to off-farm users.

The Beef Case Study farm will initiate a manure transfer program with the goal of moving 3,500 tons of manure per year to neighboring crop producers. During our first year, these products will be applied at no cost to the crop producer and applied at a rate designed to meet the crops nitrogen requirements. Side by side demonstration comparing commercial fertilizer and manure will be set up on at least three crop farm sites with an end of year comparison of yields.

The Beef Case Study farm will establish a nutrient management plan for each neighboring crop producer field receiving manure. It will also maintain records to document its implementation. All planning and record keeping will follow the same procedures as currently used on land owned by the beef case study.

If these demonstrations are successful, the beef case study farm will negotiate future prices for manure transfer with neighboring crop producers.

	a. Annual Quantity of Manure Transferred	N Transferred Off-Farm		P ₂ O ₅ Transferred Off-Farm	
		b. Concentration From Manure Analysis	c. Total Annual Transfer (lbs.) [a x b]	d. Concentration From Manure Analysis	e. Total Annual Transfer (lbs.) [a x d]
f. Excess Manure Nitrogen			70,000		
Off-Farm Users: Crop Producers	3,500 <input checked="" type="checkbox"/> Tons <input type="checkbox"/> Gallons <input type="checkbox"/> Acre-in	20 lb/ton	70,000 lb N	28 lb P ₂ O ₅ / t	98,000 lb P ₂ O ₅
h. Unused Manure Nitrogen [Row f – Row g]			0		

2. Services to be offered in support of manure transfer to off-farm users.

a. Handling and application services to be included with manure.

- | | |
|--|---|
| <input checked="" type="checkbox"/> Loading of manure | <input checked="" type="checkbox"/> Transport of manure to site |
| <input checked="" type="checkbox"/> Land application of manure | <input type="checkbox"/> Incorporation of manure |

Describe: Animal feeding operation will load, haul and land apply manure according to a nitrogen rate specified in an NMP

b. Agronomic services to be included for assisting users in agronomic applications of manure.

- | | |
|--|--|
| <input checked="" type="checkbox"/> Calibration of manure applicator | <input type="checkbox"/> Soil testing |
| <input checked="" type="checkbox"/> Manure analysis | <input type="checkbox"/> Consulting agronomist |
| <input checked="" type="checkbox"/> Customer report following application of manure nutrient rates | |

Describe: Crop producer is responsible for collecting soil samples.

c. Nuisance avoidance services to be included with transfer of manure to off-farm user:

- | | |
|---|--|
| <input type="checkbox"/> Incorporation of manure | <input type="checkbox"/> Application setback from homes: _____ |
| <input type="checkbox"/> Composting of manure | <input checked="" type="checkbox"/> Application setback from surface water: 100 ft |
| <input type="checkbox"/> Composting | _____ |
| <input type="checkbox"/> Notification of neighbors | <input type="checkbox"/> Other setbacks: _____ |
| <input type="checkbox"/> Notification of local government | <input type="checkbox"/> Timing to limit nuisance: _____ |

Section 6 Example: Emergency Response Plan

Date: 11/20/XXXX

Farm Name and Location: Beef Case Study Farm

Potential Cause of Discharge. Possible situations which may require an *Emergency Response Plan*:

Power failure Storm/extended wet period Accident

Equipment failure Failure of berm or other facility component:

Describe: **Big Gun irrigator becomes stuck or delivery hose breaks**

In Case of an Emergency:

1. *Implement the following first response or containment steps:*

- a. Determine if any people have been hurt and, if so, call 911 and treat injured persons needs.
- b. Cut power to pumping unit at the holding pond.

2. *Assess the extent of the emergency and determine required help. Collect the following information:*

- Description of emergency Quantity of manure/effluent released Required help
 Obvious damage: employee injury, fish kill, property damage Containment actions in progress
 Other: Identify if any manure has the potential for reaching Yankton Slough

3. *Contact the farm's emergency response team leader:* Joe Manager

Name: Joe Manager

Phone: (402) XXX-YYYY

Name: Jane Owner

Phone: (402) XXX-YYYY

4. *Give the team leader the following information:*

- a. Your Name b. Spill/emergency location c. Information collected in Step 2

5. *Available equipment/supplies for responding to emergency:*

Equipment/Supplies	Contact Person	Phone Number
Square hay bales for containing spill	Feed storage area	
<u>Township road grader</u>	<u>Jack Township</u>	<u>(402) XXX-YYYY</u>
<u>Feedlot tractor with blade</u>		
<u>Portable manure pump & tanker</u>	<u>Jim Neighbor</u>	<u>(402) XXX-YYYY</u>

6. *Contacts to be made by farm's emergency response team leader (discharge should be reported to NDEQ as soon as possible, but in no case less than within 24 hours of discovery):*

Organization	Contact Person	Phone Number
<u>NDEQ</u>		<u>(402) 471-2186</u>
<u>County contact (sheriff or other)</u>	<u>County Emergency Response Officer</u>	<u>(402) XXX-YYYY</u>

7. *Additional containment measures, corrective measures, or property restoration measures.*

Build dyke around spill to minimize its movement toward Yankton Slough
Rover pooled manure with tanker and land apply on dry land.
Spread hay to absorb unrecoverable liquid

8. *Will written report of accident or spill be submitted to NDEQ?* Yes No

(Written report must be filed with NDEQ within five days.)

Section 7 Example: Estimating Crop Nutrient Requirements and Credits

Crops Grown: Corn, Soybeans, Alfalfa

$$\text{Corn Nitrogen Need (lb/ac)} = 35 + (1.2 \times \text{EY}) - (8 \times \text{NO}_3\text{-N ppm}) - (0.14 \times \text{EY} \times \text{OM}) - \text{other N credits} \quad (1)$$

$$\text{Corn Phosphorus Need (lb/ac)} = \text{Removal Rate} \times \text{EY} \times \text{Years} - \text{P Credits} \quad (2)$$

$$\text{EY} = \text{expected yield (bu/ac)} = \text{most recent 3-year yield average} \times 1.05 \quad (3)$$

$\text{NO}_3\text{-N ppm}$ = average nitrate-nitrogen concentration in the root zone (2 to 4 ft. depth) in parts per million,

OM = percent organic matter.

Years = Number of years crop P needs to be met by a single manure application

$$\text{Other N credits} = \text{Legume Credits} + \text{Past Manure Credits} + \text{Commercial Fertilizer Credit} + \text{irrigation water.} \quad (4)$$

$$\text{Other P credits} = \text{Past Manure Credits} + \text{Commercial Fertilizer Credit.} \quad (5)$$

Removal Rates	Units	N	P ₂ O ₅
Corn	lbs/bu	---	0.31

Nutrient need for legume crops (pounds). Assumes 60% of legume fixed N is from manure.

$$\text{Legume Manure N Need (lb/ac)} = 0.6 \times \text{Removal Rate} \times \text{EY} - \text{Other Credits} \quad (6a)$$

$$\text{Legume Manure P Need (lb/ac)} = \text{Removal Rate} \times \text{EY} \times \text{Years} - \text{Other Credits} \quad (6b)$$

Removal Rates	Units	N	P ₂ O ₅
Soybean	lbs/bu	3.5	0.79
Alfalfa	Lbs/T.	46.2	9.3

Commercial Fertilizer Credit (N and P): All commercial fertilizers applied are credited at rates equal to the full N and P values.

Irrigation Water Nitrate Credit:

$$\text{Irrigation credit (lbs. N/ac.)} = \text{Inches applied} \times \text{ppm Nitrate-N} \times 0.227 \quad (7)$$

Legume Nutrient Credit (N only):

Previous Crop	Nitrogen Fertilizer Credits (lbs./acre)	
	Medium/Fine Soils	Sandy Soils
Soybeans	45	45
Soybeans < 30 bu./ac. due to season-long stress	1.0 lb./bu.	1.0 lb./bu.
Sugar beet tops, followed by dry beans	100	100
Alfalfa (70-100% stand, >4 plants/ft ²)	150	100
Alfalfa (30-69% stand, 1.5 to 4 plants/ft ²)	120	70
Alfalfa (0-29% stand, <1.5 plants/ft ²)	90	40

Past Manure Application Credit (N only):

$$\text{Organic N Credit} = \text{Manure Application Rate} \times \text{Organic-N content} \times \text{Factor} \quad (8)$$

Factor for Next Year: 0.15

Factor for 2 Years From Now: 0.07

Factor for 3 Years From Now: 0.04

Section 8 Example: Estimating Manure Nitrogen Application Rates

Calculations:

$$\text{N-Based Application Rate} = \text{Net Crop Nutrient Requirement} / \text{Crop Available Manure Nitrogen} \quad (9)$$

$$\text{Crop Available Manure N (first year)} = (\text{NH}_4\text{-N} \times \text{Availability factor}) + (\text{Org-N} \times \text{Availability factor}) \quad (10)$$

Example for surface applied solid beef manure with no incorporation:

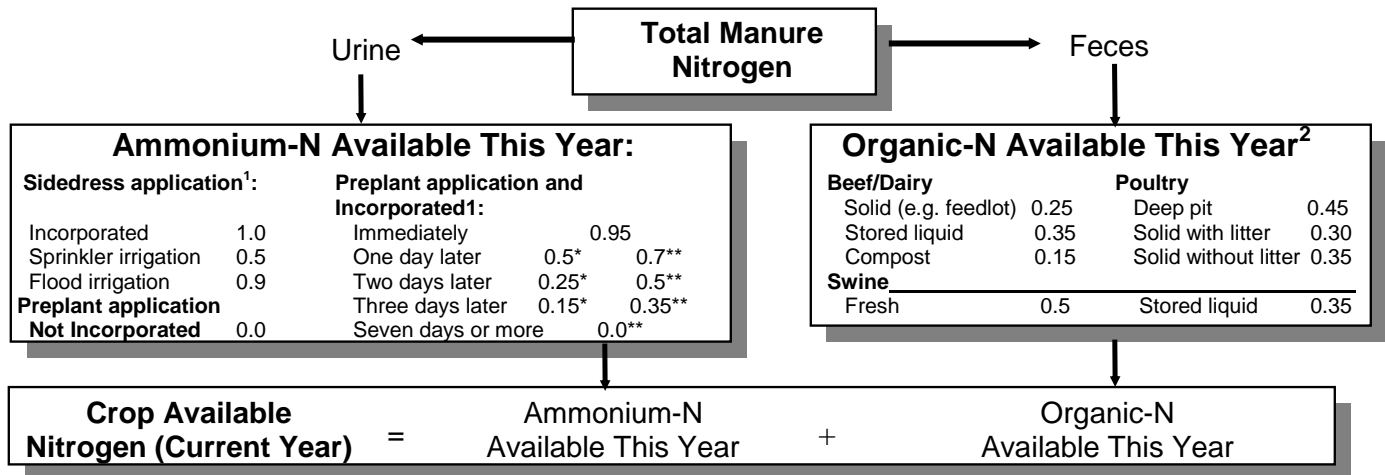
$$\text{Crop Available Manure N (first year)} = [4 \times 0.0] + [14.5 \times 0.25] = 3.6 \text{ lbs of crop available N/ton}$$

Example for runoff holding pond liquid application through pivot:

$$\text{Crop Available Manure N (first year)} = [46 \times 0.5] + [6 \times 0.35] = 25 \text{ lbs of crop available N/acre-inch}$$

Assumes manure sample for solids show 4 lbs $\text{NH}_3\text{-N/ton}$ and 14.5 lbs Org.-N/ton and for holding pond water shows 46 lbs $\text{NH}_3\text{-N/ton}$ and 6 lbs Org.-N/ton

Assumptions:



¹ Incorporation can be accomplished by tillage or by a 0.50 inch or greater rainfall.

² Organic-N availability assumes spring seeded crops such as corn and soybeans. For winter or spring manure application prior to planting small grains, multiply organic-N availability factor by 0.7. For late summer or fall manure application prior to planting small grains, use the organic N values shown in Figure 1.

*Solid Manure; **Liquid Manure

Section 9 Example: Estimating Manure Phosphorus Application Rates

Calculations:

$$\text{P-Based Application Rate} = \text{Corn Phosphorus Need (2)} / \text{Manure P Content} \quad (11)$$

Corn Phosphorus Need was calculated previously in equation 2

Manure P Content is representative concentration of manure P from manure analysis

P-Index Interpretation: The Nebraska P-Index developed by the University of Nebraska (2006) will be used for analysis. The P Index risk value is the sum of the erosion and runoff components. The interpretation of risk and recommended manure application risk fall into one of four levels:

Low (0-2). Current practices keep water quality impairment low due to agricultural P pollution. Manure can be applied at rates sufficient to meet crop P needs.

Medium (2-5). Delivery of agricultural P may cause some water quality impairment and consideration should be given to alternative conservation and P management practices. Manure can be applied at rates sufficient to meet crop N needs.

High (5-15). Phosphorus loss from the field causes much water quality impairment. Remedial action, such as alternative conservation measures or P management practices, is required. Manure can be applied, but applied P should not exceed crop P removal. Crop P removal can be the sum of single year crop P removal over 5 years with no manure application during the next four years to this same field.

Very High (> 15). Impairment of water quality is extreme and remedial action is urgently required. Phosphorus application should be discontinued. Improved conservation measures should be implemented.




Requirements for application of a phosphorus-based manure rate to a field include:

- a. No single manure application shall exceed the nitrogen-based rate of the planned crop receiving the particular manure application.
- b. Phosphorus in manure should be considered 100 percent available unless soil phosphorus concentrations are below optimum levels for crop production. In that case, values suggested in State University extension publication PM 0000, "Managing Manure Nutrients for Crop Production" will be used.
- c. If the actual crop schedule differs from the planned crop schedule, then any surplus or deficit of phosphorus shall be accounted for in the subsequent manure application.

85

Assessment completed in 2007

Field	P-Index Value	Application Rate
Field 1 – Pivot	0.7	N-Based rate
Field 2 – Feedlot Quarter	1.2	N-Based rate
Field 3 – Dry Quarter (West)	10.3	P-Based rate – 4 year P supply for single application
Field 3 – Dry Quarter (East)	6.6	P-Based rate– 4 year P supply for single application

	A	B	C	D	E	F	G	H		
1			Nebraska Phosphorus Index							
2										
3										
4										
5	Prepared by:	<u>Jane Doe</u>								
6	Prepared for:	<u>Joe Farmer</u>								
7	County	Pierce		Pierce		Pierce				
8	Field	Field 1 - Pivot		Field 2 - Feedlot Qtr		Field 3 -Dry Qtr (West)				
9	Option									
10	Erosion, S&R	2.0		1.0		7.6				
13	Filter width	20-35 ft.		0-10 ft		20-35 ft.				
14	Enrichment	Tillage		Perennial Forage and Grass		Tillage				
15	Land use	Conservation Till without contour Perennial Forage, Grass, or Hay Conservation Till with contour								
16		High Residue Crop/Low residue Meadow/grass hayland (non gra Row crop High Residue/Low								
17	Soil type	Hord-Hobbs silt loams, 0 to 7 pe Nora silt loam, 7 to 11 percent sl Nora silt loam, 7 to 11 percer								
18	Soil P (ppm)	13.0		55.0		250.0				
19	Applied P lbs	250.0		100.0		150.0				
20		Surface Application, No Incorpor Incorporate or Inject Within 24 Hr Select the application method								
21	Irrigation	Sprinkler		Sprinkler		None				
22	Rate gpm									
23	Furrow slope%									
24	Manure	7		0		5				
25	P-Index Value	0.7		1.2		10.3				
26	County	Pierce								
27	Field	Field 3 -Dry Qtr (East)								
28	Option									
29	Erosion, S&R	4.3								
30	Sediment trap	None								
31	Field radius	0.0								
32	Filter width	20-35 ft.								
33	Enrichment	Tillage								
34	Land use	Conservation Till without contouring								
35		High Residue Crop/Low residue Crop - mt								
36	Soil type	Hord-Hobbs silt loams, 0 to 7 percent slopes								
37	Soil P (ppm)	278.0								
38	Applied P lbs	150.0								
39		Surface Application, No Incorporation								
40	Irrigation	None								
41	Rate gpm									
42	Furrow slope%									
43	Manure	5								
44	P-Index Value	6.6		0.4		0.4				
45	<i>P -Index Value 0 to 2 = Low risk, 2 to 5 = Medium risk, 5 to 15 = High risk, 15+ = Very high risk</i>									
46										
47										
48		Extension is a Division of the Institute of Agriculture and Natural Resources at the University of Nebraska-Lincoln cooperating with the Counties and the United States Department of Agriculture.								
49										
50		University of Nebraska-Lincoln Extension educational programs abide with the nondiscrimination								
51		policies of the University of Nebraska-Lincoln and the United States Department of Agriculture.								

Section 10 Example: Protocols for Manure and Soil Sampling

Soil Sampling

	Field 1 – Pivot (Corn /soybean rotation)	Field 2 – Feedlot Quarter (3 yr alfalfa and 1 yr corn rotation)	Field 3 – Dry Quarter (Corn /soybean rotation)
Frequency and Soil Sampling for N and P	Pooled 8-inch deep soil samples will be collected every five years at a minimum. Field will be divided into quarters will soil samples collected from pivot irrigated areas. Four deep soil sample will be collected each year prior to corn production.	Pooled 8-inch deep soil samples will be collected every five years at a minimum. Field will be divided into three areas from which soil samples collected. Three deep soil sample will be collected each year.	Pooled 8-inch deep soil samples will be collected every five years at a minimum. Three samples will be collected from area west of Yankton Slough and one from area east of slough.. Four deep soil sample will be collected each year prior to corn production.
Sampling Procedures for N and P: (e.g. no. of cores / area, depth, acres / sample area, etc.)	Nebguide G91-1000-A, Guidelines for Soil Sampling, will be used as a basis for all procedures		
Sample Analysis Procedures for N and P:	<input checked="" type="checkbox"/> Soil nitrate <input checked="" type="checkbox"/> Bray 1 for P <input type="checkbox"/> Olsen for P Lab: _____ <input type="checkbox"/> Melich III for P <input type="checkbox"/> Other: _____		
Source (e.g. UNL) of Nitrogen and Phosphorus Recommendations	UNL Recommendations		

Additional Crop Nutrient Status Measurements

(e.g., other soil nitrate tests, irrigation water tests, chlorophyll meter readings, corn stalk nitrate test)

Test:	Separate stalk nitrate tests will be conducted for irrigated and dryland corn. Tests will be completed every third year
-------	---

Timing of Selected Activities. Check appropriate months when practice should occur.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
8-inch samples											X	X
Deep soil Samples			X	X								

Manure Sampling

	Manure Handling System: Feedlot Manure Solids	Manure Handling System: Runoff Holding Pond Water
Manure Sampling Frequency:	Two samples taken annually associated with timing of each pen clean out period (typically May and November).	Annually
Sample Collection Procedures: (see publications No. 4 and 7, pg. 40)	Sample associated with May cleanout should be taken from stock piles just prior to land application. Sample associated with November cleanout should be taken at time of spreader loading (typically as pens are cleaned). Procedures defined in NebFact 02-507 "Manure Testing: What to Request?" and Nebguide G02-1450 "A Sampling Manures for Nutrient Analysis" will be followed.	One sample will be collected annually, typically during first pump out event in spring. Procedures defined in NebFact 02-507 "Manure Testing: What to Request?" and Nebguide G02-1450 "A Sampling Manures for Nutrient Analysis" will be followed.
Analysis to be Completed	<input checked="" type="checkbox"/> Total nitrogen (required) <input checked="" type="checkbox"/> Ammonium nitrogen (required) <input checked="" type="checkbox"/> Organic nitrogen (recommended) <input checked="" type="checkbox"/> Phosphorus (recommended) <input checked="" type="checkbox"/> Potassium <input checked="" type="checkbox"/> Trace minerals <input checked="" type="checkbox"/> Moisture or solids content (recommended) <input checked="" type="checkbox"/> pH <input checked="" type="checkbox"/> Electrical conductivity (recommended*) <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Total nitrogen (required) <input checked="" type="checkbox"/> Ammonium nitrogen (required) <input checked="" type="checkbox"/> Organic nitrogen (recommended) <input checked="" type="checkbox"/> Phosphorus (recommended) <input checked="" type="checkbox"/> Potassium <input checked="" type="checkbox"/> Trace minerals <input checked="" type="checkbox"/> Moisture or solids content (recommended) <input checked="" type="checkbox"/> pH <input checked="" type="checkbox"/> Electrical conductivity (recommended*) <input type="checkbox"/> Other: _____
Other: (e.g. laboratory used)		

Timing of Selected Activities. Check appropriate months when sampling should occur.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Manure sampling												
Solids at pen cleanout											X	
Solids from stockpiles							X					
From holding pond water			X									

Section 11 Example: Producer Instructions and Adjustments

Crop Nutrient Requirement Calculations

- All calculations are repeated annually based upon updated information on yields, previous crops, previous years manure applications, and commercial fertilizer application plans.

Application Rates

- Manure analysis is completed at least annually.
- Each field application rate is adjusted annually based on crop nutrient requirements, the results of the most recent P-Index, manure analysis, and the method of application.

Timing of Manure Application. Manure applications timing shall be adjusted to match a crop production year starting and ending in November for row crops. Timing will be adjusted to consider:

- Soil moisture conditions. Manure application timing may be adjusted if soil moisture levels present a risk for runoff or tile drains are flowing.
- Weather conditions and forecast. Forecasted precipitation suggests a potential for significant field runoff.
- Planned crop rotation is modified.

Solid Manure Spreader Calibration

$$\text{Rate per acre (T/ac)} = \frac{\text{Spreader Capacity T} \times 43560}{(\text{Width}^* \times \text{Travel Distance})}$$

* Distance moved over in field with each pass through field.

Example: 20 ton manure solids spreader makes a pass every 6 30" corn rows (15 feet) and empties spreader in 2400 feet is applying 24 tons per acre.

$$\text{Rate per acre} = \frac{20 \text{ ton} \times 43560}{(15' \times 2400')} = 24 \text{ ton /acre}$$

Irrigation Application Calibration

- a. Estimate pumping time: _____ hours
- b. Estimate water flow rate: _____ gallons per minute
- c. Estimate acres covered: _____ acres
- d. Estimate application rate:

$$\text{Inches (or ac-in/ac)} = \frac{\text{Pumping Time} \times \text{Flow Rate}}{\text{Acres} \times 450} = \frac{\text{X}}{\text{X} \times 450} = \text{_____ in.}$$

Records for cropping system nutrient plan

- Records are to be maintained which summarize verifiable yields, the results of the P-Index, previous crops, previous manure applications, and commercial fertilizer applied for all fields that will potentially receive manure.
- Records of manure analysis and the method of application on each field receiving manure shall also be maintained.

Recommended Records, Inspections, Logs	Sample Record
Strategic Plans/Records	
Standard operating procedures for: Soil testing Manure sample collection P Index Results	Section 6 of Strategic Plan
Annual or Continuously Updated Records Most items should be completed for each field or management area	
<p>Field Nutrient Balance:</p> <ul style="list-style-type: none"> a. Crop Available manure nutrient credit b. Annual pre-season plan for field-specific nitrogen and phosphorus balance summarizing planned crops, yields, nutrient credits for all nutrient sources). c. Post-season summary of crops grown, actual yields and nutrient balance <p>Application Plan for equipment operator:</p> <ul style="list-style-type: none"> a. Annual application plan identifying location, rate, form, method, and timing for manure and fertilizer. b. Post season summary of manure and fertilizer application rate <p>Field specific nutrient application record:</p> <ul style="list-style-type: none"> a. Date, rate, method and weather conditions (24 hours prior and following application) for manure application. b. Date and rate of fertilizer application c. Irrigation water use and nitrate analysis <p>Testing and monitoring</p> <ul style="list-style-type: none"> a. Field specific soil test results b. Manure source specific test results <p>Application equipment records</p> <ul style="list-style-type: none"> a. Application equipment calibration results b. Irrigation equipment checklist for backflow protection c. Irrigation equipment maintenance log <p>Report of all manure spills resulting from land application to permitting authority (phone notification in 24 hours and written report within 5 days...check with your permitting authority for possible differences in reporting times for your individual state.</p> <p>Annual Report (Submitted to permitting authority by January 31 of each year)</p> <ul style="list-style-type: none"> a. Total number of acres of land that are covered by this facility's nutrient management plan b. Total number of acres of land where manure, litter, or process wastewater generated at this facility was spread. Include only land application areas that are under the control of this CAFO facility. c. Is the facility's nutrient management plan developed or approved by a certified nutrient management planner? d. Amount of manure, litter, and process wastewater that were generated at the facility in the 12 month period covered by this report. 	<p style="text-align: center;">Part A, B, and C Of Annual Plan (Sect. 7, 8, and 9) or Annual Pre-Season Plan and Post- Season Summary for N and P (Heartland¹ – pg 26-27)</p> <p style="text-align: center;">Equipment Operators Nutrient Applicators Plan (Heartland¹ – pg 29)</p> <p style="text-align: center;">Solid Manure And Irrigation Field Application Record (Heartland¹ – pg 30 & 32)</p> <p style="text-align: center;">Attach Lab Summary & Enter into Part B, Crop Available Nutrients (pg 6)</p> <p style="text-align: center;">Solid Manure Spreader Calibration & Maintenance (Heartland¹ – pg 35-36, 39-40)</p> <p style="text-align: center;">Livestock Waste Discharge Notification (Heartland¹ – pg 21-22)</p> <p style="text-align: center;">Annual NPDES Report (Heartland¹ – pg 45-47)</p>

¹ Heartland refers to Heartland Regional Water Quality project publication "Records Checklist and Samples for Animal Feeding Operations" found at <http://www.heartlandwg.iastate.edu/ManureManagement/recordkeeping/checklistandforms/planrecordschecklist>.

Section 12 Example: Annual Plan - Individual Field Expected Yields and Nutrient Requirements

Sample Calculations

Field 1 – Pivot
Reference:

Expected Yield (2007)
 $[(163 + 158 + 166)/3] \times 1.05 = 170$
 Strategic Plan (equation 5)

N Requirement (2007)
 $35 + (1.2 \times \text{EY}) - (8 \times 5) - (0.14 \times 170 \times 2) = 191$
 Strategic Plan (equation 1)

P₂O₅ Requirement (2007)
 $0.31 \times 170 \times 1 \text{ yr} - 0 = 53$
 Strategic Plan (equation 2)

Nitrogen Annual Field Plan

Field or Management Area: Field 1 – Pivot **Soil Organic Matter:** Yr.: 2006, 2.0 %. Yr.: , %.

If irrigated: Acre-inches / year (for Col. h): 6 **NO₃-N conc. of irrigation water:** Yr.: 2007, 9 ppm. Yr.: , ppm.

a. Year	b. Previous Crop	c. Planned Crop	d. Actual Yield / Expected Yield bu./ac.	e. Soil Test Nitrate-N (average ppm)	f. Total Nitrogen Need or Removal (Ref. Table R-5 to R-17) (lbs./acre)	Nitrogen Credits (lbs./acre)			j. Fertilizer Nitrogen Credit (Starter, etc.) (lbs./ac.)	k. Net N Need Before Manure Applica- tion (Cols. f-g - h - i - j) (lbs./ac.)	l. Manure Applic. Option (write line no. from Form 17, Col. a)	m. Planned Manure Application Rate (Form 17, Col. c) (tons/ac, gal./ac, or in./ac.)	n. Rate of Manure Nitrogen Available (Form 17, Col. j) (lbs./ac.)	o. Extra Nitrogen Needed as Fertilizer (Cols. k-n) (lbs./ac.)
						g. Manure N from Past Years (Form 17, Col. k-m) (lbs./ac.)	h. Irrigation Water N (ppm x 0.227 x Ac.-in.) (lbs./ac.)	i. Legume / Green Man. N (Ref. Table R-4) (lbs./ac.)						
2004	soybean	corn	163											
2005	soybean	corn	158											
2006	corn	soybeans	166											
2007	soybean	corn	170	5	151	30	12	45	0	64	B	20 t/ac	73	0
2008	corn	soybeans												
2009														
2010														
2011														

Phosphorus Annual Field Plan

a. Crop Year	Manure Phosphorus Availability					Crop Phosphorus Balance								
	b. Manure Handling System	c. Planned Manure Application Rate	d. Manure Phosphorus (P ₂ O ₅) Concentration from Analysis	e. Phos. Avail- ability Factor (0.7 or 1.0)	f. Phos- phorus Manure Credit (c x d x e) (lb./ac.)	Planned Crop		i. Soil Test Phos- phorus (ppm) & Method	j. Phos- phorus (P ₂ O ₅) Recom- menda- tion (lb./ac.)	k. P Fer- tilizer Applica- tion (P ₂ O ₅) (lbs./ac.)	Crop P (P ₂ O ₅) Removal (<u>use only if no soil test is available</u>)		n. P ₂ O ₅ Balance (Cols. f + k - m) (lbs./ac)	o. Potential Soil P ₂ O ₅ Increase or Decrease (n ÷ 20) (ppm)
						g. Name	h. Expect- ed Yield				l. Factor (See Table R- 1)	m. Total P Removed (h x l)		
2004		<input checked="" type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input checked="" type="checkbox"/> lbs./ton <input type="checkbox"/> lbs./1000 gal <input type="checkbox"/> lbs./ac-in		lbs./acre						lbs./acre	lbs./acre	lbs./acre	
2005		<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> lbs./ton <input type="checkbox"/> lbs./1000 gal <input type="checkbox"/> lbs./ac-in		lbs./acre						lbs./acre	lbs./acre	lbs./acre	
2006		<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> lbs./ton <input type="checkbox"/> lbs./1000 gal <input type="checkbox"/> lbs./ac-in		lbs./acre						lbs./acre	lbs./acre	lbs./acre	
2007	Beef open lot	20 <input checked="" type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	18.7 <input checked="" type="checkbox"/> lbs./ton <input type="checkbox"/> lbs./1000 gal <input type="checkbox"/> lbs./ac-in	0.7	262 lbs./acre	Corn	170	13	- lbs./acre	0	0.31	53 lbs./acre	- 117 lbs./acre	6
2008		<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> lbs./ton <input type="checkbox"/> lbs./1000 gal <input type="checkbox"/> lbs./ac-in		lbs./acre						lbs./acre	lbs./acre	lbs./acre	
2009		<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> lbs./ton <input type="checkbox"/> lbs./1000 gal <input type="checkbox"/> lbs./ac-in		lbs./acre						lbs./acre	lbs./acre	lbs./acre	
2010		<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> lbs./ton <input type="checkbox"/> lbs./1000 gal <input type="checkbox"/> lbs./ac-in		lbs./acre						lbs./acre	lbs./acre	lbs./acre	
2011		<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> lbs./ton <input type="checkbox"/> lbs./1000 gal <input type="checkbox"/> lbs./ac-in		lbs./acre						lbs./acre	lbs./acre	lbs./acre	

Section 13 Example. Annual Plan - Crop Available Nutrients

Sample Calculations

	<u>N – Current Year (2007)</u>	<u>N – Next Year (2007)</u>	<u>N – 2 yrs from now (2007)</u>	<u>N – 3 yrs from now (2007)</u>	<u>P₂O₅ Available (2007)</u>
Scraped Solids from Pens:	$30 \times (4 \times 0.0 + 14.5 \times 0.25) = 109$	$30 \times 14.5 \times 0.15 = 65$	$30 \times 14.5 \times 0.07 = 30$	$30 \times 14.5 \times 0.04 = 17$	
Reference:	Strategic Plan (equation 7)	Strategic Plan (equation 8)	Strategic Plan (equation 9)	Strategic Plan (assumption i)	

Results

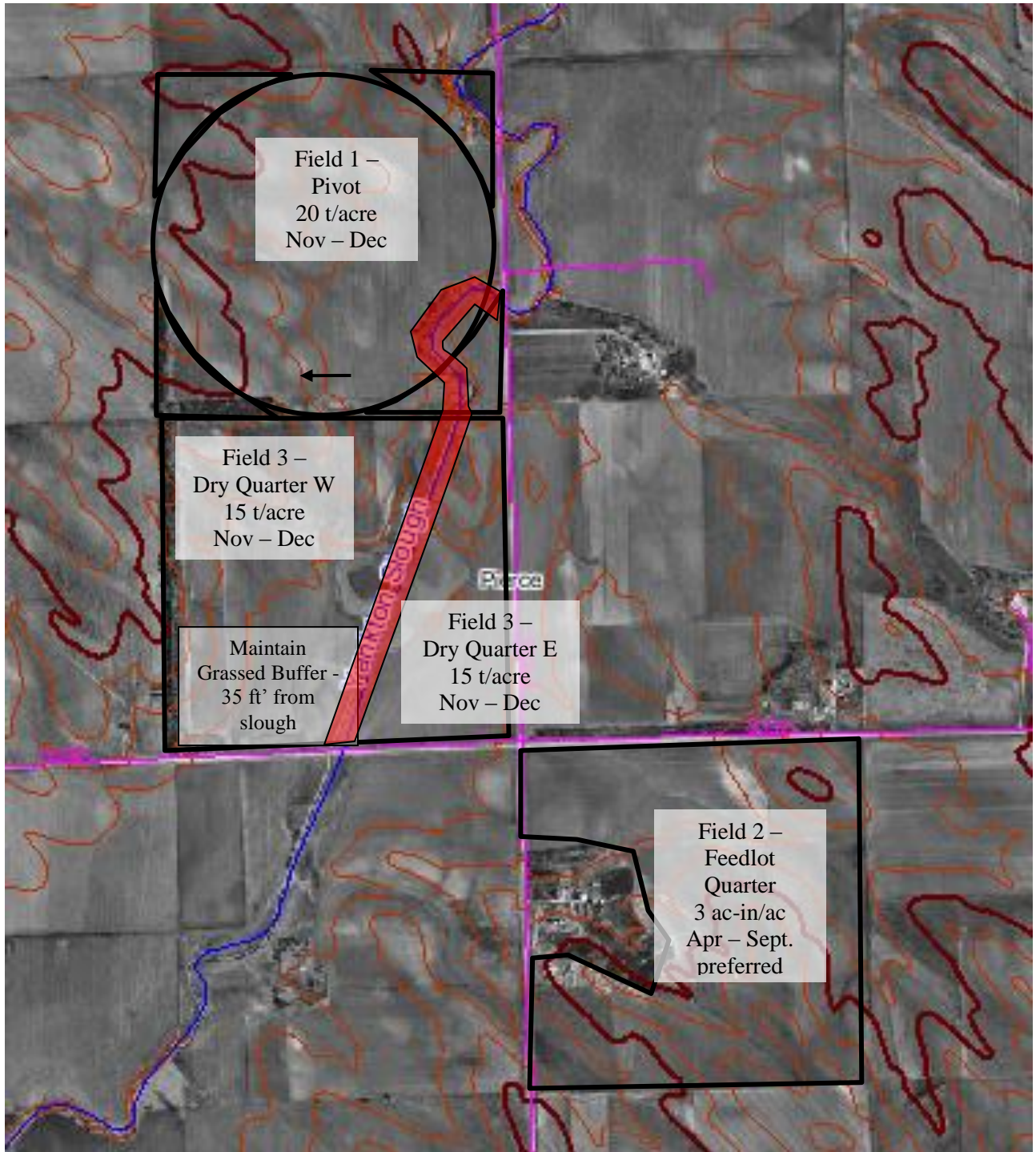
Manure Application Options			Ammonium-N Available This Year				Organic-N Available This Year			j. This Year's Total N Available (f + i) (lbs./ac)	Organic-N Available		
a. Option #	b. Manure Source, Season of Application, and Incorporation	c. Planned Application Rate	d. Ammonium-N Content ("as is" basis)	e. Avail- able Factor (see <i>Figure 1</i>)	f. Available NH ₄ -N (c x d x e) (lbs./ac.)	g. Organic-N Content ("as is" basis)	h. Avail- able Factor (see <i>Figure 1</i>)	i. Available Organic-N (c x g x h) (lbs./ac.)	k. Next Year (c x g x 0.15) (lbs./ac)		l. 2 Years from Now (c x g x 0.07) (lbs./ac.)	m. 3 years from Now (c x g x 0.04) (lbs./ac)	
A	Beef feedlot manure solids, not incorporated	30 <input checked="" type="checkbox"/> tons/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	4 <input checked="" type="checkbox"/> Lbs./ton <input type="checkbox"/> Lbs./1000 gal <input type="checkbox"/> Lbs./ac-in	0.0	0	14.5 <input checked="" type="checkbox"/> Lbs./ton <input type="checkbox"/> Lbs./1000 gal <input type="checkbox"/> Lbs./ac-in	0.25	109	109	65	30	17	
B	Feedlot manure solids, not incorporated	20 <input type="checkbox"/> tons/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	4 <input type="checkbox"/> Lbs./ton <input type="checkbox"/> Lbs./1000 gal <input type="checkbox"/> Lbs./ac-in	0.0	0	14.5 <input type="checkbox"/> Lbs./ton <input type="checkbox"/> Lbs./1000 gal <input type="checkbox"/> Lbs./ac-in	0.25	73	73	44	20	12	
C	Feedlot manure solids, not incorporated	15 <input type="checkbox"/> tons/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	4 <input type="checkbox"/> Lbs./ton <input type="checkbox"/> Lbs./1000 gal <input type="checkbox"/> Lbs./ac-in	0.0	0	14.5 <input type="checkbox"/> Lbs./ton <input type="checkbox"/> Lbs./1000 gal <input type="checkbox"/> Lbs./ac-in	0.25	54	54	33	15	9	
D		<input type="checkbox"/> tons/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> Lbs./ton <input type="checkbox"/> Lbs./1000 gal <input type="checkbox"/> Lbs./ac-in			<input type="checkbox"/> Lbs./ton <input type="checkbox"/> Lbs./1000 gal <input type="checkbox"/> Lbs./ac-in							
E		<input type="checkbox"/> tons/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> tons/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac			<input type="checkbox"/> tons/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac							

Section 14 Example: Annual Plan - Action Plan

Year : 2007

Field ID	Manure Source	Planned Manure Application Rate		Incorporate Into Soil? ____ days	Manure Nutrient Applic. Rate (lbs./acre)		Suggested Timing of Manure Application	Commercial Fertilizer Rate (lbs./acre)		Application Instructions
					N	P ₂ O ₅		N	P ₂ O ₅	
Field 1 - Pivot	beef open lot solids	20	<input checked="" type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> Yes, <input checked="" type="checkbox"/> No	73	170	<input type="checkbox"/> J <input type="checkbox"/> F <input type="checkbox"/> M <input type="checkbox"/> A <input type="checkbox"/> M <input type="checkbox"/> J <input type="checkbox"/> J <input type="checkbox"/> A <input type="checkbox"/> S <input type="checkbox"/> O <input checked="" type="checkbox"/> N <input checked="" type="checkbox"/> D	0	0	35 ft. grass buffer on slough
Field 2 – Feedlot Quarter	holding pond liquid	3	<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input checked="" type="checkbox"/> ac-in/ac	<input type="checkbox"/> Yes, <input checked="" type="checkbox"/> No	120	100	<input type="checkbox"/> J <input type="checkbox"/> F <input type="checkbox"/> M <input checked="" type="checkbox"/> A <input checked="" type="checkbox"/> M <input checked="" type="checkbox"/> J <input checked="" type="checkbox"/> J <input checked="" type="checkbox"/> A <input type="checkbox"/> S <input type="checkbox"/> O <input type="checkbox"/> N <input type="checkbox"/> D As needed based upon storm events	0	0	
Field 3 – Dry Qtr (East)	beef open lot solids	15	<input checked="" type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> Yes, <input checked="" type="checkbox"/> No	54	130	<input type="checkbox"/> J <input type="checkbox"/> F <input type="checkbox"/> M <input type="checkbox"/> A <input type="checkbox"/> M <input type="checkbox"/> J <input type="checkbox"/> J <input type="checkbox"/> A <input type="checkbox"/> S <input type="checkbox"/> O <input checked="" type="checkbox"/> N <input checked="" type="checkbox"/> D	0	0	35 ft. grass buffer on slough
Field 3 – Dry Qtr (West)	beef open lot solids	15	<input checked="" type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> Yes, <input checked="" type="checkbox"/> No	54	130	<input type="checkbox"/> J <input type="checkbox"/> F <input type="checkbox"/> M <input type="checkbox"/> A <input type="checkbox"/> M <input type="checkbox"/> J <input type="checkbox"/> J <input type="checkbox"/> A <input type="checkbox"/> S <input type="checkbox"/> O <input checked="" type="checkbox"/> N <input checked="" type="checkbox"/> D	0	0	35 ft. grass buffer on slough
			<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> Yes, <input type="checkbox"/> No			<input type="checkbox"/> J <input type="checkbox"/> F <input type="checkbox"/> M <input type="checkbox"/> A <input type="checkbox"/> M <input type="checkbox"/> J <input type="checkbox"/> J <input type="checkbox"/> A <input type="checkbox"/> S <input type="checkbox"/> O <input type="checkbox"/> N <input type="checkbox"/> D			
			<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> Yes, <input type="checkbox"/> No			<input type="checkbox"/> J <input type="checkbox"/> F <input type="checkbox"/> M <input type="checkbox"/> A <input type="checkbox"/> M <input type="checkbox"/> J <input type="checkbox"/> J <input type="checkbox"/> A <input type="checkbox"/> S <input type="checkbox"/> O <input type="checkbox"/> N <input type="checkbox"/> D			
			<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> Yes, <input type="checkbox"/> No			<input type="checkbox"/> J <input type="checkbox"/> F <input type="checkbox"/> M <input type="checkbox"/> A <input type="checkbox"/> M <input type="checkbox"/> J <input type="checkbox"/> J <input type="checkbox"/> A <input type="checkbox"/> S <input type="checkbox"/> O <input type="checkbox"/> N <input type="checkbox"/> D			
			<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> Yes, <input type="checkbox"/> No			<input type="checkbox"/> J <input type="checkbox"/> F <input type="checkbox"/> M <input type="checkbox"/> A <input type="checkbox"/> M <input type="checkbox"/> J <input type="checkbox"/> J <input type="checkbox"/> A <input type="checkbox"/> S <input type="checkbox"/> O <input type="checkbox"/> N <input type="checkbox"/> D			
			<input type="checkbox"/> Ton/ac <input type="checkbox"/> 1000 gal/ac <input type="checkbox"/> ac-in/ac	<input type="checkbox"/> Yes, <input type="checkbox"/> No			<input type="checkbox"/> J <input type="checkbox"/> F <input type="checkbox"/> M <input type="checkbox"/> A <input type="checkbox"/> M <input type="checkbox"/> J <input type="checkbox"/> J <input type="checkbox"/> A <input type="checkbox"/> S <input type="checkbox"/> O <input type="checkbox"/> N <input type="checkbox"/> D			

Fields Owned or Managed by Beef Case Study Feeding Operation



Manure Nutrient Excretion Estimator. Total nutrients excreted by a livestock based on feed ration inputs.

This worksheet only considers feed intake and not feed disappearance. If excess feed ends up in the manure, then the amount of excess feed and its nutrients needs to be added to the nutrient excreted values for an accurate estimation.

Date: _____

I. Feed Nutrient Intake

Animal Group	A. Daily Feed Intake (lbs DM/day)	B. Feed Nutrient Concentration			C. Total Nutrient in Feed (lbs) = A X B	
		Protein	N ^a	P	N (lbs)	P (lbs)
<i>Beef Example</i>	27,000	0.135	0.0216	0.0035	583	94.5

II. Nutrients Retained

a. Animal

Animal Group	D. Number of Animals	E. Average Daily Gain	F. Live Weight Nutrient Concentration		G. Nutrients Retained by Animal (lbs) = D x E x F	
			N	P	N (lbs)	P (lbs)
<i>Beef Example</i>	1,000	4.08	0.016	0.0070	65.3	28.6
Beef			0.016	0.0070		
Dairy			0.012	0.0070		
Pork			0.023	0.0072		
Hens			0.022	0.0060		
Broilers			0.026	0.0060		
Turkeys			0.021	0.0060		

b. Animal Products

Animal Product	H. Production (lbs/day)	I. Animal Products Nutrient Concentration		J. Nutrients Retained by Animal Products (lbs) = H x I	
		N	P	N (lbs)	P (lbs)
Milk ^b		0.0050	0.0010		
Eggs ^b		0.0166	0.0021		

III. Nutrients Excreted

Animal Group	K. Days Fed per Year	L. Animal Nutrient Excreted in Elemental Form = K x (C - G) or = K x (C - J)		
		N (lbs/yr)	P (lbs/yr)	P ₂ O ₅ ^c (lbs/yr)
<i>Beef Example</i>	350	181,195	23,065	52,358

CALCULATION SPACE

^a N in feed = Protein ÷ 6.25

^b N in milk = Protein ÷ 6.28; N in eggs = Protein ÷ 6.25; Assumes 3.2% and 10.4% protein in milk and eggs, respectively.

^c lbs P₂O₅ = lbs P x 2.29