WM796

OPTIMIZATION OF BEST MANAGEMENT PRACTICES FOR BEEF CATTLE RANCHING IN THE LAKE OKEECHOBEE BASIN, Part 2.

PROGRESS REPORT #1

November 07, 2001

by
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November 2, 2001

This initial progress report presents accomplishments to date on the following project tasks:

Task 1. Project Work Plan and QAPP

Task 4. Soil and Water Quality Assessments

Task 1. Work Plan and QAPP

The project work plan and QAPP are completed and are presently available at www.intellitemps.net/canetti Upon updating of the project website, these files will also be accessible at www.agen.ufl.edu/~maerc

Task 4. Soil and Water Quality Assessments

Water quality sampling data collected from the 16 pasture sites during the calendar year 2000 has been tabulated and summarized for evaluation of mean annual concentrations by site and by pasture array (winter vs. summer). Overall, results of the year 2000 water quality data collection are inconclusive due to the lack of significant stormwater runoff volumes during this relatively dry year experienced at MAERC. The mean TP concentrations for each pasture plot show no correlation with BMP treatments (cattle stocking rate). In addition, the mean TP concentrations measured in the year 2000 exhibit significant differences relative to the data collected in 1998 and 1999, as shown in Figure 1 and Table 1. Figures 2-5 and Tables 2-5 present TP, NO_x, NH_4 and TKN concentration summary statistics for the summer and winter pasture plots, as measured during the year 2000.

Table 1. Summary statistics for ISCO samples Total P concentration results from summer and winter pastures for the year 1998, 1999 and 2000 showing mean phosphorus concentrations in mg/L (C represents the control plots).

Station Code	Treatment	Rep	Average TP in mg/L			Number of Measurements		
			1998	1999	2000	1998	1999	2000
S1	C	1	0.35	0.51	0.06	97	49	20
S2	20	1	0.19	0.56	0.29	41	44	6
S3	35	1	0.76	0.48	0.07	7	29	5
S4	15	1	0.47	0.58	0.64	91	45	14
S5	35	2	0.62	0.65	0.42	69	42	28
S6	15	2	0.33	0.58	0.54	112	53	21
S7	20	2	0.22	0.60	0.25	125	68	79
S8	C	2	0.76	0.65	1.05	83	52	32
Summer Average			**0.46**	**0.58**	**0.42**	**78**	**48**	**26**
W1	15	1	0.06	0.13	0.25	188	51	16
W2	20	1	0.06	0.19	0.13	144	38	15
W3	35	1	0.10	0.08	0.50	204	31	15
W4	C	1	0.06	0.07	0.14	131	74	17
W5	35	2	0.06	0.10	0.31	188	43	15
W6	15	2	0.08	0.07	0.78	183	51	8
W7	C	2	0.13	0.22	0.32	158	36	10
W8	20	2	0.07	0.10	0.30	217	22	14
Winter Average			**0.08**	**0.12**	**0.34**	**177**	**43**	**14**

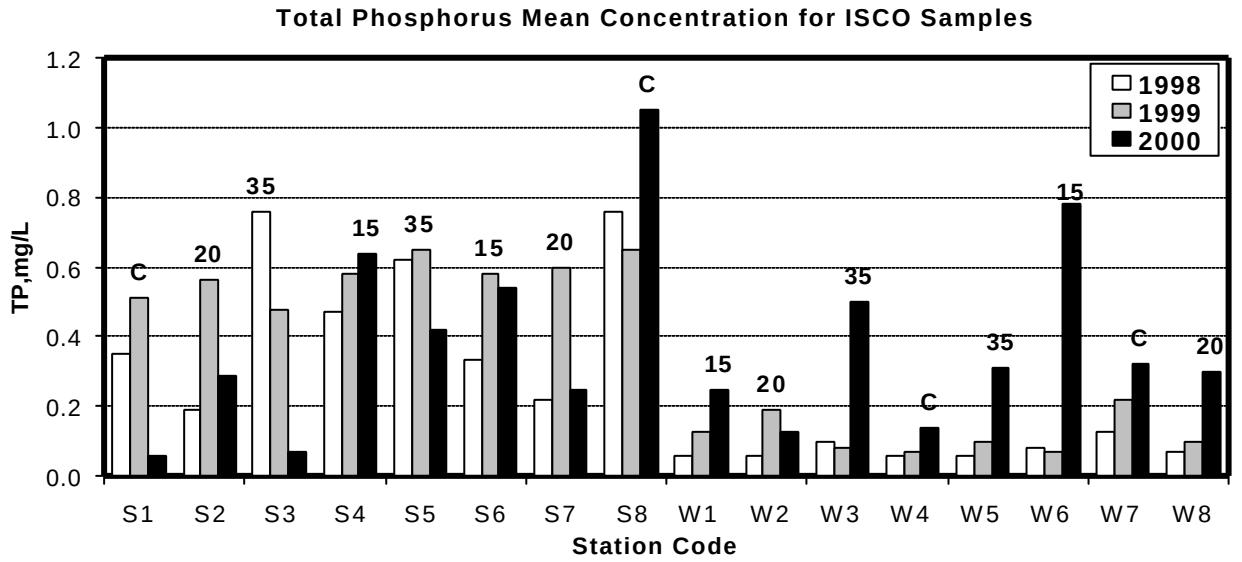

Figure 1. Comparisons of TP mean concentration measurements for ISCO samples collected from *summer* and *winter* pastures during the years 1998, 1999 and 2000.

Table 2. Summary statistics for ISCO samples Total P concentration results from summer and winter pastures for the year 2000, including number of samples (n), mean phosphorus concentrations in mg/L, and standard deviation in mg/L (C represents the control plots).

Station Code	Treatment	Rep	n	Average TP mg/L	Std Dev
S1	C	1	20	0.06	0.04
S2	20	1	6	0.29	0.17
S3	35	1	5	0.07	0.03
S4	15	1	14	0.64	0.73
S5	35	2	28	0.42	0.40
S6	15	2	21	0.54	0.29
S7	20	2	79	0.25	0.28
S8	C	2	32	1.05	0.72
Summer Average			**26**	**0.42**	**0.33**
W1	15	1	16	0.25	0.14
W2	20	1	15	0.13	0.03
W3	35	1	15	0.50	0.38
W4	C	1	17	0.14	0.07
W5	35	2	15	0.31	0.48
W6	15	2	8	0.78	0.60
W7	C	2	10	0.32	0.13
W8	20	2	14	0.30	0.60
Winter Average			**14**	**0.34**	**0.30**

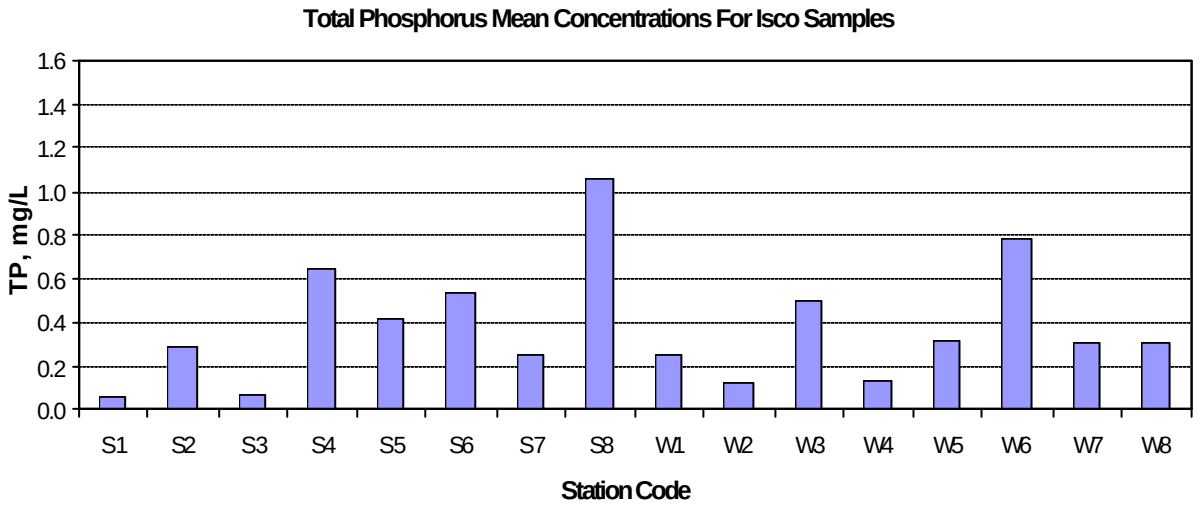

Figure 2. Comparisons of TP mean concentration measurements for ISCO samples collected from *summer* and *winter* pastures during the year 2000.

Table 3. Summary statistics for **ISCO** samples NOx concentration results from *summer* and *winter* pastures for the year 2000, including number of samples (n), mean NOx concentrations in mg/L, and standard deviation in mg/L (C represents the control plots).

Station Code	Treatment	Rep	n	Average NOx mg/L	Std Dev
S1	C	1	20	0.01	0.00
S2	20	1	6	0.01	0.00
S3	35	1	5	0.01	0.00
S4	15	1	14	0.01	0.00
S5	35	2	28	0.02	0.02
S6	15	2	21	0.05	0.14
S7	20	2	79	0.12	0.79
S8	C	2	32	0.01	0.01
Summer Average			**26**	**0.03**	**0.12**
W1	15	1	16	0.12	0.20
W2	20	1	15	1.56	1.14
W3	35	1	15	0.15	0.24
W4	C	1	17	0.13	0.11
W5	35	2	15	0.25	0.22
W6	15	2	8	0.03	0.02
W7	C	2	10	0.14	0.13
W8	20	2	14	0.09	0.15
Winter Average			**14**	**0.31**	**0.28**

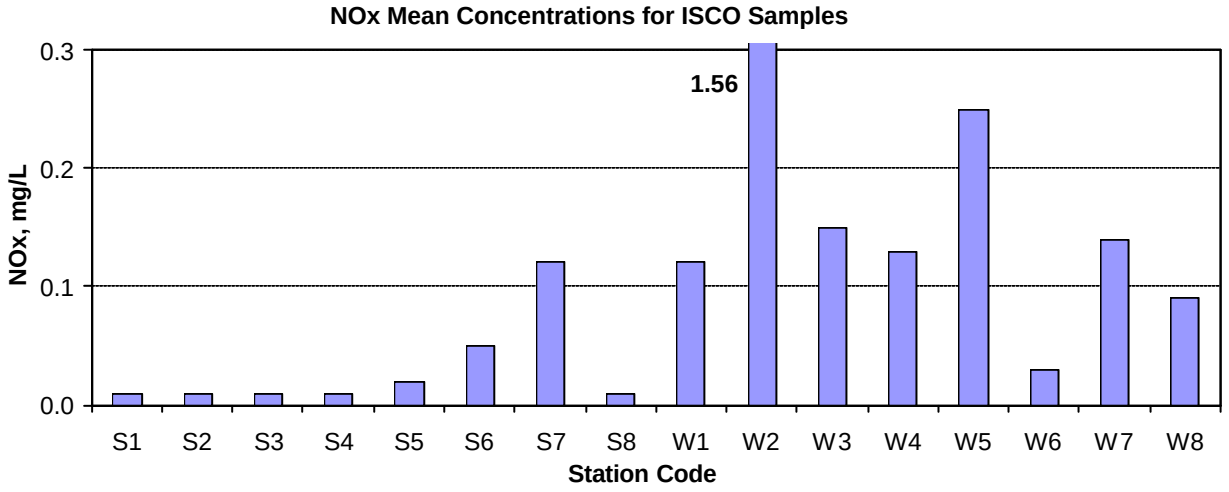

Figure 3. Comparisons of NOx mean concentration measurements for ISCO samples collected from *summer* and *winter* pastures during the year 2000.

Table 4. Summary statistics for **ISCO** samples NH_4 concentration results from *summer* and *winter* pastures for the year 2000,including number of samples (n), mean NH_4 concentrations in mg/L, and standard deviation in mg/L (C represents the control plots).

Station Code	Treatment	Rep	n	Average NH_4 mg/L	Std Dev
S1	C	1	20	0.21	0.90
S2	20	1	6	0.28	0.06
S3	35	1	5	0.20	0.10
S4	15	1	14	0.33	0.16
S5	35	2	28	0.24	0.11
S6	15	2	21	0.48	0.51
S7	20	2	79	0.24	0.15
S8	C	2	32	0.33	0.16
Summer Average			**26**	**0.29**	**0.27**
W 1	15	1	16	1.52	1.04
W 2	20	1	15	2.25	0.99
W 3	35	1	15	2.38	2.48
W 4	C	1	17	0.82	0.66
W 5	35	2	15	1.44	0.85
W 6	15	2	8	0.60	0.48
W 7	C	2	10	0.98	0.45
W 8	20	2	14	0.56	0.33
Winter Average			**14**	**1.32**	**0.91**

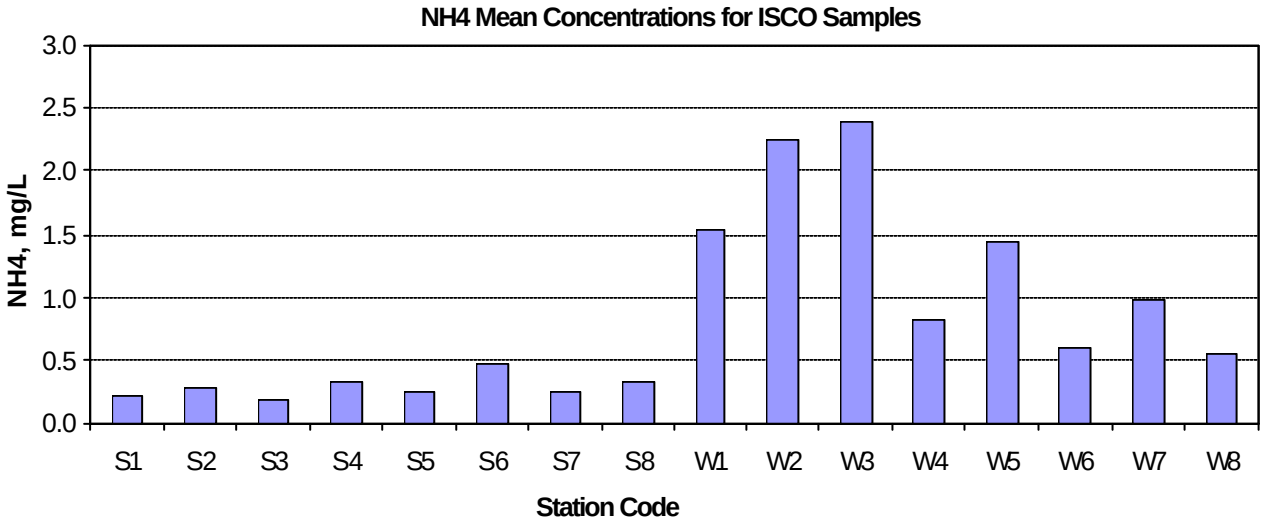

Figure 4. Comparisons of NH_4 mean concentration measurements for ISCO samples collected from *summer* and *winter* pastures during the year 2000.

Table 5. Summary for **ISCO** samples TKN concentration results from s*ummer* and w*inter* pastures for the year 2000,including number of samples (n), mean TKN concentrations in mg/L, and standard deviation in mg/L (C represents the control plots).

Station Code	Treatment	Rep	n	Average TKN mg/L	Std Dev
S1	C	1	20	1.44	0.64
S2	20	1	6	2.27	0.45
S3	35	1	5	1.66	0.31
S4	15	1	14	2.61	1.12
S5	35	2	28	2.55	1.03
S6	15	2	21	2.89	1.26
S7	20	2	79	2.07	1.23
S8	C	2	32	4.54	1.53
Summer Average			**26**	**2.50**	**0.95**
W 1	15	1	16	4.70	1.59
W 2	20	1	15	6.15	1.77
W 3	35	1	15	7.76	5.12
W 4	C	1	17	3.83	1.65
W 5	35	2	15	4.40	2.45
W 6	15	2	8	5.26	2.53
W 7	C	2	10	4.76	0.87
W 8	20	2	14	3.81	0.45
Winter Average			**14**	**5.08**	**2.05**

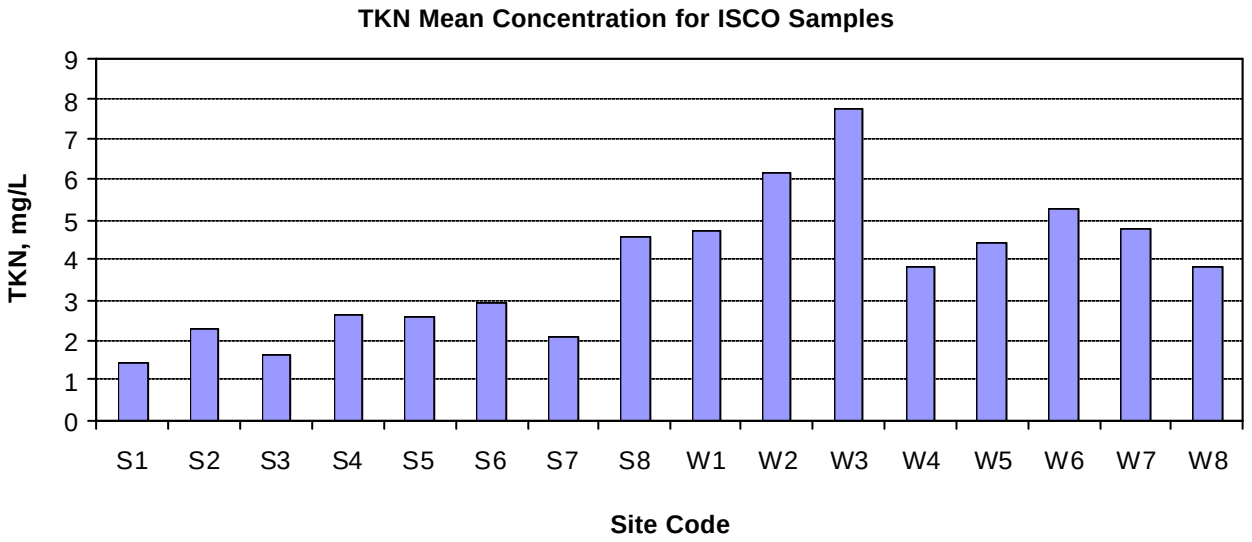

Figure 5. Comparisons of TKN mean concentration measurements for ISCO samples collected from *summer* and *winter* pastures during the year 2000.

QA/QC Assessment of Water Quality Samples

During the 2000 calendar year runoff water samples were collected at each of the 16 summer and winter pasture flume stations. The vast majority of these samples were autosamples collected by the ISCO units commanded by the CR-10 dataloggers. Procedures provided to the MAERC technicians for the collection of grab samples are detailed at http://www.southerndatastream.com/maerc/sop/index.htm. Laboratory tests conducted on the autosamples by the TVA Environmental Laboratory include TP, NOx, NH_4 and TKN. An overall QA/QC assessment of the ISCO samples is provided in Table 6. A total of 60 ISCO sample sets representing 412 samples were collected in the year 2000. Of these only six sets passed strict QA/QC criteria. These six sets include 54 samples or approximately 10% of all sample sets collected. If the QA/QC evaluations criteria are relaxed to include only the TP parameter then the number of sample sets passing the QA/QC inspection increases to 19, or approximately 32% of all sample sets. The pass/ fail criteria used to perform the QA/QC evaluation are :
Criteria for QA/QC test for ISCO and grab sampling equipment blanks (EB&EBC):

- [TP] : 0.01 mg/L
- [NO_X] : 0.01 mg/L
- [NH_4] : 0.10 mg/L
- [TKN] : 0.01 mg/L

Criteria for QA/QC test for ISCO and grab sampling field duplicate (FD1&FD2):

- CV < 33% **NOT significant (pass)**
- CV > 33%, and [TP, NO_x, NH_4] > 0.20; [TKN] > 2.00 **Significant (no pass)**
- CV > 33%, and [TP, NO_x, NH_4] < 0.10; [TKN]<1.00 **Significant, but low magnitude (pass)**
- CV > 33%, and [TP, NO_x, NH_4] < 0.20; [TKN] < 2.00 **Significant, but reasonable (pass)**

Manually acquired grab samples were collected periodically in the year 2000 at each of the 16 summer and winter flume stations to augment the ISCO autosampler data. Procedures provided to the MAERC technicians for the collection of grab samples are detailed at http://www.southerndatastream.com/maerc/sop/index.htm. Laboratory analyses were performed on these grab samples to determine the runoff nutrient concentration of NH_4, NOx, TKN, TP, NO_2 and ortho-P. An overall QA/QC assessment of the grab sample sets is provided in Table 6. A total of nine grab sample sets were collected in 2000 representing 128 samples. Of these only two sets passed strict QA/QC criteria. These two sets include 37 samples or approximately 30% of all sample sets collected. If the QA/QC evaluations criteria are relaxed to include only the TP parameter then the number of sample sets passing the QA/QC inspection increases to 4, or approximately 55% of all sample sets. Based upon qualitative graphical inspection of the field duplicate (FD) pairs and equipment blanks (EB), a group of questionable samples were identified and targeted for detailed investigation. The individual FD and EB graphs are provided in Appendices A-F.

Table 6 (ISCO samples) and Table 7 (grab samples) provide a net qualitative assessment of sample set adherence to QA/QC criteria, while Tables 8, 9 and 10 present the quantitative standards against which the ISCO and grab sample equipment blanks and field duplicate are evaluated. From inspection of these graphs and tables it is apparent that the laboratory water used for the equipment blanks is not normally high in phosphorus, relative to concentration ranges of concern in this study. In the cases where EB (Equipment Blank) concentrations of TP were high (above 0.005 mg/L), the corresponding EBC (Capped Equipment Blanks) concentrations were not generally also high, suggesting that the TP contamination was not consistently present in the EB water prior to placement in the ISCO bottle. However in a few cases, notably W4:9/11/00, S1:9/11/00, and several other winter ISCO sets, EBC concentrations of TP were above 0.010 and above the corresponding EB concentration of TP.

Closed container (capped) ISCO bottle containing analyte-free water (EBC) were placed in each ISCO sample tray alongside open bottle of analyte-free water (EB) to evaluate the effect of sample storage in there trays under field conditions. Results from lab tests of both types of equipment blanks reveals evidence of contamination of sample bottles stored in the ISCO autosamplers. The source of the contamination may be dust, insects, or misdirected incoming sample water. However, proper assessment of this contamination is complicated by the fact that the laboratory water used in the equipment blank was not truly free of analytes. Inspecting EB results for nitrogen species (TKN, NH4, and NO_X) it is quite apparent that the laboratory water used for the blank contains significant concentrations of nitrogen (NH_4 : 0.05 mg/L, NO_x : 0. 01 mg/L, and TKN : 0.10 mg/L). Results also show concentrations of ISCO equipment blanks as high as 0.4 mg/L NH_4 and 0.7 mg/L TKN.

The field duplicates results show generally good agreement above 0.2 mg/L TP but demonstrate somewhat erratic results below this level. The most extreme EB and FD total phosphorus QA/QC problems cases were assigned index numbers 1 through 16 as noted in Tables 8, 9, and 10. After reviewing all documentation (ISCO service sheets, Chain of Custody forms, and laboratory results files) attempts were made to arrive at conclusions as to the cause or explanations for the TP discrepancies. These conclusions are summarized in Table 11 based upon detailed data as documented case by case in Appendix G.

Inspection of this available evidence did not point to any specifics causes of the EB and FD problems. However, the evidence does point out the need for better documentation and adherence to SOPs by sampling technicians. Independent of SOPs and documentation, the results show apparent high variability in ditch water sample nutrient concentrations as well as field contamination of sample containers while stored in the ISCO units. This variability is exacerbated by the fact that the year 2000 had low flow and relatively few water samples.

Table 6. ISCO sample sets collected at each flume station and description of QA/QC problems related to equipment blanks (EB) and field duplicate (FD) criteria.

STATION CODE	SET DATE	NUMBER OF SAMPLES	EB PROBLEMS	FD PROBLEMS	QA/QC PASS	TP ONLY QA/QC PASS
S1	07/17/00	13	TP, TKN	NH4	No	No
	07/31/00	2	NH4, TKN	No FD	No	No
	08/28/00	3	NH4	OK	No	**YES**
	09/11/00	7	NH4, TKN	TP, TKN	No	**YES**
	09/26/00	3	OK	No FD	No	No
S2	01/31/00	2	TKN	No FD	No	No
	09/11/00	7	No EB	OK	No	No
S3	07/17/00	4	TKN	TP, NH4	No	**YES**
	09/11/00	4	OK	No FD	No	No
S4	07/17/00	4	TKN	OK	No	**YES**
	07/31/00	2	NH4, TKN	No FD	No	No
	08/28/00	2	NH4	No FD	No	No
	09/11/00	9	OK	NH4	No	**YES**
	09/26/00	5	OK	OK	**YES**	**YES**
S5	07/03/00	3	NH4, TKN	OK	No	**YES**
	07/17/00	5	No EB	No FD	No	No
	07/31/00	4	NH4	No FD	No	No
	08/28/00	10	OK	OK	**YES**	**YES**
	09/11/00	12	OK	OK	**YES**	**YES**
	09/26/00	5	OK	No FD	No	No
S6	07/17/00	11	TP, TKN	No FD	No	No
	07/31/00	9	TP. NH4. TKN	No FD	No	No
	8/28//00	2	NH4	No FD	No	No
	09/11/00	5	OK	No FD	No	No
	09/26/00	3	OK	No FD	No	No
S7	01/17/00	5	OK	No FD	No	No
	01/31/00	9	OK	NOx	No	**YES**
	02/14/00	4	TKN	No FD	No	No
	03/13/00	7	TKN	NOx, NH4	No	**YES**
	03/27/00	6	OK	NH4, TKN	No	**YES**
	07/03/00	11	NH4. TKN	TP	No	No
	07/17/00	8	NH4, TKN	No FD	No	No
	07/31/00	5	OK	No FD	No	No
	08/15/00	6	NH4. TKN	TP	No	No
	08/28/00	14	NH4	TP	No	**YES**
	09/11/00	9	OK	NH4	No	**YES**
	09/26/00	4	OK	No FD	No	No
S8	01/31/00	2	OK	No FD	No	No
	07/17/00	3	No EB	No FD	No	No
	08/02/00	2	TP. TKN	No FD	No	No
	08/28/00	8	NH4	TP, NH4, TKN	No	No
	09/11/00	15	OK	OK	**YES**	**YES**
	09/26/00	10	NH4, TKN	OK	No	**YES**
W1	01/31/00	2	OK	No FD	No	No
	09/11/00	16	No EB	No FD	No	No
	09/25/00	8	OK	OK	**YES**	**YES**
W2	09/11/00	16	No EB	NH4	No	No
	09/25/00	4	No EB	OK	No	No
W3	09/11/00	17	NH4. TKN	NH4	No	**YES**
	09/25/00	4	OK	No FD	No	No
W4	01/31/00	2	TKN	No FD	No	No
	09/11/00	16	TP, NH4, TKN	OK	No	No
W5	09/11/00	16	NH4, TKN	TP, TKN	No	No
	09/25/00	3	OK	No FD	No	No
W6	09/11/00	9	TP. NH4. TKN	NOx	No	No
	09/25/00	4	OK	OK	**YES**	**YES**
W7	09/11/00	12	TP, NH4, TKN	OK	No	No
W8	01/31/00	2	OK	No FD	No	No
	09/11/00	14	No EB	OK	No	No
	09/25/00	4	OK	No FD	No	No

Table 7**.** **Grab** sample sets collected at each flume station and descriptions of QA/QC problems related to equipment blanks (**EB**) and field duplicate (**FD**) criteria.

SET DATE	NUMBER OF STATIONS SAMPLED	NUMBER OF SAMPLES COLLECTED	EB PROBLEMS	FD PROBLEMS	QA/QC PASS	TP ONLY QA/QC PASS
04/26/00	5	13	OK	NH4, ortho-P	No	**YES**
07/31/00	7	17	No EB	No FD	No	No
08/03/00	3	4	OK	No FD	No	No
09/05/00	8	21	OK	TP	No	**YES**
09/07/00	2	4	OK	OK	**YES**	**YES**
09/17/00	2	2	No EB	No FD	No	No
09/18/00	14	33	OK	OK	**YES**	**YES**
09/19/00	4	5	NH4	No FD	No	No
10/04/00	10	29	OK	TP, TKN	No	No

Table 8 Cases where graphical displays of **ISCO** and **Grab** samples equipment blank **(EB&EBC)** results show have high values and suggest possible QA/QC problems.

Case	File	Field Number		Station	Set Date		TP		NOx		NH4		TKN	
Number	Numbe	EB	EBC	Cede	EB	EBC	EB	EBC	EB	EBC	EB	EBC	EB	EBC
1	18	**2798**	**2810**	S1	07/17/00		**0.032**						**0.16**	
	20	**2797**		S1	07/31/00						**0.14**		**0.14**	
	21	**2849**		S1	08/28/00						**0.12**			
	23	**3043**	**3049**	S1	09/11/00	09/11/00		**0.012**			**0.17**	**0.16**	**0.12**	**0.12**
	12	**2668**		S2	01/31/00								**0.11**	
	18	**2811**	**2814**	S3	07/17/00	07/17/00							**0.18**	**0.15**
	18	**2815**	**2818**	S4	07/17/00	07/17/00							**0.19**	**0.13**
	20	**2499**		S4	07/31/00						**0.22**		**0.25**	
	21	**2852**		S4	08/28/00						**0.14**			
	16	**2764**		S5	07/03/00						**0.11**		**0.12**	
	18		**2823**	S5		07/17/00								**0.12**
	20	**2801**		S5	07/31/00						**0.2**			
	21		**2863**	S5		08/28/00						**0.12**		
2	18	**2824**	**2834**	S6	07/17/00	07/17/00	**0.140**						**0.69**	**0.16**
3	20	**2803**		S6	07/31/00		**0.020**				**0.16**		**0.17**	
	21	**2864**		S6	08/28/00						**0.14**			
	25		**3220**	S6		09/26/00						**0.12**		
	12	**2700**		S7	02/14/00								**0.11**	
	13	**2705**		S7	03/13/00								**0.62**	
	16	**2767**		S7	07/03/00						**0.15**		**0.17**	
	18	**2835**	**2842**	S7	07/17/00	07/17/00					**0.12**	**0.11**	**0.24**	**0.19**
	20	**2812**		S7	07/31/00									
	20	**2820**		S7	08/15/00						**0.12**		**0.18**	
	21	**2866**		S7	08/28/00						**0.12**			
	25		**3224**	S7		09/26/00								**0.12**
4	20	**2819**		S8	08/02/00		**0.550**						**0.11**	
	21	**2880**		S8	08/28/00						**0.15**			
	25	**3225**	**3234**	S8	09/26/00	09/26/00					**0.16**	**0.1**	**0.21**	**0.12**
	23		**2942**	W1		09/11/00						**0.13**		
	25	**3172**	**3179**	W1	09/25/00	09/25/00				**0.02**				
	23	**2959**		W3	09/11/00						**0.12**		**0.13**	
	12	**2664**		W4	01/31/00								**0.11**	
5	23	**2976**		W4	09/11/00		**0.023**				**0.15**		**0.12**	
	23	**2992**	**3007**	W5	09/11/00	09/11/00		**0.011**			**0.13**	**0.13**	**0.23**	**0.12**
	25	**3194**	**3196**	W5	09/25/00	09/25/00				**0.03**				
6	23	**3008**	**3016**	W6	09/11/00	09/11/00	**0.023**				**0.44**	**0.13**	**0.48**	
	25	**3197**	**3200**	W6	09/25/00	09/25/00								**0.12**
7	23	**3017**	**3028**	W7	09/11/00	09/11/00	**0.022**				**0.19**	**0.14**	**0.23**	
	23		**3042**	W8		09/11/00						**0.15**		**0.14**
GRAB EB														
8	24	**3147**		W1	09/19/00		**0.08**							
Threshold criteria							**0.01**	**0.01**	**0.01**	**0.01**	**0.10**	**0.10**	**0.10**	**0.10**

Table 9. Cases where graphical displays of **ISCO** sample field duplicate **(FD1&FD2)** results appear different and suggest possible QA/QC problems.

Case Number	Parameter	Station Code	Set Date	Sampling Date	Result, mg/L		Statistics				Comments
					FD1	FD2	diff	/diff/	avg	CV	
	TP	S1	9/11/00	9/17/00	**0.13**	**0.05**	0.08	0.08	0.09	65%	Significant, but reasonable
	TP	S3	7/17/00	7/30/00	**0.07**	**0.02**	0.05	0.05	0.047	71%	Significant, but low magnitude
9	**TP**	S7	7/3/00	7/3/00	**0.10**	**0.20**	-0.10	0.10	0.15	47%	Significant
10	**TP**	S7	8/15/00	8/26/01	**0.21**	**0.09**	0.12	0.12	0.15	57%	Significant
	TP	S7	8/28/00	9/5/00	**0.12**	**0.05**	0.07	0.07	0.09	58%	Significant, but reasonable
11	**TP**	S8	8/28/00	9/6/00	**0.07**	**0.28**	-0.21	0.21	0.18	85%	Significant
12	**TP**	W5	9/11/00	9/21/00	**1.98**	**0.40**	1.58	1.58	1.19	94%	Significant
	NOX	S7	1/31/00	1/31/00	**0.01**	**0.02**	-0.01	0.01	0.02	47%	Significant, but low magnitude
	NOX	S7	3/13/00	4/11/00	**0.36**	**0.01**	0.35	0.34	0.19	130%	Significant
	NOX	W6	9/11/00	9/19/00	**0.04**	**0.01**	0.03	0.03	0.03	85%	Significant, but low magnitude
	NH_4	S1	7/1700	7/30/00	**0.16**	**0.27**	-0.11	0.11	0.22	36%	Significant, but reasonable
	NH_4	S3	7/17/00	7/30/00	**0.19**	**0.04**	0.15	0.15	0.12	92%	Significant, but reasonable
	NH_4	S4	9/11/00	9/17/00	**0.26**	**0.08**	0.18	0.18	0.17	75%	Significant
	NH_4	S7	3/13/00	4/11/00	**0.53**	**0.12**	0.41	0.41	0.33	89%	Significant
	NH_4	S7	3/27/00	4/4/00	**0.34**	**0.08**	0.26	0.26	0.21	88%	Significant
	NH_4	S7	9/11/00	9/17/00	**0.15**	**0.33**	-0.18	0.18	0.24	53%	Significant, but reasonable
	NH_4	S8	8/28/00	9/6/00	**0.01**	**0.21**	-0.2	0.2	0.11	129%	Significant
	NH_4	W2	9/11/00	9/18/00	**0.29**	**0.58**	-0.29	0.29	0.44	47%	Significant
	NH_4	W3	9/11/00	9/23/00	**1.10**	**6.10**	-5	5	3.60	98%	Significant
	TKN	S1	9/11/00	9/17/00	**1.90**	**0.05**	1.85	1.85	0.98	134%	Significant, but reasonable
	TKN	S7	3/27/00	4/4/00	**2.60**	**1.30**	1.30	1.30	1.95	47%	Significant
	TKN	S8	8/28/00	9/6/00	**0.98**	**2.60**	-1.62	1.62	1.79	64%	Significant
	TKN	W5	9/11/00	9/21/00	**0.75**	**6.00**	-5.25	5.25	3.38	110%	Significant

Table 10. Cases where graphical displays of **Grab** sample field duplicate **(FD1&FD2)** results appear different and suggest possible QA/QC problems.

Case Nnumber	Parameter	Station Code	Set Date	Result, mg/L		Statistic				Comments
				FD1	FD2	diff	/diff/	avg	CV	
13	**TP**	S1	10/4/00	**0.01**	**0.07**	-0.06	0.06	0.040	106%	Significant, but low magnitude
14	**TP**	S8	9/5/00	**0.18**	**0.03**	0.15	0.15	0.105	101%	Significant, but reasonable
15	**TP**	W1	10/4/00	**0.04**	**0.26**	-0.22	0.22	0.150	104%	Significant
	NH4	S1	4/26/00	**0.02**	**0.01**	0.01	0.01	0.015	47%	Significant, but low magnitude
	TKN	S1	10/4/00	**0.40**	**2.10**	-1.7	1.7	1.250	96%	Significant
	TKN	W1	10/4/00	**1.30**	**3.70**	-2.4	2.4	2.500	68%	Significant

Table 11. Summary of QA/QC problems for selected EB and FD cases with respect to field data sheets, Chain of custody forms, and laboratory result files.

Result TP EB	Result TP EBC	ISCO Sheet	COC Form	Lab analysis date	Notes	Conclusion
0.032	**0.006**	OK	Error	8/17/00	COC for EBC missing	
0.140	**0.004**	OK	Error	8/17/00	COC for EBC missing	
0.020	**No EBC**	Time Misalignment	Error	9/14/00	In LAB and IS Time misalignment. In COC for all 7/31/00/S6 we have field number duplicate.we have EBC in IS but we don't in COC and Lab file	
0.550	**No EBC**	OK	Error	9/14/00	In COC for all 8/2/00/S6 we have field number duplicate.we have EBC in IS but we don't in COC and Lab file.	
0.023	**No EBC**	OK	Error	11/14/00	we have EBC and some other sample in IS and COC but we don't in Lab file. Total 4 missing (purple coluor)	
0.023	**0.002**	OK	Error	11/14/00	we have 9 sample in IS and COC but one missing in Lab file. Missing samlpes in purple color	
0.022	**0.006**	OK	OK	11/14/00	No comments	No Explanation
NH4 EB						
0.08	**No EBC**	OK	OK	11/14/00	No comments	No Explanation
TP FD1	**TP FD2**					
0.10	**0.2**	OK	Error	8/22/00	In COC We have misapprehension Take a look in evedince	
0.21	**0.09**	Time Misalignment	Error	9/14/00	In IS we have time Misalignment. In COC fields numbers duplicate take a look in evedence	
0.12	**0.05**	OK	OK	9/26/00	No comments	No Explanation
0.07	**0.28**	OK	OK	9/26/00	No comments	No Explanation
1.98	**0.40**	OK	OK	10/20/00	No comments	No Explanation
0.01	**0.07**	OK	OK	10/26/00	No comments	No Explanation
0.18	**0.03**	OK	OK	9/14/00	No comments	No Explanation
0.04	**0.26**	OK	OK	10/26/00	No comments	No Explanation

The numbering systems for figures and tables included in the Appendices A-F are shown in Table 12.

Table 12. The numbering convention is as follows. Parameters: TP-1, NOx-2, NH4-3, TKN-4, NO2-5, ortho-P 6,followed by Site: 1(summer), 2(winter) and 3(summer), 4(winter) for ISCO and grab respectively.

ISCO

Parameter	TP		NOX		NH4		TKN	
Site	S	W	S	W	S	W	S	W
Graph	1.1a	1.2a	2.1a	2.2a	3.1a	3.2a	4.1a	4.2a
	1.1b	1.2b	2.1b	2.2b	3.1b	3.2b	4.1b	4.2b
	1.1c	1.2c	2.1c	2.2c	3.1c	3.2c	4.1c	4.2c
Table	1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2

GRAB

Parameter	TP		NOX		NH4		TKN		NO2		ortho-P	
Site	S	W	S	W	S	W	S	W	S	W	S	W
Graph	1.3a	1.4a	2.3a	2.4a	3.3a	3.4a	4.3a	4.4a	5.3a	5.4a	6.3a	6.4a
	1.3b	1.4b	2.3b	2.4b	3.3b	3.4b	4.3b	4.4b	5.3b	5.4b	6.3b	6.4b
	1.3c	1.4c	2.3c	2.4c	3.3c	3.4c	4.3c	4.4c	5.3c	5.4c	6.3c	6.4c
Table	1.3	1.4	2.3	2.4	3.3	3.4	4.3	4.4	5.3	5.4	6.3	6.4

Appendix A

Graphs

Describing Results for

Equipment Blanks

Collected by

ISCO and GRAB Samples

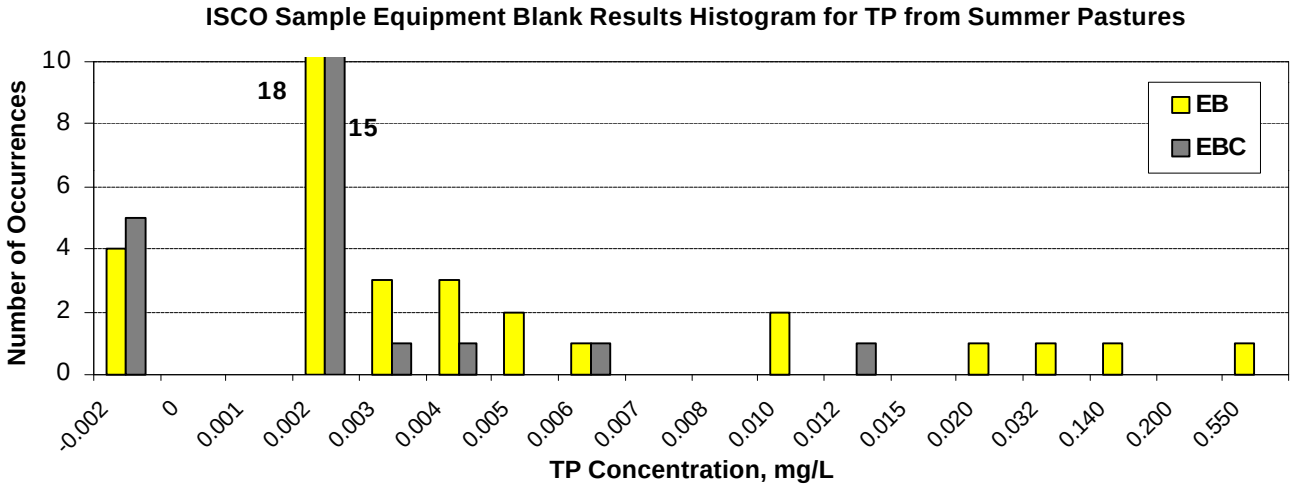

Figure 1.1.a Frequency distribution for magnitudes of TP concentration measurements for equipment blanks (EB) and equipment blanks capped (EBC) from *summer* pastures during the year 2000.

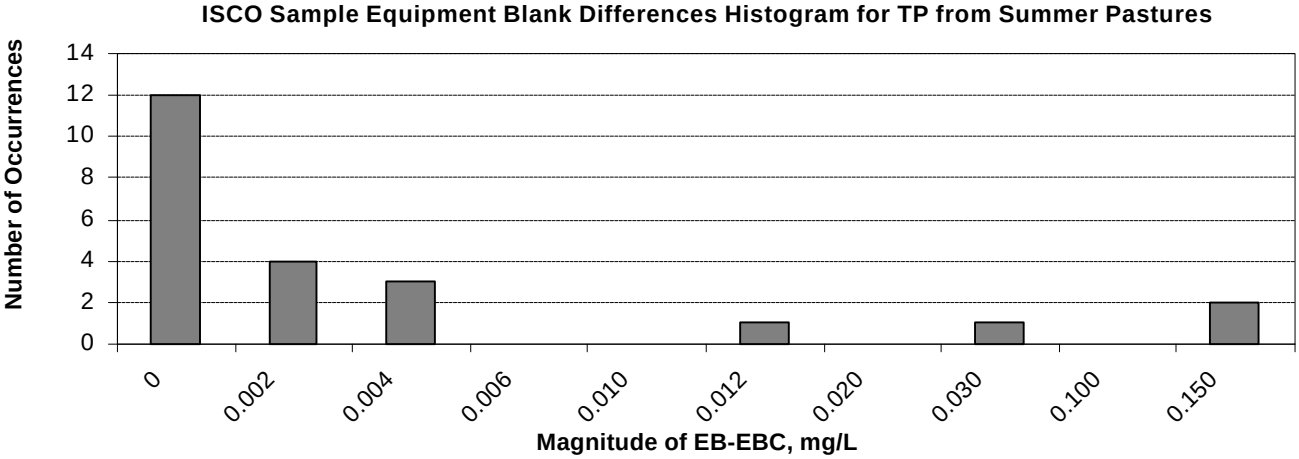

Figure 1.1b Frequency distribution for differences between equipment blanks (EB) and equipment blanks capped (EBC) of TP concentration measurements from *summer* pastures during the year 2000.

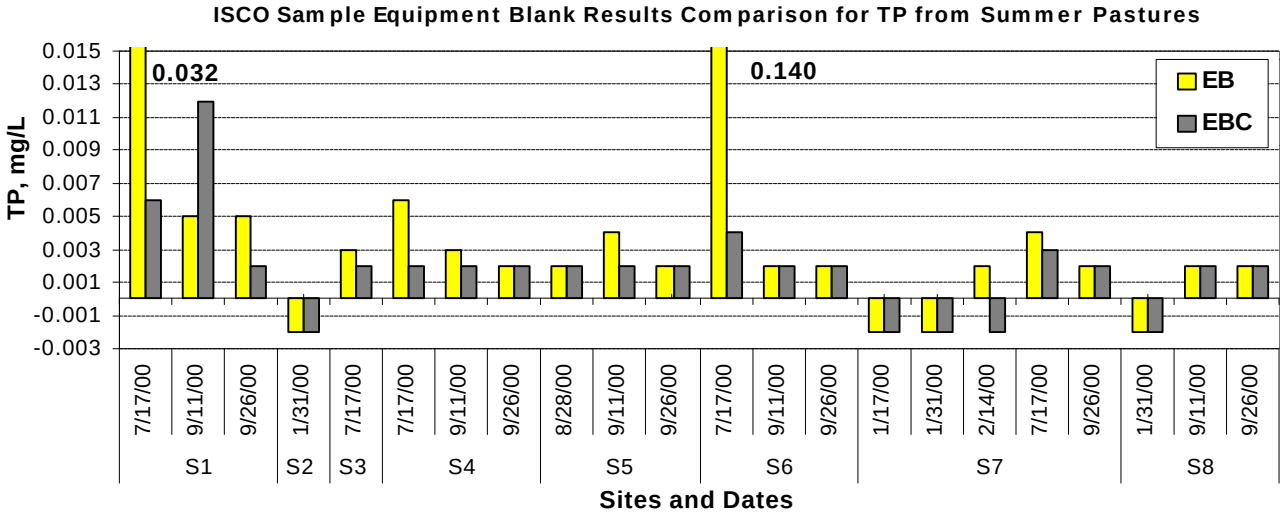

Figure 1.1c Comparison of equipment blanks (EB) and equipment blanks capped (EBC) of TP concentration measurements from *summer* pastures during the year 2000.

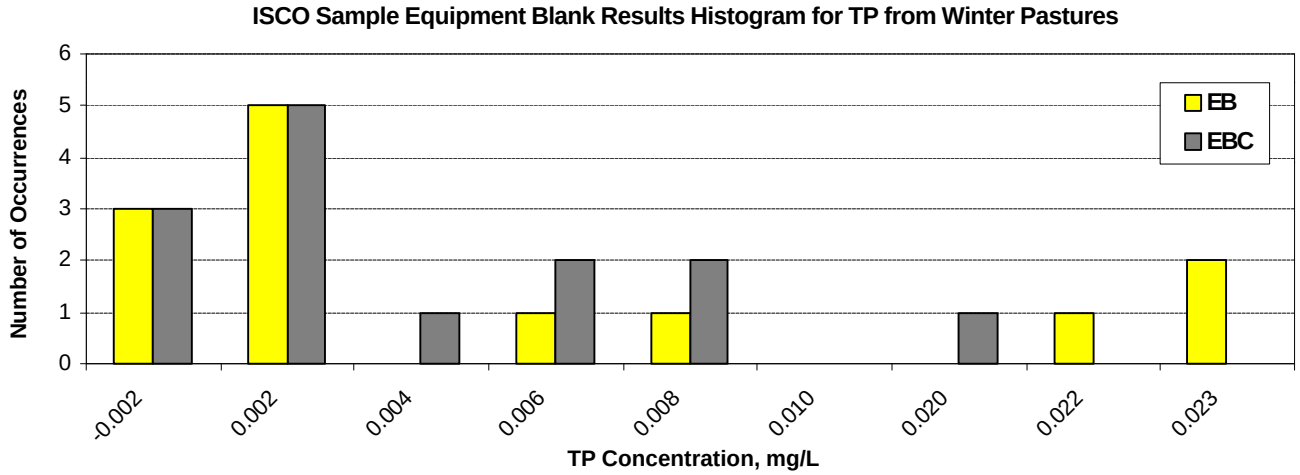

Figure 1.2a Frequency distribution for magnitudes of TP concentration measurements for equipment blanks (EB) and equipment blanks capped (EBC) from *winter* pastures during the year 2000.

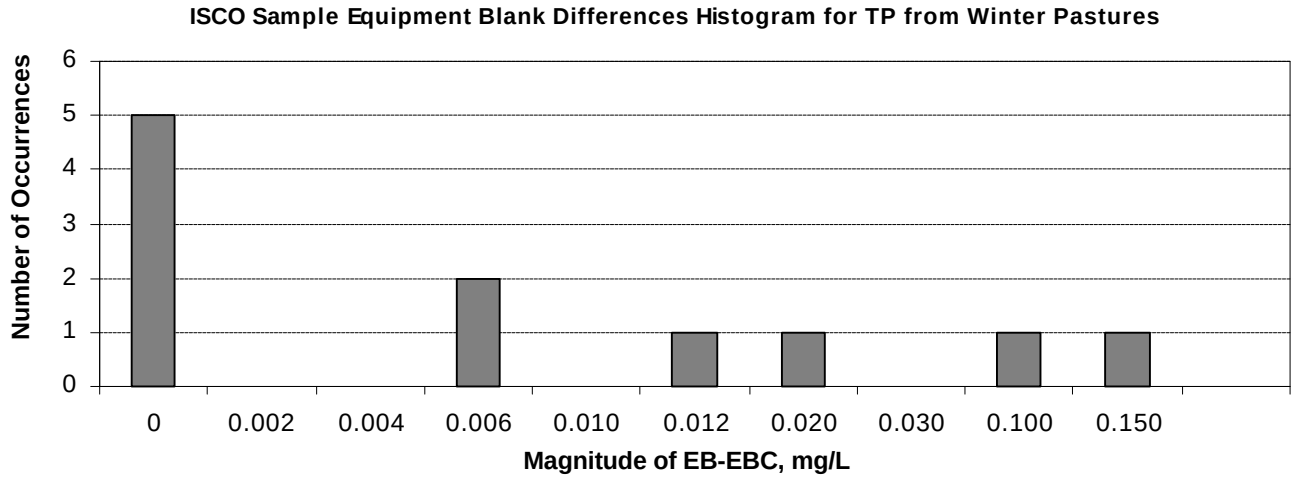

Figure 1.2b Frequency distribution for differences between equipment blanks (EB) and equipment blanks capped (EBC) of TP concentration measurements from *winter* pastures during the year 2000.

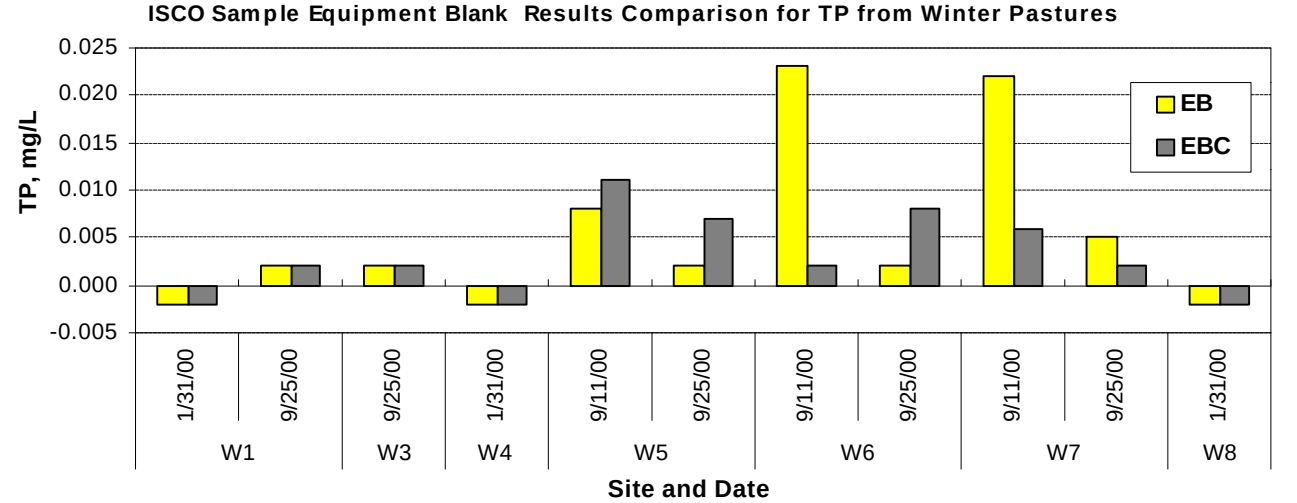

Figure 1.2c Comparison of equipment blanks (EB) and equipment blanks capped (EBC) of TP concentration measurements from *winter* pastures during the year 2000.

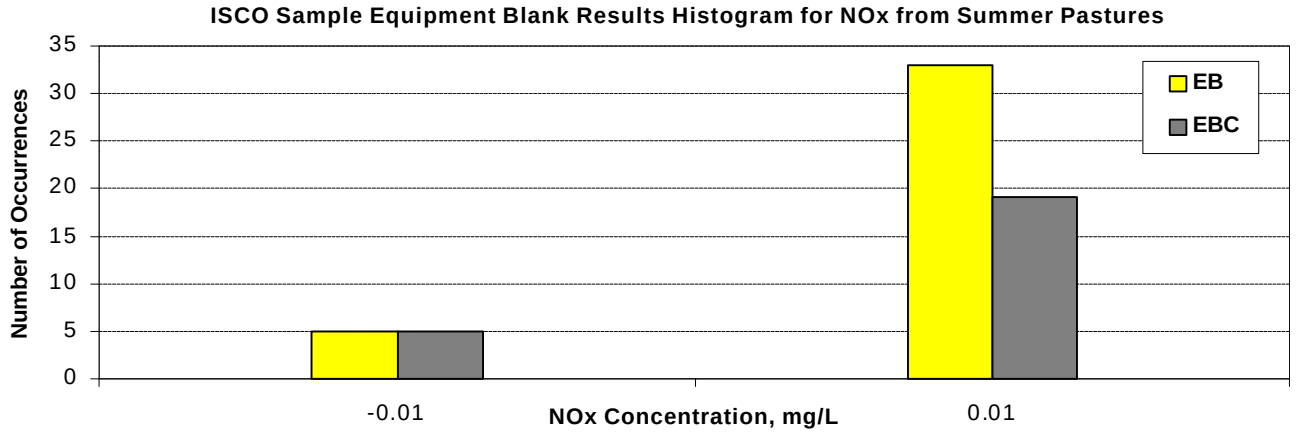

Figure 2.1a Frequency distribution for magnitudes of NOx concentration measurements for equipment blanks (EB) and equipment blanks capped (EBC) from *summer* pastures during the year 2000.

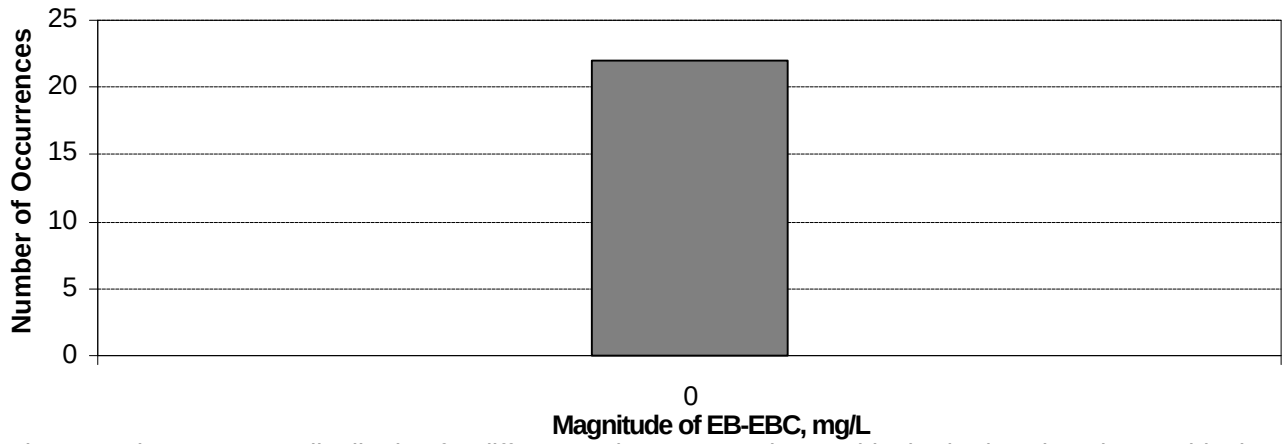

Figure 2.1b Frequency distribution for differences between equipment blanks (EB) and equipment blanks capped (EBC) of NOx concentration measurements from *summer* pastures during the year 2000.

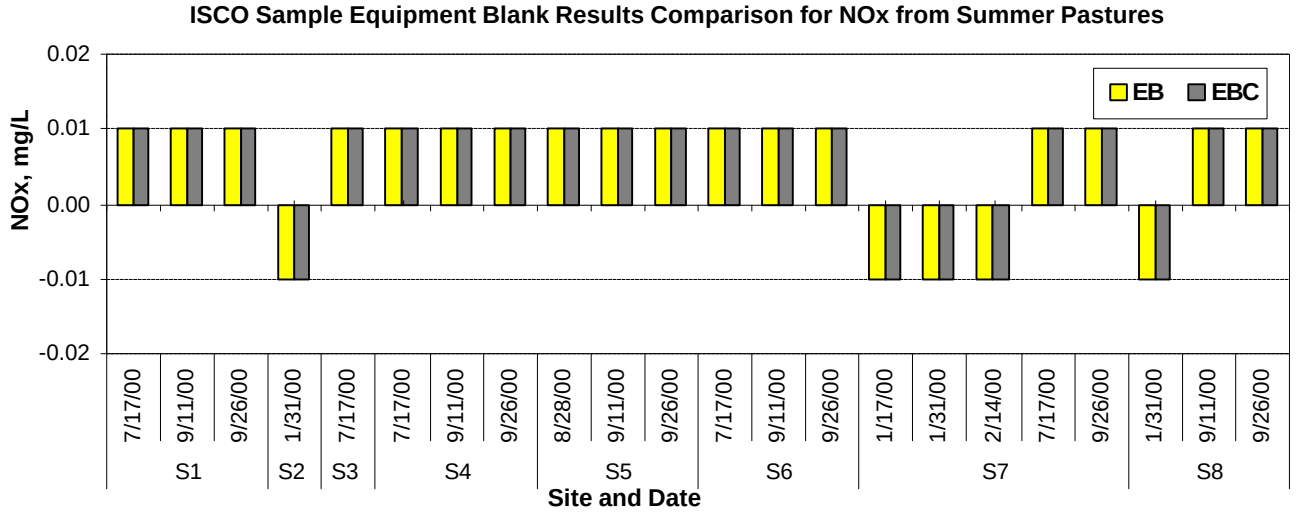

Figure 2.1c Comparison of equipment blanks (EB) and equipment blanks capped (EBC) of NOx concentration measurements from *summer* pastures during the year 2000.

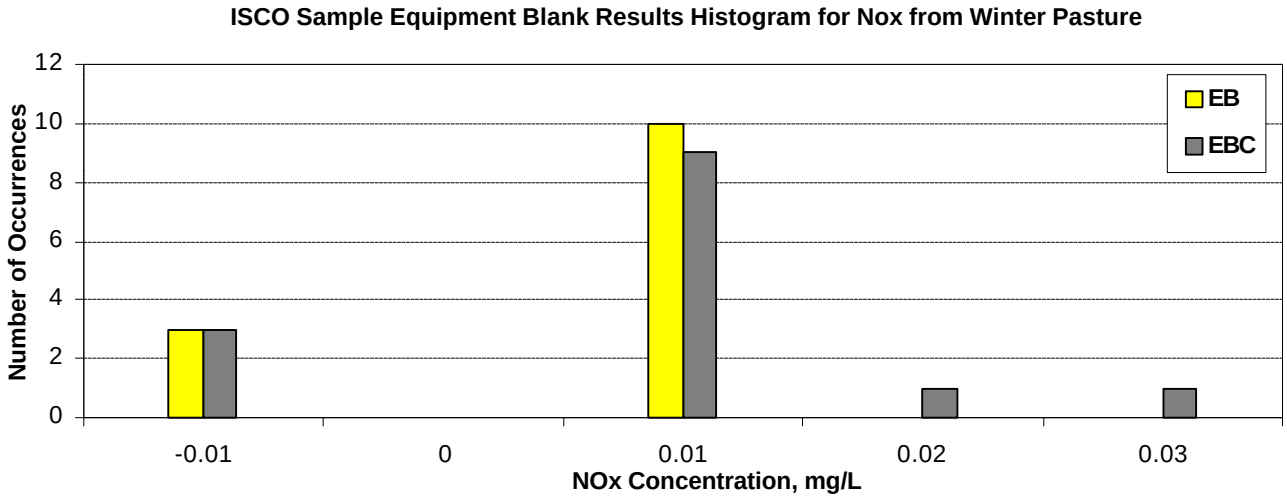

Figure 2.2a Frequency distribution for magnitudes of NOx concentration measurements for equipment blanks (EB) and equipment blanks capped (EBC) from *winter* pastures during the year 2000

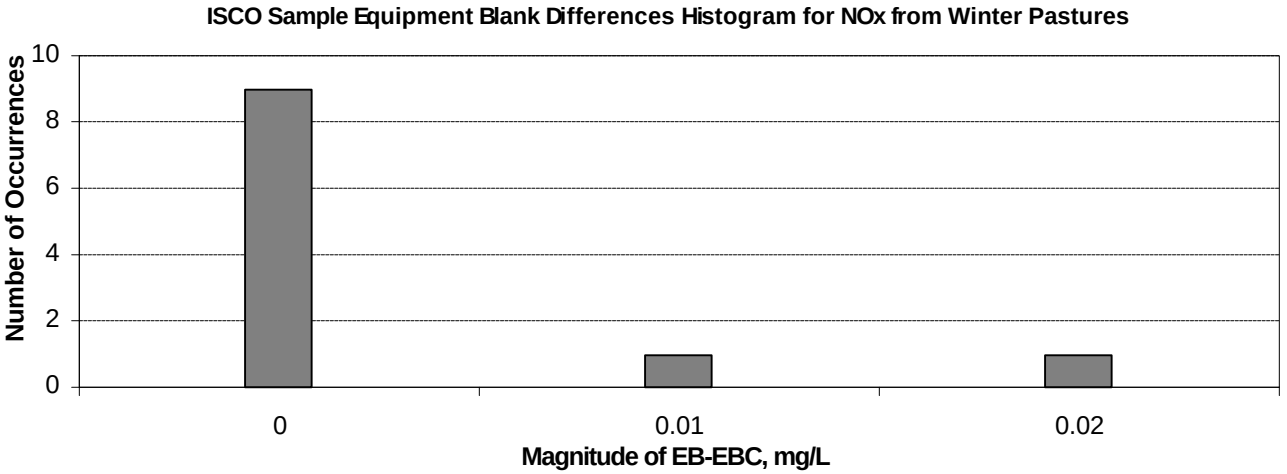

Figure 2.2b Frequency distribution for differences between equipment blanks (EB) and equipment blanks capped (EBC) of NOx concentration measurements from *winter* pastures during the year 2000.

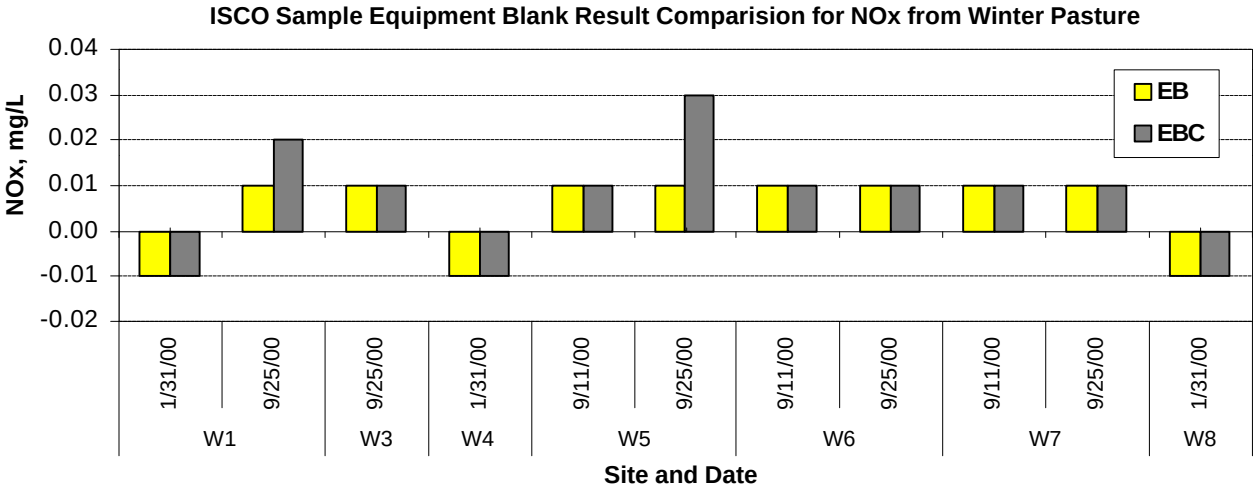

Figure 2.2c Comparison of equipment blanks (EB) and equipment blanks capped (EBC) of NOx concentration measurements from *winter* pastures during the year 2000.

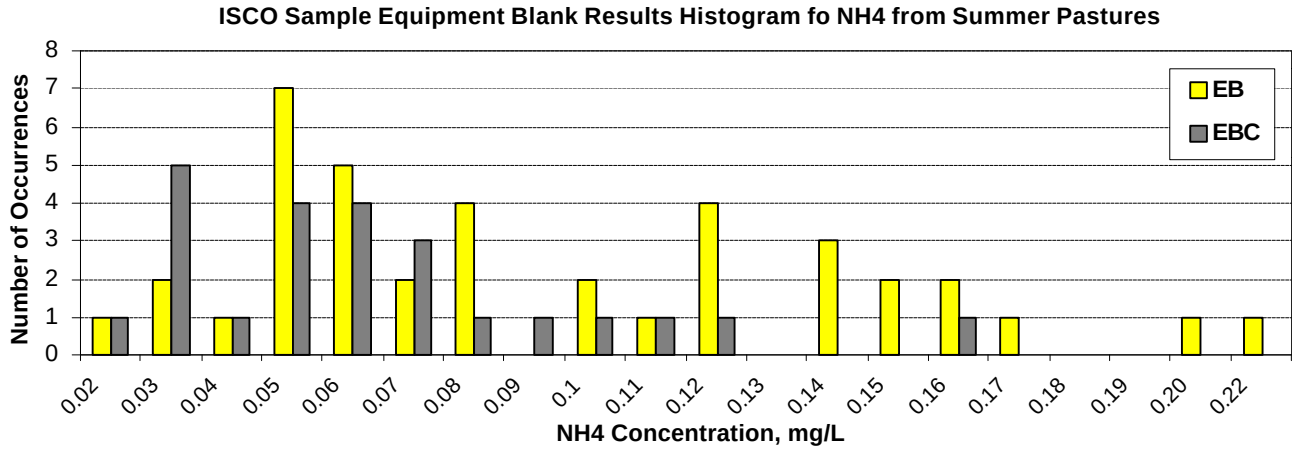

Figure 3.1a Frequency distribution for magnitudes of NH4 concentration measurements for equipment blanks (EB) and equipment blanks capped (EBC) from *summer* pastures during the year 2000.

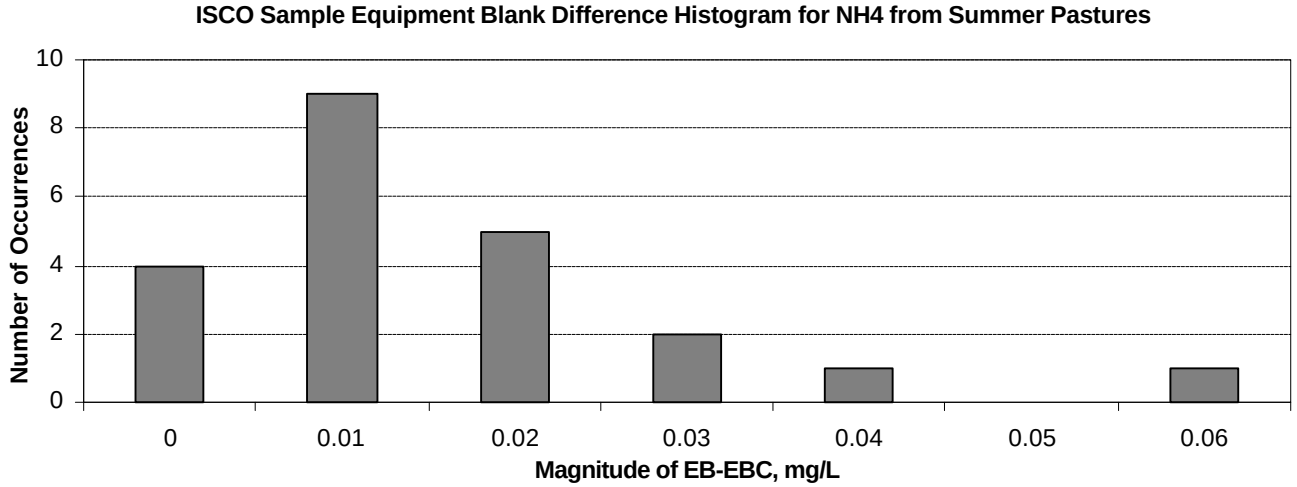

Figure 3.1b Frequency distribution for differences between equipment blanks (EB) and equipment blanks capped (EBC) of NH4 concentration measurements from *summer* pastures during the year 2000.

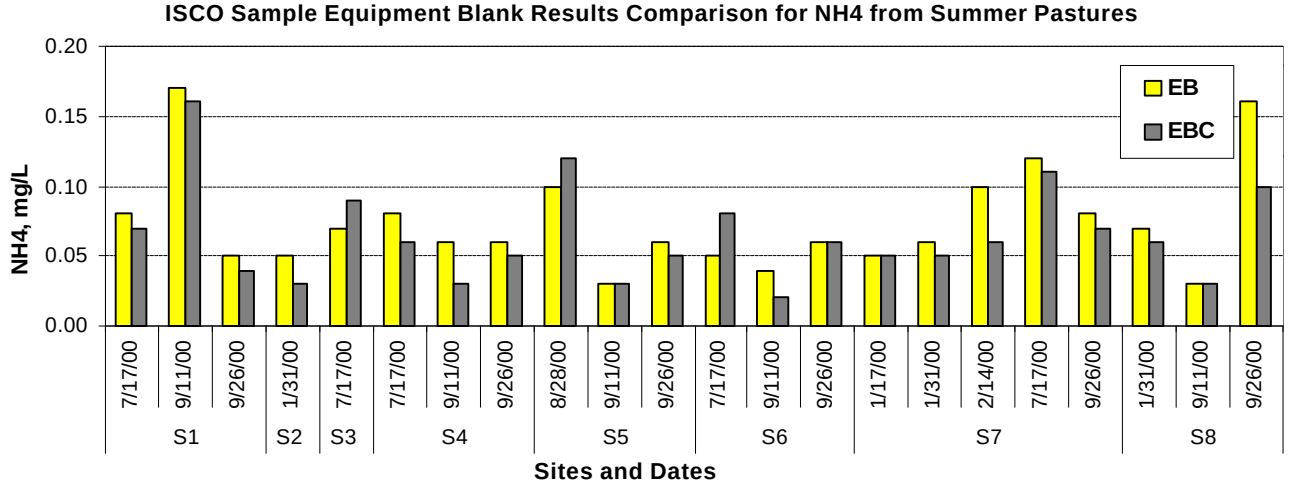

Figure 3.1c Comparison of equipment blanks (EB) and equipment blanks capped (EBC) of NH4 concentration measurements from summ*er* pastures during the year 2000.

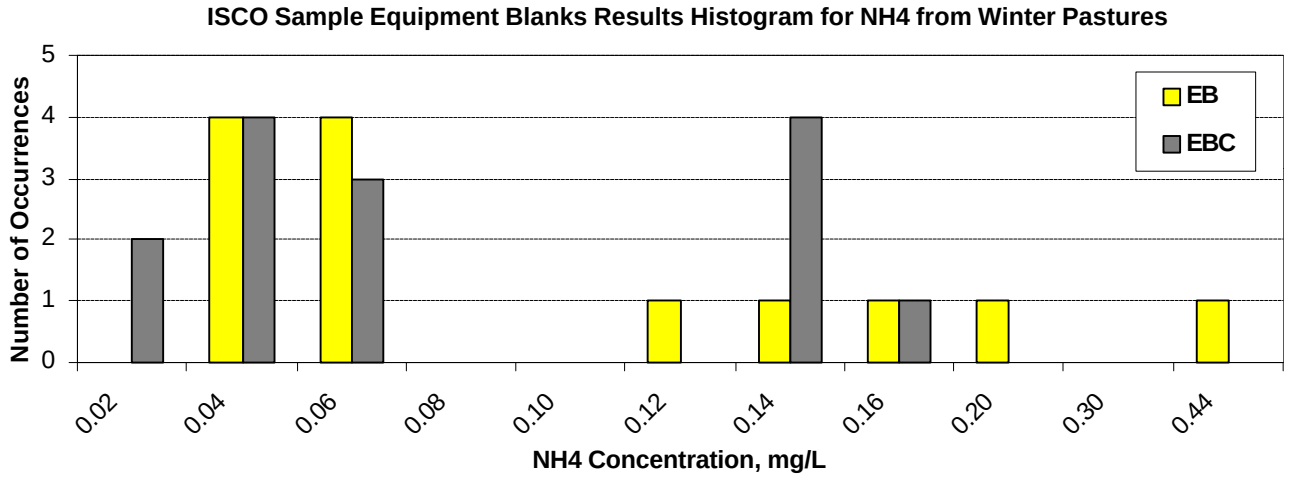

Figure 3.2a Frequency distribution for magnitudes of NH4 concentration measurements for equipment blanks (EB) and equipment blanks capped (EBC) from *winter* pastures during the year 2000.

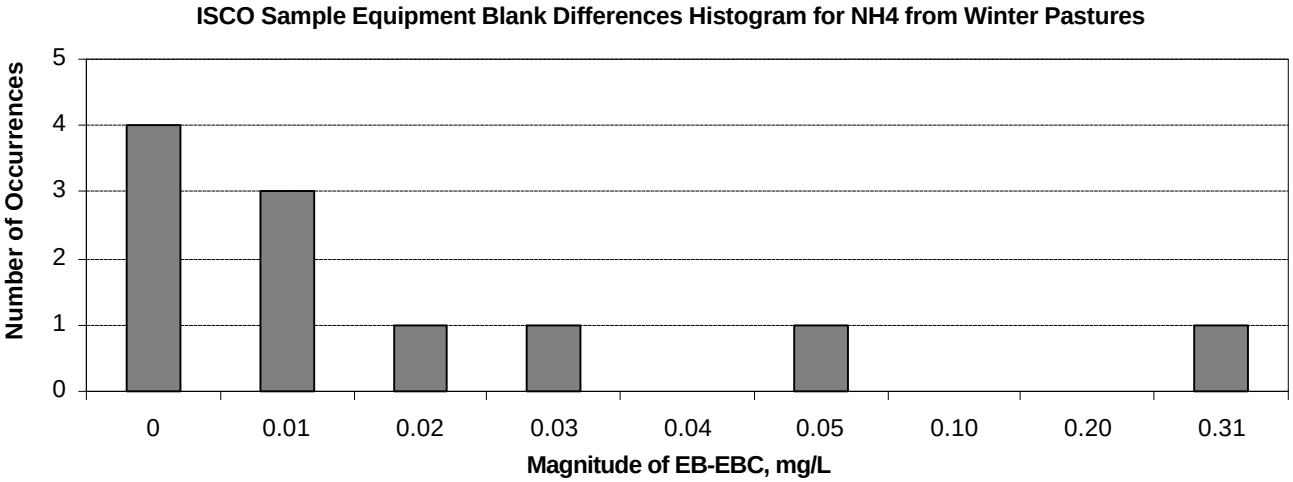

Figure 3.2b Frequency distribution for differences between equipment blanks (EB) and equipment blanks capped (EBC) of NH4 concentration measurements from *winter* pastures during the year 2000

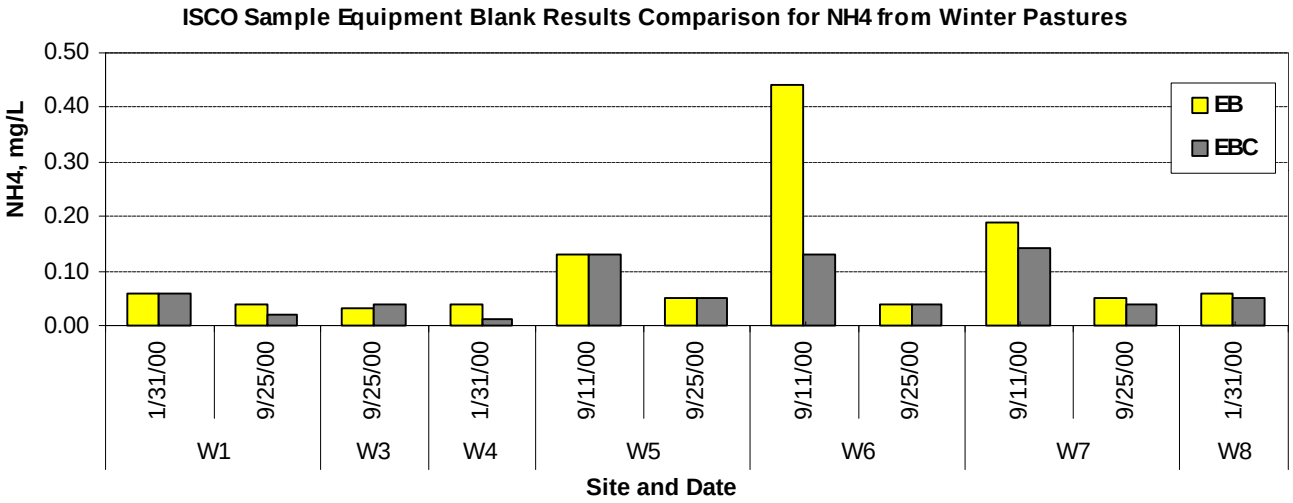

Figure 3.2c Comparison of equipment blanks (EB) and equipment blanks capped (EBC) of NH4 concentration measurements from *winter* pastures during the year 2000.

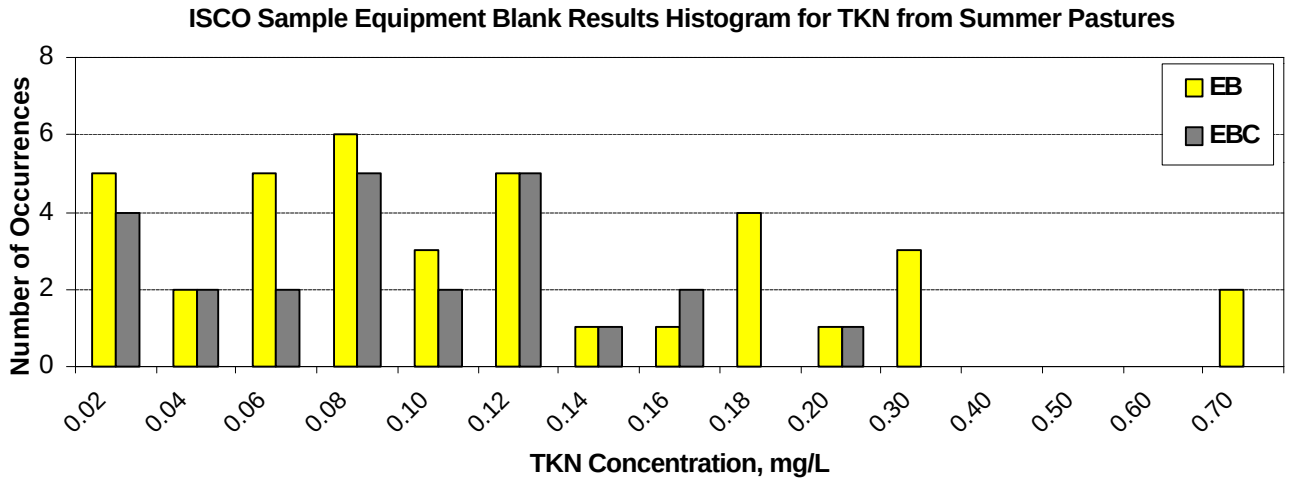

Figure 4.1a Frequency distribution for magnitudes of TKN concentration measurements for equipment blanks (EB) and equipment blanks capped (EBC) from *summer* pastures during the year 2000.

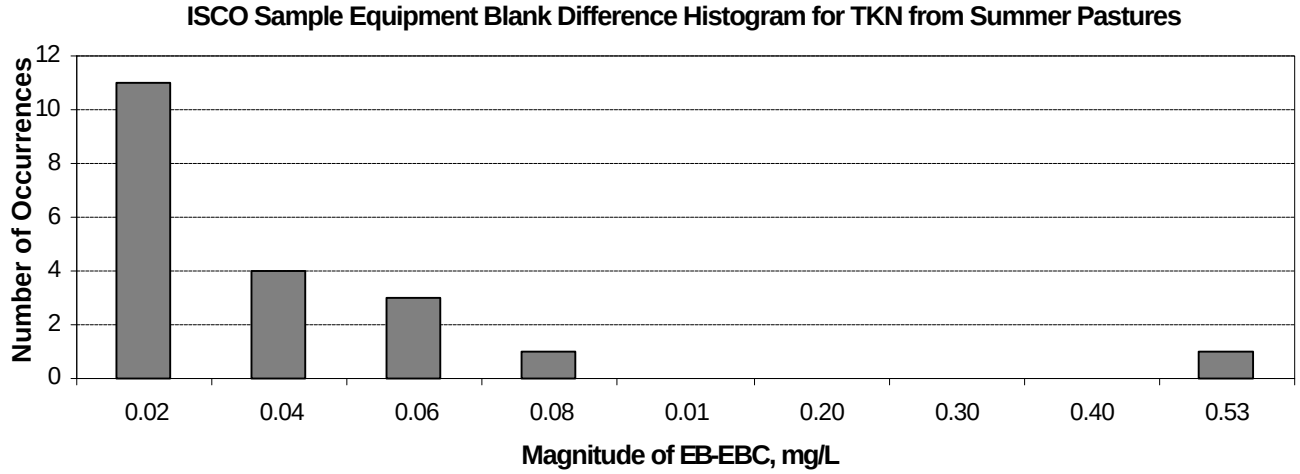

Figure 4.1b Frequency distribution for differences between equipment blanks (EB) and equipment blanks capped (EBC) of TKN concentration measurements from *summer* pastures during the year 2000.

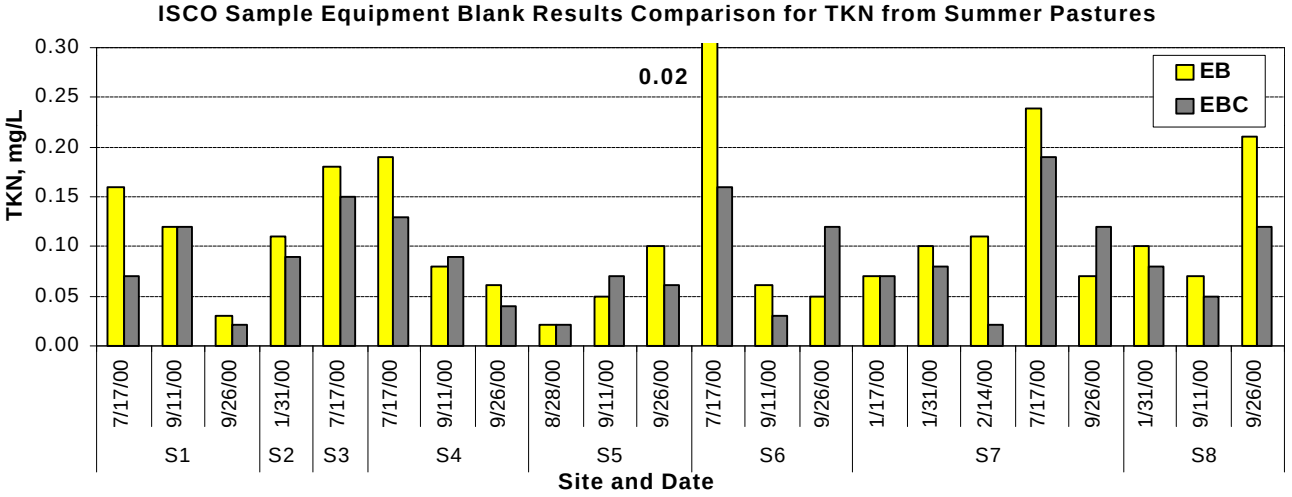

Figure 4.1c Comparison of equipment blanks (EB) and equipment blanks capped (EBC) of TKN concentration measurements from *summer* pastures during the year 2000.

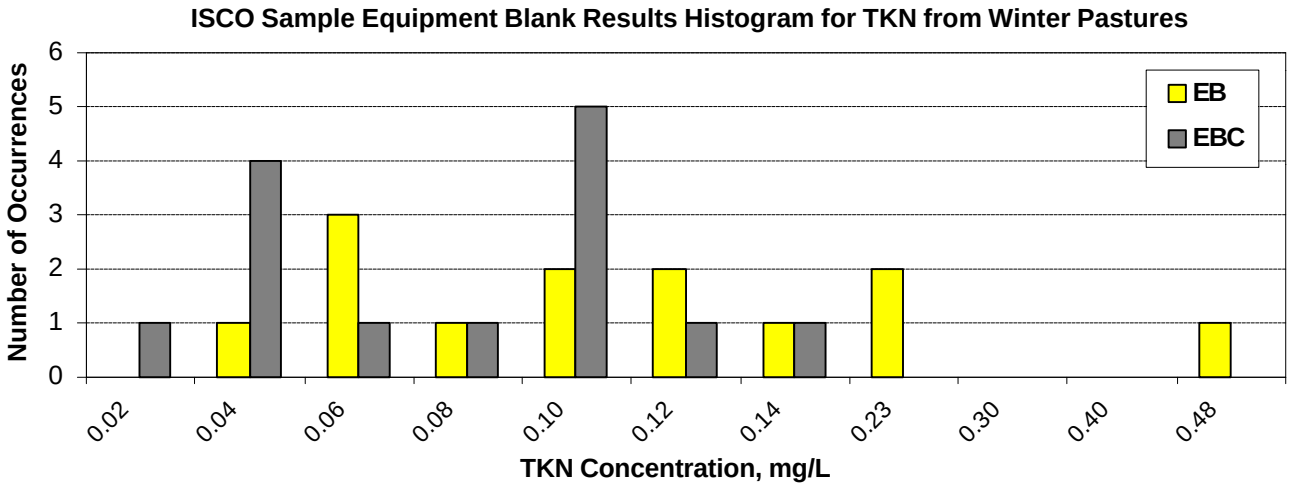

Figure 4.2a Frequency distribution for magnitudes of TKN concentration measurements for equipment blanks (EB) and equipment blanks capped (EBC) from *winter* pastures during the year 2000.

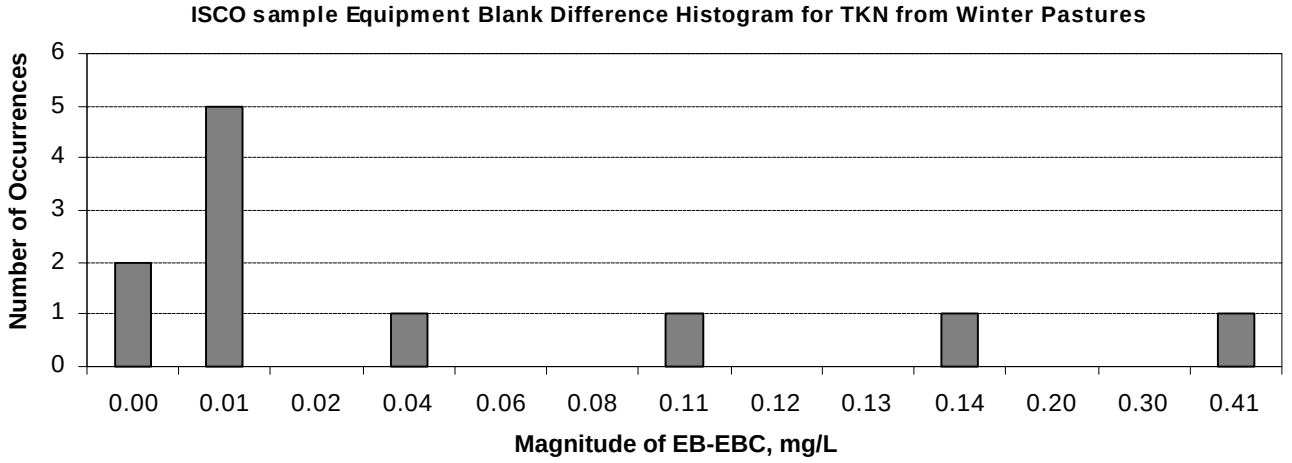

Figure 4.2b Frequency distribution for differences between equipment blanks (EB) and equipment blanks capped (EBC) of TKN concentration measurements from *winter* pastures during the year 2000.

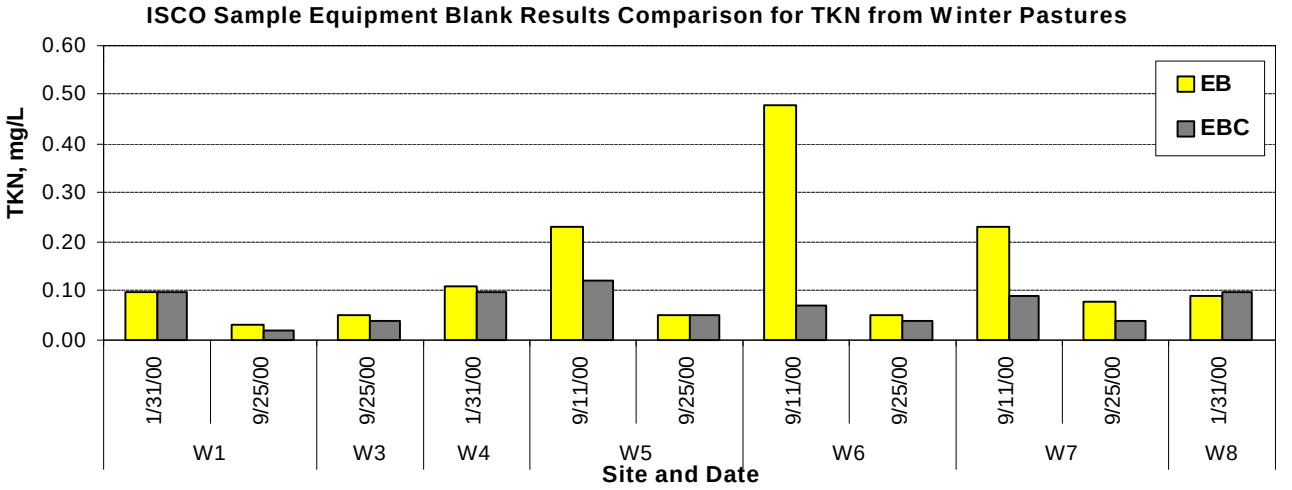

Figure 4.2c Comparison of equipment blanks (EB) and equipment blanks capped (EBC) of TKN concentration measurements from *winter* pastures during the year 2000.

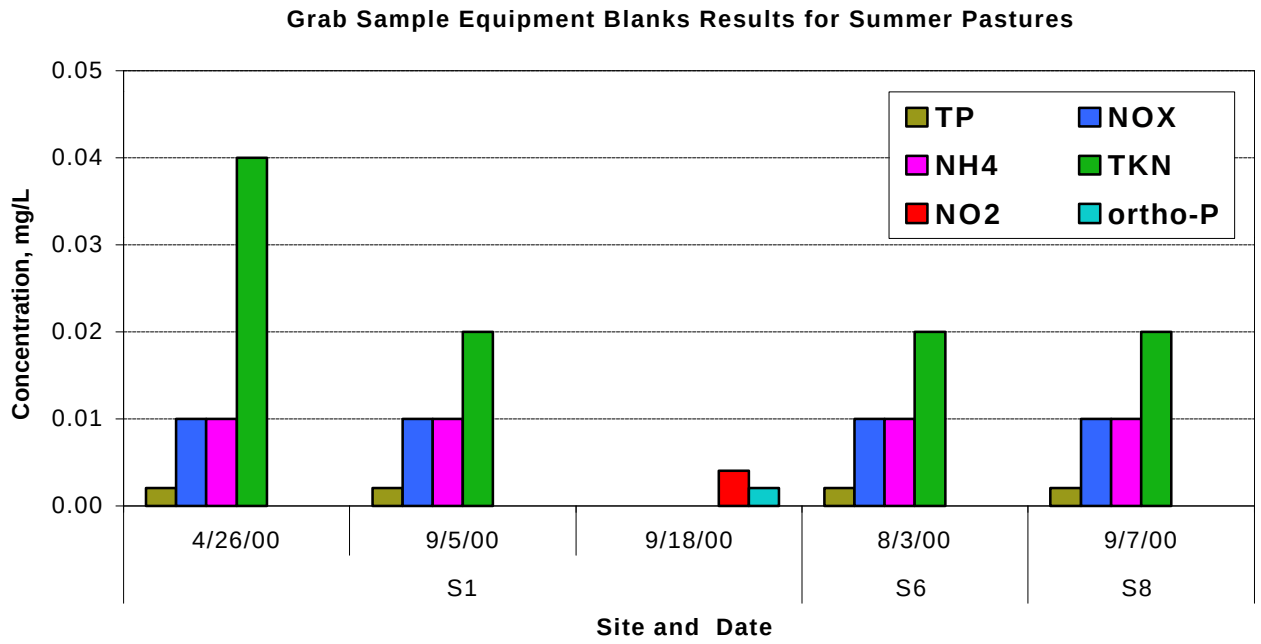

Figure 1.2a. Comparison of equipment blanks (EB) and equipment blanks capped (EBC) TP, NOx, NH4, TKN, NO2,ortho-P, concentration measurements from *summer* pastures during the year 2000.

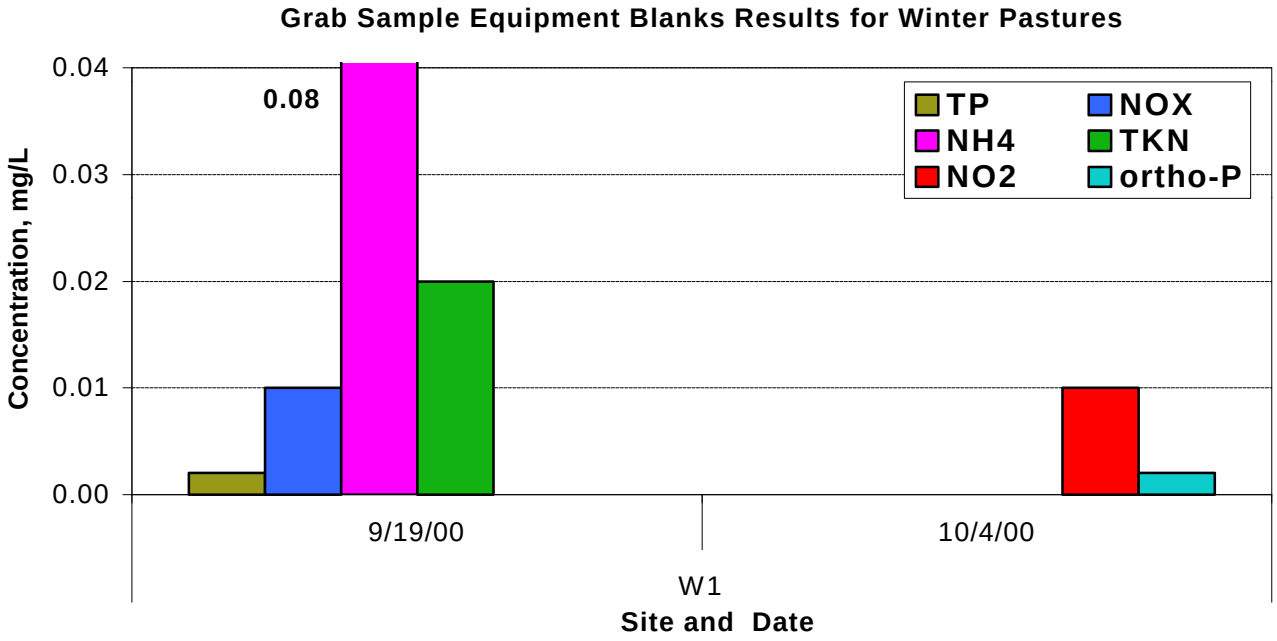

Figure 1.2a. Comparison of equipment blanks (EB) and equipment blanks capped (EBC) TP, NOx, NH4, TKN, NO2,ortho-P, concentration measurements from *winter* pastures during the year 2000.

Appendix B

Tables

Describing Results for

Equipment Blanks

Collected by

ISCO and GRAB Samples

Table 1.1.1. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks **(EBC)** of *paired* **TP** concentration measurements and statistics for *summer* pastures during the year 2000.

File	Field Number		Station	Set/Sampaling	Result, mg/L		Statistics			
Number	EB	EBC	code	Date	EB	EBC	diff	/diff/	avg	CV%
18	**2798**	**2810**	S1	7/17/00	**0.032**	**0.006**	0.026	0.026	0.019	97%
23	**3043**	**3049**	S1	9/11/00	**0.005**	**0.012**	-0.007	0.007	0.009	58%
25	**3205**	**3207**	S1	9/26/00	**0.005**	**0.002**	0.003	0.003	0.004	61%
12	**2668**	**2669**	S2	1/31/00	**-0.002**	**-0.002**	0	0	-0.002	0%
18	**2811**	**2814**	S3	7/17/00	**0.003**	**0.002**	0.001	0.001	0.003	28%
18	**2815**	**2818**	S4	7/17/00	**0.006**	**0.002**	0.004	0.004	0.004	71%
23	**3064**	**3072**	S4	9/11/00	**0.003**	**0.002**	0.001	0.001	0.003	28%
25	**3208**	**3212**	S4	9/26/00	**0.002**	**0.002**	0	0	0.002	0%
21	**2854**	**2863**	S5	8/28/00	**0.002**	**0.002**	0	0	0.002	0%
23	**3073**	**3084**	S5	9/11/00	**0.004**	**0.002**	0.002	0.002	0.003	47%
25	**3213**	**3217**	S5	9/26/00	**0.002**	**0.002**	0.000	0.000	0.002	0%
18	**2824**	**2834**	S6	7/17/00	**0.140**	**0.004**	0.136	0.136	0.072	134%
23	**3085**	**3089**	S6	9/11/00	**0.002**	**0.002**	0	0	0.002	0%
25	**3218**	**3220**	S6	9/26/00	**0.002**	**0.002**	0	0	0.002	0%
12	**2695**	**2699**	S7	1/17/00	**-0.002**	**-0.002**	0	0	-0.002	0%
12	**2670**	**2678**	S7	1/31/00	**-0.002**	**-0.002**	0	0	-0.002	0%
12	**2700**	**2703**	S7	2/14/00	**0.002**	**-0.002**	0.004	0.004	0.000	#DIV/0!
18	**2835**	**2842**	S7	7/17/00	**0.004**	**0.003**	0.001	0.001	0.004	20%
25	**3221**	**3224**	S7	9/26/00	**0.002**	**0.002**	0	0	0.002	0%
12	**2679**	**2680**	S8	1/31/00	**-0.002**	**-0.002**	0	0	-0.002	0%
23	**3101**	**3115**	S8	9/11/00	**0.002**	**0.002**	0	0	0.002	0%
25	**3225**	**3234**	S8	9/26/00	**0.002**	**0.002**	0	0	0.002	0%

Table 1.1.2. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks **(EBC)** of *all* **TP** concentration measurements and statistics for *summer* pastures during the year 2000.

File	Field Number		Station	Set/Sampling Date		Result, mg/L	
Number	EB	EBC	Code	EBC	EB	EB	EBC
18	**2798**	**2810**	S1	7/17/00	7/17/00	**0.032**	**0.006**
20	**2797**		S1	7/31/00		**0.002**	
21	**2849**		S1	8/28/00		**0.002**	
23	**3043**	**3049**	S1	9/11/00	9/11/00	**0.005**	**0.012**
25	**3205**	**3207**	S1	9/26/00	9/26/00	**0.005**	**0.002**
12	**2668**	**2669**	S2	1/31/00	1/31/00	**-0.002**	**-0.002**
23		**3058**	S2	9/11/00	9/11/00		**0.002**
18	**2811**	**2814**	S3	7/17/00	7/17/00	**0.003**	**0.002**
23	**3059**		S3	9/11/00		**0.002**	
18	**2815**	**2818**	S4	7/17/00	7/17/00	**0.006**	**0.002**
20	**2499**		S4	7/31/00		**0.010**	
21	**2852**		S4	8/28/00		**0.002**	
23	**3064**	**3072**	S4	9/11/00	9/11/00	**0.003**	**0.002**
25	**3208**	**3212**	S4	9/26/00	9/26/00	**0.002**	**0.002**
16	**2764**		S5	7/3/00		**0.003**	
20	**2801**		S5	7/31/00		**Scratched**	
21	**2854**	**2863**	S5	8/28/00	8/28/00	**0.002**	**0.002**
23	**3073**	**3084**	S5	9/11/00	9/11/00	**0.004**	**0.002**
25	**3213**	**3217**	S5	9/26/00	9/26/00	**0.002**	**0.002**
18		**2823**	S5		7/17/00		**0.002**
18	**2824**	**2834**	S6	7/17/00	7/17/00	**0.140**	**0.004**
20	**2803**		S6	7/31/00		**0.020**	
21	**2864**		S6	8/28/00		**0.002**	
23	**3085**	**3089**	S6	9/11/00	9/11/00	**0.002**	**0.002**
25	**3218**	**3220**	S6	9/26/00	9/26/00	**0.002**	**0.002**
12	**2695**	**2699**	S7	1/17/00	1/17/00	**-0.002**	**-0.002**
12	**2670**	**2678**	S7	1/31/00	1/31/00	**-0.002**	**-0.002**
12	**2700**	**2703**	S7	2/14/00	2/14/00	**0.002**	**-0.002**
13	**2705**		S7	3/13/00		**NES**	
13	**2712**		S7	3/27/00		**NES**	
16	**2767**		S7	7/3/00		**0.002**	
18	**2835**	**2842**	S7	7/17/00	7/17/00	**0.004**	**0.003**
20	**2812**		S7	7/31/00		**0.002**	
20	**2820**		S7	8/15/00		**0.010**	
21	**2866**		S7	8/28/00		**0.002**	
23	**3090**		S7	9/11/00		**0.004**	
25	**3221**	**3224**	S7	9/26/00	9/26/00	**0.002**	**0.002**
12	**2679**	**2680**	S8	1/31/00	1/31/00	**-0.002**	**-0.002**
20	**2819**		S8	8/2/00		**0.550**	
21	**2880**		S8	8/28/00		**0.002**	
23	**3101**	**3115**	S8	9/11/00	9/11/00	**0.002**	**0.002**
25	**3225**	**3234**	S8	9/26/00	9/26/00	**0.002**	**0.002**

Table 1.2.1. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks (**EBC)** of *paired* **TP** concentration measurements and statistics for *winter* pastures during the year 2000.

File	Field Number		Station	Set/Sampaling	Result, mg/L		Statistics			
Number	EB	EBC	code	Date	EB	EBC	diff	/diff/	avg	CV%
12	**2662**	**2663**	W1	1/31/00	**-0.002**	**-0.002**	0	0	-0.002	0%
25	**3172**	**3179**	W1	9/25/00	**0.002**	**0.002**	0	0	0.002	0%
25	**3184**	**3187**	W3	9/25/00	**0.002**	**0.002**	0	0	0.002	0%
12	**2664**	**2665**	W4	1/31/00	**-0.002**	**-0.002**	0	0	-0.002	0%
23	**2992**	**3007**	W5	9/11/00	**0.008**	**0.011**	-0.003	0.003	0.010	22%
25	**3194**	**3196**	W5	9/25/00	**0.002**	**0.007**	-0.005	0.005	0.005	79%
23	**3008**	**3016**	W6	9/11/00	**0.023**	**0.002**	0.021	0.021	0.013	119%
25	**3197**	**3200**	W6	9/25/00	**0.002**	**0.008**	-0.006	0.006	0.005	85%
23	**3017**	**3028**	W7	9/11/00	**0.022**	**0.006**	0.016	0.016	0.014	81%
12	**2666**	**2667**	W8	1/31/00	**-0.002**	**-0.002**	0	0	-0.002	0%
25	**3201**	**3204**	W8	9/25/00	**0.005**	**0.002**	0.003	0.003	0.004	61%

Table 1.2.2. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks (**EBC)** of all **TP** concentration measurements and statistics for *winter* pastures during the year 2000

File	Field Number		Station	Set/Sampling Date		Result, mg/L	
Number	EB	EBC	code	EB	EBC	EB	EBC
12	**2662**	**2663**	W 1	1/31/00	1/31/00	**-0.002**	**-0.002**
23		**2942**	W 1		9/11/00		**0.003**
25	**3172**	**3179**	W 1	9/25/00	9/25/00	**0.002**	**0.002**
25		**3183**	W 2		9/25/00		**0.002**
23	**2959**		W 3	9/11/00		**0.002**	
25	**3184**	**3187**	W 3	9/25/00	9/25/00	**0.002**	**0.002**
23	**2976**		W 4	9/11/00		**0.023**	
12	**2664**	**2665**	W 4	1/31/00	1/31/00	**-0.002**	**-0.002**
23	**2992**	**3007**	W 5	9/11/00	9/11/00	**0.008**	**0.011**
25	**3194**	**3196**	W 5	9/25/00	9/25/00	**0.002**	**0.007**
23	**3008**	**3016**	W 6	9/11/00	9/11/00	**0.023**	**0.002**
25	**3197**	**3200**	W 6	9/25/00	9/25/00	**0.002**	**0.008**
23	**3017**	**3028**	W 7	9/11/00	9/11/00	**0.022**	**0.006**
12	**2666**	**2667**	W 8	1/31/00	1/31/00	**-0.002**	**-0.002**
23		**3042**	W 8		9/11/00		**0.005**
25	**3201**	**3204**	W 8	9/25/00	9/25/00	**0.005**	**0.002**

Table 2.1.1. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks **(EBC)** of *paired* NOx concentration measurements and statistics for *summer* pastures during the year 2000.

File	Field Number		Station	Set/Sampaling	Result, mg/L		Statistics			
Number	EB	EBC	Code	Date	EB	EBC	diff	/diff/	avg	CV%
18	**2798**	**2810**	S1	7/17/00	**0.01**	**0.01**	0	0	0.01	0%
23	**3043**	**3049**	S1	9/11/00	**0.01**	**0.01**	0	0	0.01	0%
25	**3205**	**3207**	S1	9/26/00	**0.01**	**0.01**	0	0	0.01	0%
12	**2668**	**2669**	S2	1/31/00	**-0.01**	**-0.01**	0	0	-0.01	0%
18	**2811**	**2814**	S3	7/17/00	**0.01**	**0.01**	0	0	0.01	0%
18	**2815**	**2818**	S4	7/17/00	**0.01**	**0.01**	0	0	0.01	0%
23	**3064**	**3072**	S4	9/11/00	**0.01**	**0.01**	0	0	0.01	0%
25	**3208**	**3212**	S4	9/26/00	**0.01**	**0.01**	0	0	0.01	0%
21	**2854**	**2863**	S5	8/28/00	**0.01**	**0.01**	0	0	0.01	0%
23	**3073**	**3084**	S5	9/11/00	**0.01**	**0.01**	0	0	0.01	0%
25	**3213**	**3217**	S5	9/26/00	**0.01**	**0.01**	0	0	0.01	0%
18	**2824**	**2834**	S6	7/17/00	**0.01**	**0.01**	0	0	0.01	0%
23	**3085**	**3089**	S6	9/11/00	**0.01**	**0.01**	0	0	0.01	0%
25	**3218**	**3220**	S6	9/26/00	**0.01**	**0.01**	0	0	0.01	0%
12	**2695**	**2699**	S7	1/17/00	**-0.01**	**-0.01**	0	0	-0.01	0%
12	**2670**	**2678**	S7	1/31/00	**-0.01**	**-0.01**	0	0	-0.01	0%
12	**2700**	**2703**	S7	2/14/00	**-0.01**	**-0.01**	0	0	-0.01	0%
18	**2835**	**2842**	S7	7/17/00	**0.01**	**0.01**	0	0	0.01	0%
25	**3221**	**3224**	S7	9/26/00	**0.01**	**0.01**	0	0	0.01	0%
12	**2679**	**2680**	S8	1/31/00	**-0.01**	**-0.01**	0	0	-0.01	0%
23	**3101**	**3115**	S8	9/11/00	**0.01**	**0.01**	0	0	0.01	0%
25	**3225**	**3234**	S8	9/26/00	**0.01**	**0.01**	0	0	0.01	0%

Table 2.1.2. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks **(EBC)** of *all NOx* concentration measurements and statistics for *summer* pastures during the year 2000.

File Number	Field Number		Station Code	Set/Sampling Date		Result	
	EB	EBC		EBC	EB	EB	EBC
20	**2797**		S1	7/31/00		**0.01**	
23	**3043**	**3049**	S1	9/11/00	09/11/00	**0.01**	**0.01**
25	**3205**	**3207**	S1	9/26/00	36795	**0.01**	**0.01**
18	**2798**	**2810**	S1	7/17/00	7/17/00	**0.01**	**0.01**
21	**2849**		S1	8/28/00		**0.01**	
12	**2668**	**2669**	S2	1/31/00	1/31/00	**-0.01**	**-0.01**
23		**3058**	S2	9/11/00	9/11/00		**0.01**
18	**2811**	**2814**	S3	7/17/00	36724	**0.01**	**0.01**
23	**3059**		S3	9/11/00		**0.01**	
18	**2815**	**2818**	S4	7/17/00	7/17/00	**0.01**	**0.01**
20	**2499**		S4	7/31/00		**0.01**	
21	**2852**		S4	8/28/00		**0.01**	
23	**3064**	**3072**	S4	9/11/00	9/11/00	**0.01**	**0.01**
25	**3208**	**3212**	S4	9/26/00	09/26/00	**0.01**	**0.01**
16	**2764**		S5	7/3/00		**0.01**	
20	**2801**		S5	7/31/00		**0.01**	
21	**2854**	**2863**	S5	8/28/00	8/28/00	**0.01**	**0.01**
23	**3073**	**3084**	S5	9/11/00	36780	**0.01**	**0.01**
25	**3213**	**3217**	S5	9/26/00	09/26/00	**0.01**	**0.01**
18		**2823**	S5		7/17/00		**0.01**
18	**2824**	**2834**	S6	7/17/00	7/17/00	**0.01**	**0.01**
20	**2803**		S6	7/31/00		**0.01**	
21	**2864**		S6	8/28/00		**0.01**	
23	**3085**	**3089**	S6	9/11/00	9/11/00	**0.01**	**0.01**
25	**3218**	**3220**	S6	9/26/00	09/26/00	**0.01**	**0.01**
12	**2695**	**2699**	S7	1/17/00	36542	**-0.01**	**-0.01**
12	**2670**	**2678**	S7	1/31/00	1/31/00	**-0.01**	**-0.01**
12	**2700**	**2703**	S7	2/14/00	36570	**-0.01**	**-0.01**
13	**2705**		S7	3/13/00		**NES**	
13	**2712**		S7	3/27/00		**NES**	
16	**2767**		S7	7/3/00		**0.01**	
18	**2835**	**2842**	S7	7/17/00	7/17/00	**0.01**	**0.01**
20	**2812**		S7	7/31/00		**0.01**	
20	**2820**		S7	8/15/00		**0.01**	
21	**2866**		S7	8/28/00		**0.01**	
23	**3090**		S7	9/11/00		**0.01**	
25	**3221**	**3224**	S7	9/26/00	9/26/00	**0.01**	**0.01**
12	**2679**	**2680**	S8	1/31/00	1/31/00	**-0.01**	**-0.01**
20	**2819**		S8	8/2/00		**0.01**	
21	**2880**		S8	8/28/00		**0.01**	
23	**3101**	**3115**	S8	9/11/00	9/11/00	**0.01**	**0.01**
25	**3225**	**3234**	S8	9/26/00	09/26/00	**0.01**	**0.01**

Table 2.2.1. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks (**EBC)** of *paired* **NOx** concentration measurements and statistics for *winter* pastures during the year 2000.

File Number	Field Number		Station Code	Set/Sampaling Date	Result, mg/L		Statistics			
	EB	EBC			EB	EBC	diff	/diff/	avg	CV%
12	**2662**	**2663**	W1	1/31/00	**-0.01**	**-0.01**	0	0	-0.01	0%
25	**3172**	**3179**	W1	9/25/00	**0.01**	**0.02**	-0.01	0.01	0.02	47%
25	**3184**	**3187**	W3	9/25/00	**0.01**	**0.01**	0	0	0.01	0%
12	**2664**	**2665**	W4	1/31/00	**-0.01**	**-0.01**	0	0	-0.01	0%
23	**2992**	**3007**	W5	9/11/00	**0.01**	**0.01**	0	0	0.01	0%
25	**3194**	**3196**	W5	9/25/00	**0.01**	**0.03**	-0.02	0.02	0.02	71%
23	**3008**	**3016**	W6	9/11/00	**0.01**	**0.01**	0	0	0.01	0%
25	**3197**	**3200**	W6	9/25/00	**0.01**	**0.01**	0	0	0.01	0%
23	**3017**	**3028**	W7	9/11/00	**0.01**	**0.01**	0	0	0.01	0%
12	**2666**	**2667**	W7	1/31/00	**-0.01**	**-0.01**	0	0	-0.01	0%
25	**3201**	**3204**	W8	9/25/00	**0.01**	**0.01**	0	0	0.01	0%

Table 2.2.2. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks (**EBC)** of *all* **NOx** concentration measurements and statistics for *winter* pastures during the year 2000

File Number	Field Number		Station Code	Set/Sampling Date		Result, mg/L	
	EB	EBC		EB	EBC	EB	EBC
12	**2662**	**2663**	W1	1/31/00	1/31/00	**-0.01**	**-0.01**
23		**2942**	W1		9/11/00		**0.01**
25	**3172**	**3179**	W1	9/25/00	9/25/00	**0.01**	**0.02**
25		**3183**	W2		9/25/00		**0.01**
23	**2959**		W3	9/11/00		**0.01**	
25	**3184**	**3187**	W3	9/25/00	9/25/00	**0.01**	**0.01**
12	**2664**	**2665**	W4	1/31/00	1/31/00	**-0.01**	**-0.01**
23	**2976**		W4	9/11/00		**0.01**	
23	**2992**	**3007**	W5	9/11/00	9/11/00	**0.01**	**0.01**
25	**3194**	**3196**	W5	9/25/00	9/25/00	**0.01**	**0.03**
23	**3008**	**3016**	W6	9/11/00	9/11/00	**0.01**	**0.01**
25	**3197**	**3200**	W6	9/25/00	9/25/00	**0.01**	**0.01**
23	**3017**	**3028**	W7	9/11/00	9/11/00	**0.01**	**0.01**
12	**2666**	**2667**	W8	1/31/00	1/31/00	**-0.01**	**-0.01**
23		**3042**	W8		9/11/00		**0.01**
25	**3201**	**3204**	W8	9/25/00	9/25/00	**0.01**	**0.01**

Table 3.1.1. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks **(EBC)** of *paired* **NH4** concentration measurements and statistics for *summer* pastures during the year 2000.

File	Field Number		Station	Set/Sampaling	Result, mg/L		Statistics			
Number	EB	EBC	Code	Date	EB	EBC	diff	/diff/	avg	CV%
18	**2798**	**2810**	S1	7/17/00	**0.08**	**0.07**	0.01	0.01	0.08	9%
23	**3043**	**3049**	S1	9/11/00	**0.17**	**0.16**	0.01	0.01	0.17	4%
25	**3205**	**3207**	S1	9/26/00	**0.05**	**0.04**	0.01	0.01	0.05	16%
12	**2668**	**2669**	S2	1/31/00	**0.05**	**0.03**	0.02	0.02	0.04	35%
18	**2811**	**2814**	S3	7/17/00	**0.07**	**0.09**	-0.02	0.02	0.08	18%
18	**2815**	**2818**	S4	7/17/00	**0.08**	**0.06**	0.02	0.02	0.07	20%
23	**3064**	**3072**	S4	9/11/00	**0.06**	**0.03**	0.03	0.03	0.05	47%
25	**3208**	**3212**	S4	9/26/00	**0.06**	**0.05**	0.01	0.01	0.06	13%
21	**2854**	**2863**	S5	8/28/00	**0.10**	**0.12**	-0.02	0.02	0.11	13%
23	**3073**	**3084**	S5	9/11/00	**0.03**	**0.03**	0	0	0.03	0%
25	**3213**	**3217**	S5	9/26/00	**0.06**	**0.05**	0.01	0.01	0.06	13%
18	**2824**	**2834**	S6	7/17/00	**0.05**	**0.08**	-0.03	0.03	0.07	33%
23	**3085**	**3089**	S6	9/11/00	**0.04**	**0.02**	0.02	0.02	0.03	47%
25	**3218**	**3220**	S6	9/26/00	**0.06**	**0.06**	0	0	0.06	0%
12	**2695**	**2699**	S7	1/17/00	**0.05**	**0.05**	0	0	0.05	0%
12	**2670**	**2678**	S7	1/31/00	**0.06**	**0.05**	0.01	0.01	0.06	13%
12	**2700**	**2703**	S7	2/14/00	**0.10**	**0.06**	0.04	0.04	0.08	35%
18	**2835**	**2842**	S7	7/17/00	**0.12**	**0.11**	0.01	0.01	0.12	6%
25	**3221**	**3224**	S7	9/26/00	**0.08**	**0.07**	0.01	0.01	0.08	9%
12	**2679**	**2680**	S8	1/31/00	**0.07**	**0.06**	0.01	0.01	0.07	11%
23	**3101**	**3115**	S8	9/11/00	**0.03**	**0.03**	0	0	0.03	0%
25	**3225**	**3234**	S8	9/26/00	**0.16**	**0.10**	0.06	0.06	0.13	33%

Table 3.1.2. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks **(EBC)** of *all* **NH4** concentration measurements and statistics for *summer* pastures during the year 2000.

File Number	Field Number		Station Code	Set/Sampling Date		Result, mg/L	
	EB	EBC		EBC	EB	EB	EBC
18	**2798**	**2810**	S1	7/17/00	7/17/00	**0.08**	**0.07**
20	**2797**		S1	7/31/00		**0.14**	
21	**2849**		S1	8/28/00		**0.12**	
23	**3043**	**3049**	S1	9/11/00	09/11/00	**0.17**	**0.16**
25	**3205**	**3207**	S1	9/26/00	36795	**0.05**	**0.04**
12	**2668**	**2669**	S2	1/31/00	1/31/00	**0.05**	**0.03**
23		**3058**	S2	9/11/00	9/11/00		**0.03**
18	**2811**	**2814**	S3	7/17/00	7/17/00	**0.07**	**0.09**
23	**3059**		S3	9/11/00		**0.05**	
23	**3064**	**3072**	S4	9/11/00	9/11/00	**0.06**	**0.03**
18	**2815**	**2818**	S4	7/17/00	7/17/00	**0.08**	**0.06**
20	**2499**		S4	7/31/00		**0.22**	
21	**2852**		S4	8/28/00		**0.14**	
25	**3208**	**3212**	S4	9/26/00	36795	**0.06**	**0.05**
16	**2764**		S5	7/3/00		**0.11**	
20	**2801**		S5	7/31/00		**0.20**	
21	**2854**	**2863**	S5	8/28/00	8/28/00	**0.10**	**0.12**
23	**3073**	**3084**	S5	9/11/00	9/11/00	**0.03**	**0.03**
25	**3213**	**3217**	S5	9/26/00	9/26/00	**0.06**	**0.05**
18		**2823**	S5		7/17/00		**0.07**
18	**2824**	**2834**	S6	7/17/00	7/17/00	**0.05**	**0.08**
20	**2803**		S6	7/31/00		**0.16**	
21	**2864**		S6	8/28/00		**0.14**	
23	**3085**	**3089**	S6	9/11/00	9/11/00	**0.04**	**0.02**
25	**3218**	**3220**	S6	9/26/00	36795	**0.06**	**0.06**
12	**2695**	**2699**	S7	1/17/00	36542	**0.05**	**0.05**
12	**2670**	**2678**	S7	1/31/00	36556	**0.06**	**0.05**
12	**2700**	**2703**	S7	2/14/00	2/14/00	**0.10**	**0.06**
13	**2705**		S7	3/13/00		**NES**	
13	**2712**		S7	3/27/00		**NES**	
16	**2767**		S7	7/3/00		**0.15**	
18	**2835**	**2842**	S7	7/17/00	7/17/00	**0.12**	**0.11**
20	**2812**		S7	7/31/00		**0.05**	
20	**2820**		S7	8/15/00		**0.12**	
21	**2866**		S7	8/28/00		**0.12**	
23	**3090**		S7	9/11/00		**0.05**	
25	**3221**	**3224**	S7	9/26/00	9/26/00	**0.08**	**0.07**
12	**2679**	**2680**	S8	1/31/00	1/31/00	**0.07**	**0.06**
20	**2819**		S8	8/2/00		**0.08**	
21	**2880**		S8	8/28/00		**0.02**	
23	**3101**	**3115**	S8	9/11/00	9/11/00	**0.03**	**0.03**
25	**3225**	**3234**	S8	9/26/00	9/26/00	**0.16**	**0.10**

Table 3.2.1. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks (**EBC)** of *paired* **NH_4** concentration measurements and statistics for *winter* pastures during the year 2000.

File Number	Field Number		Station Code	Set/Sampaling Date	Result, mg/L		Statistics			
	EB	EBC			EB	EBC	diff	/diff/	avg	CV%
12	**2662**	**2663**	W1	1/31/00	**0.06**	**0.06**	0	0	0.06	0%
25	**3172**	**3179**	W1	9/25/00	**0.04**	**0.02**	0.02	0.02	0.03	47%
25	**3184**	**3187**	W3	9/25/00	**0.03**	**0.04**	-0.01	0.01	0.04	20%
12	**2664**	**2665**	W4	1/31/00	**0.04**	**0.01**	0.03	0.03	0.03	85%
23	**2992**	**3007**	W5	9/11/00	**0.13**	**0.13**	0	0	0.13	0%
25	**3194**	**3196**	W5	9/25/00	**0.05**	**0.05**	0	0	0.05	0%
23	**3008**	**3016**	W6	9/11/00	**0.44**	**0.13**	0.31	0.31	0.29	77%
25	**3197**	**3200**	W6	9/25/00	**0.04**	**0.04**	0	0	0.04	0%
23	**3017**	**3028**	W7	9/11/00	**0.19**	**0.14**	0.05	0.05	0.17	21%
12	**2666**	**2667**	W7	1/31/00	**0.06**	**0.05**	0.01	0.01	0.06	13%
25	**3201**	**3204**	W8	9/25/00	**0.05**	**0.04**	0.01	0.01	0.05	16%

Table 3.2.2. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks (**EBC)** of *all* **NH_4** concentration measurements and statistics for *winter* pastures during the year 2000.

File Number	Field Number		Station Code	Set/Sampling Date		Result, mg/L	
	EB	EBC		EB	EBC	EB	EBC
12	**2662**	**2663**	W1	1/31/00	1/31/00	**0.06**	**0.06**
23		**2942**	W1		9/11/00		**0.13**
25	**3172**	**3179**	W1	9/25/00	9/25/00	**0.04**	**0.02**
25		**3183**	W2		9/25/00		**0.03**
23	**2959**		W3	9/11/00		**0.12**	
25	**3184**	**3187**	W3	9/25/00	9/25/00	**0.03**	**0.04**
12	**2664**	**2665**	W4	1/31/00	1/31/00	**0.04**	**0.01**
23	**2976**		W4	9/11/00		**0.15**	
23	**2992**	**3007**	W5	9/11/00	9/11/00	**0.13**	**0.13**
25	**3194**	**3196**	W5	9/25/00	9/25/00	**0.05**	**0.05**
23	**3008**	**3016**	W6	9/11/00	9/11/00	**0.44**	**0.13**
25	**3197**	**3200**	W6	9/25/00	9/25/00	**0.04**	**0.04**
23	**3017**	**3028**	W7	9/11/00	9/11/00	**0.19**	**0.14**
12	**2666**	**2667**	W8	1/31/00	1/31/00	**0.06**	**0.05**
23		**3042**	W8		9/11/00		**0.15**
25	**3201**	**3204**	W8	9/25/00	9/25/00	**0.05**	**0.04**

Table 4.1.1. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks **(EBC)** of *paired* **TKN** concentration measurements and statistics for *summer* pastures during the year 2000.

File	Field Number		Station	Set/Sampaling	Result, mg/L		Statistics			
Number	EB	EBC	Code	Date	EB	EBC	diff	/diff/	avg	CV%
18	**2798**	**2810**	S1	7/17/00	**0.16**	**0.07**	0.09	0.09	0.12	55%
23	**3043**	**3049**	S1	9/11/00	**0.12**	**0.12**	0	0	0.12	0%
25	**3205**	**3207**	S1	9/26/00	**0.03**	**0.02**	0.01	0.01	0.03	28%
12	**2668**	**2669**	S2	1/31/00	**0.11**	**0.09**	0.02	0.02	0.10	14%
18	**2811**	**2814**	S3	7/17/00	**0.18**	**0.15**	0.03	0.03	0.17	13%
18	**2815**	**2818**	S4	7/17/00	**0.19**	**0.13**	0.06	0.06	0.16	27%
23	**3064**	**3072**	S4	9/11/00	**0.08**	**0.09**	-0.01	0.01	0.09	8%
25	**3208**	**3212**	S4	9/26/00	**0.06**	**0.04**	0.02	0.02	0.05	28%
21	**2854**	**2863**	S5	8/28/00	**0.02**	**0.02**	0	0	0.02	0%
23	**3073**	**3084**	S5	9/11/00	**0.05**	**0.07**	-0.02	0.02	0.06	24%
25	**3213**	**3217**	S5	9/26/00	**0.10**	**0.06**	0.04	0.04	0.08	35%
18	**2824**	**2834**	S6	7/17/00	**0.69**	**0.16**	0.53	0.53	0.43	88%
23	**3085**	**3089**	S6	9/11/00	**0.06**	**0.03**	0.03	0.03	0.05	47%
25	**3218**	**3220**	S6	9/26/00	**0.05**	**0.12**	-0.07	0.07	0.09	58%
12	**2695**	**2699**	S7	1/17/00	**0.07**	**0.07**	0	0	0.07	0%
12	**2670**	**2678**	S7	1/31/00	**0.10**	**0.08**	0.02	0.02	0.09	16%
12	**2700**	**2703**	S7	2/14/00	**0.11**	**0.02**	0.09	0.09	0.07	98%
18	**2835**	**2842**	S7	7/17/00	**0.24**	**0.19**	0.05	0.05	0.22	16%
25	**3221**	**3224**	S7	9/26/00	**0.07**	**0.12**	-0.05	0.05	0.10	37%
12	**2679**	**2680**	S8	1/31/00	**0.10**	**0.08**	0.02	0.02	0.09	16%
23	**3101**	**3115**	S8	9/11/00	**0.07**	**0.05**	0.02	0.02	0.06	24%
25	**3225**	**3234**	S8	9/26/00	**0.21**	**0.12**	0.09	0.09	0.17	39%

Table 4.1.2. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks **(EBC)** of *all* **TKN** concentration measurements and statistics for *summer* pastures during the year 2000.

File Number	Field Number		Station Code	Set/Sampling Date		Result	
	EB	EBC		EBC	EB	EB	EBC
18	**2798**	**2810**	S1	7/17/00	07/17/00	**0.16**	**0.07**
20	**2797**		S1	7/31/00		**0.14**	
21	**2849**		S1	8/28/00		**0.04**	
23	**3043**	**3049**	S1	9/11/00	9/11/00	**0.12**	**0.12**
25	**3205**	**3207**	S1	9/26/00	9/26/00	**0.03**	**0.02**
12	**2668**	**2669**	S2	1/31/00	1/31/00	**0.11**	**0.09**
23		**3058**	S2	9/11/00	9/11/00		**0.02**
18	**2811**	**2814**	S3	7/17/00	36724	**0.18**	**0.15**
23	**3059**		S3	9/11/00		**0.07**	
18	**2815**	**2818**	S4	7/17/00	07/17/00	**0.19**	**0.13**
20	**2499**		S4	7/31/00		**0.25**	
21	**2852**		S4	8/28/00		**0.02**	
23	**3064**	**3072**	S4	9/11/00	9/11/00	**0.08**	**0.09**
25	**3208**	**3212**	S4	9/26/00	9/26/00	**0.06**	**0.04**
16	**2764**		S5	7/3/00		**0.12**	
20	**2801**		S5	7/31/00		**Scratched**	
21	**2854**	**2863**	S5	8/28/00	8/28/00	**0.02**	**0.02**
23	**3073**	**3084**	S5	9/11/00	36780	**0.05**	**0.07**
25	**3213**	**3217**	S5	9/26/00	09/26/00	**0.10**	**0.06**
18		**2823**	S5		7/17/00		**0.12**
18	**2824**	**2834**	S6	7/17/00	7/17/00	**0.69**	**0.16**
20	**2803**		S6	7/31/00		**0.17**	
21	**2864**		S6	8/28/00		**0.02**	
23	**3085**	**3089**	S6	9/11/00	9/11/00	**0.06**	**0.03**
25	**3218**	**3220**	S6	9/26/00	9/26/00	**0.05**	**0.12**
12	**2695**	**2699**	S7	1/17/00	01/17/00	**0.07**	**0.07**
12	**2670**	**2678**	S7	1/31/00	1/31/00	**0.10**	**0.08**
12	**2700**	**2703**	S7	2/14/00	2/14/00	**0.11**	**0.02**
13	**2705**		S7	3/13/00		**0.62**	
13	**2712**		S7	3/27/00		**NES**	
16	**2767**		S7	7/3/00		**0.17**	
18	**2835**	**2842**	S7	7/17/00	36724	**0.24**	**0.19**
20	**2812**		S7	7/31/00		**0.08**	
20	**2820**		S7	8/15/00		**0.18**	
21	**2866**		S7	8/28/00		**0.02**	
23	**3090**		S7	9/11/00		**0.06**	
25	**3221**	**3224**	S7	9/26/00	36795	**0.07**	**0.12**
12	**2679**	**2680**	S8	1/31/00	01/31/00	**0.10**	**0.08**
20	**2819**		S8	8/2/00		**0.11**	
21	**2880**		S8	8/28/00		**0.02**	
23	**3101**	**3115**	S8	9/11/00	9/11/00	**0.07**	**0.05**
25	**3225**	**3234**	S8	9/26/00	9/26/00	**0.21**	**0.12**

Table 4.2.1. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks (**EBC)** of *paired* **TKN** concentration measurements and statistics for *winter* pastures during the year 2000.

File	Field Number		Station	Set/Sampaling	Result, mg/L		Statistics			
Number	EB	EBC	Code	Date	EB	EBC	diff	/diff/	avg	CV%
12	**2662**	**2663**	W1	1/31/00	**0.10**	**0.10**	0.00	0.00	0.10	0%
25	**3172**	**3179**	W1	9/25/00	**0.03**	**0.02**	0.01	0.01	0.03	28%
25	**3184**	**3187**	W3	9/25/00	**0.05**	**0.04**	0.01	0.01	0.05	16%
12	**2664**	**2665**	W4	1/31/00	**0.11**	**0.10**	0.01	0.01	0.11	7%
23	**2992**	**3007**	W5	9/11/00	**0.23**	**0.12**	0.11	0.11	0.18	44%
25	**3194**	**3196**	W5	9/25/00	**0.05**	**0.05**	0.00	0.00	0.05	0%
23	**3008**	**3016**	W6	9/11/00	**0.48**	**0.07**	0.41	0.41	0.28	105%
25	**3197**	**3200**	W6	9/25/00	**0.05**	**0.04**	0.01	0.01	0.05	16%
23	**3017**	**3028**	W7	9/11/00	**0.23**	**0.09**	0.14	0.14	0.16	62%
12	**2666**	**2667**	W8	1/31/00	**0.09**	**0.10**	-0.01	-0.01	0.10	7%
25	**3201**	**3204**	W8	9/25/00	**0.08**	**0.04**	0.04	0.04	0.06	47%

Table 4.2.2. Summary of **ISCO** equipment blanks **(EB)** and capped equipment blanks (**EBC)** of *all* **TKN** concentration measurements and statistics for *winter* pastures during the year 2000

File	Field Number		Station	Set/Sampling Date		Result, mg/L	
Number	EB	EBC	Code	EB	EBC	EB	EBC
25	**2662**	**2663**	W1	1/31/00	1/31/00	**0.1**	**0.1**
25		**2942**	W1		9/11/00		**0.09**
25	**3172**	**3179**	W1	9/25/00	9/25/00	**0.03**	**0.02**
25		**3183**	W2		9/25/00		**0.04**
25	**2959**		W3	9/11/00		**0.13**	
25	**3184**	**3187**	W3	9/25/00	9/25/00	**0.05**	**0.04**
25	**2976**		W4	9/11/00		**0.12**	
25	**2664**	**2665**	W4	1/31/00	1/31/00	**0.11**	**0.1**
25	**2992**	**3007**	W5	9/11/00	9/11/00	**0.23**	**0.12**
25	**3194**	**3196**	W5	9/25/00	9/25/00	**0.05**	**0.05**
25	**3008**	**3016**	W6	9/11/00	9/11/00	**0.48**	**0.07**
25	**3197**	**3200**	W6	9/25/00	9/25/00	**0.05**	**0.04**
23	**3017**	**3028**	W7	9/11/00	9/11/00	**0.23**	**0.09**
23	**3201**	**3204**	W8	9/25/00	9/25/00	**0.08**	**0.04**
23		**3042**	W8		9/11/00		**0.14**
25	**2666**	**2667**	W8	1/31/00	1/31/00	**0.09**	**0.1**

Table 7.1. Summary of all TP, Nox, NH4, TKN, NO2, ortho-P concentration measurement and statistics for open bottle equipment blankas (EB) for *summer* pastures during the year 2000.

File	Field	Station	Sampling	Result, mg/L					
Number	Number	Code	Date	TP	NOX	TKN	NH4	NO2	ortho-P
14	**2724**	S1	4/26/00	**0.002**	**0.01**	**0.04**	**0.01**		
19	**2827**		9/5/00	**0.002**	**0.01**	**0.02**	**0.01**		
22	**2898**		9/18/00					**0.004**	**0.002**
18	**2846**	S6	8/3/00	**0.002**	**0.01**	**0.02**	**0.01**		
21	**2889**	S8	9/7/00	**0.002**	**0.01**	**0.02**	**0.01**		

Table 7.2. Summary of all TP, Nox, NH4, TKN, NO2, ortho-P concentration measurement and statistics for open bottle equipment blankas (EB) for *winter* pastures during the year 2000 and 20001.

File	Field	Station	Sampling	Result, mg/L					
Number	Number	Code	Date	TP	NOX	TKN	NH4	NO2	ortho-P
24	3147	W 1	9/19/00	0.002	0.01	0.02	0.08		
24	3130		10/4/00					0.01	0.002

Appendix C

Graphs

Describing Results for

Field Duplicates

Collected by

ISCO Samples

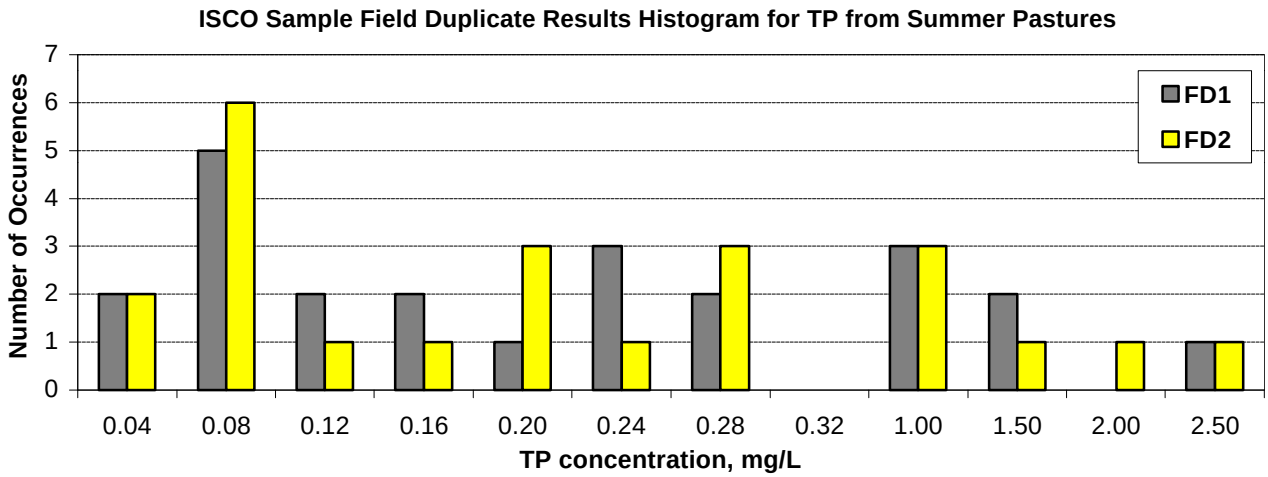

Figure 1.1a Frequency distribution for magnitudes of TP concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

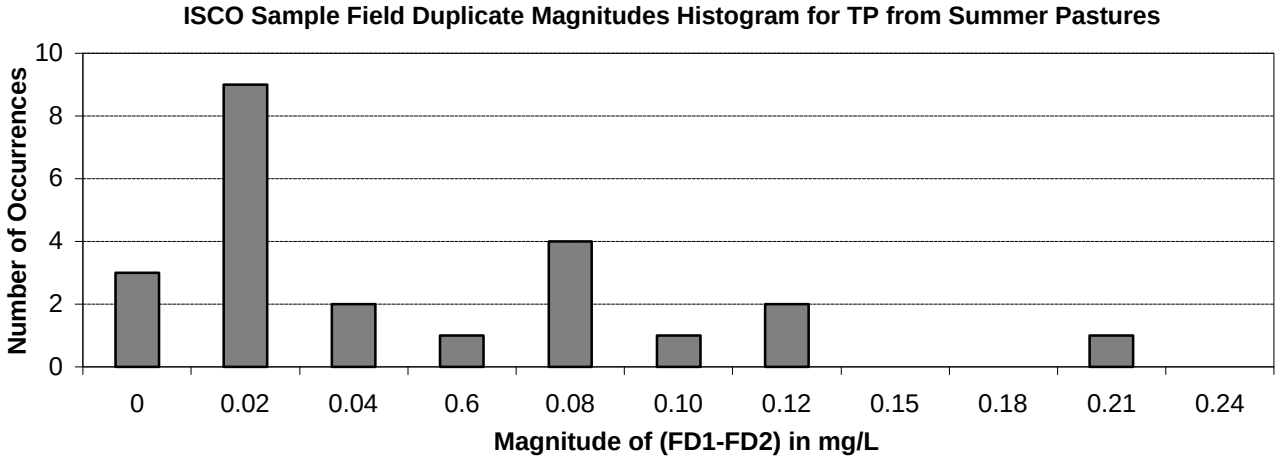

Figure 1.1b Frequency distribution for differences (FD1-FD2) between paired TP concentration measurements for field duplicates from *summer* pastures during the year 2000.

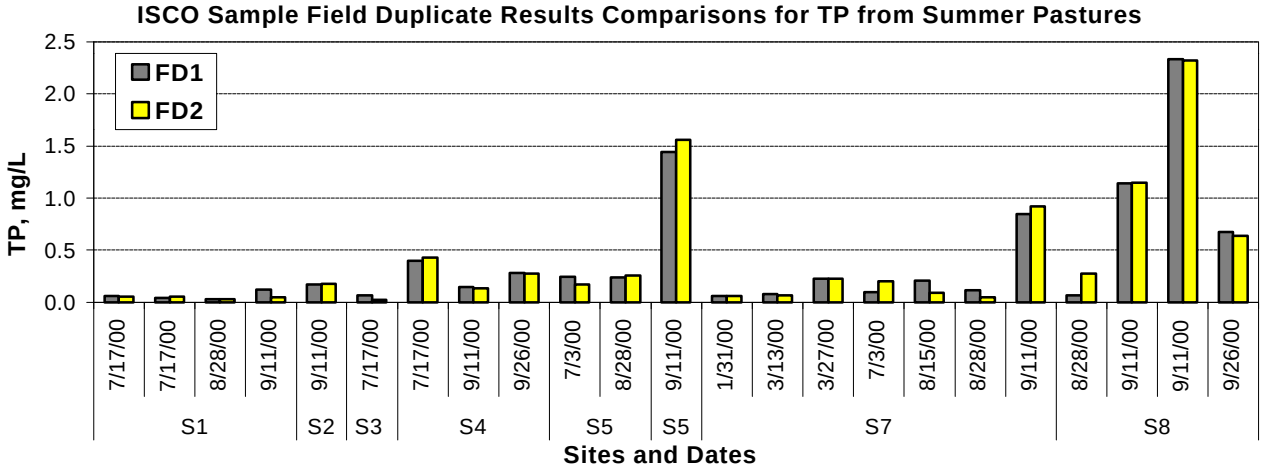

Figure 1.1c Comparison of paired TP concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

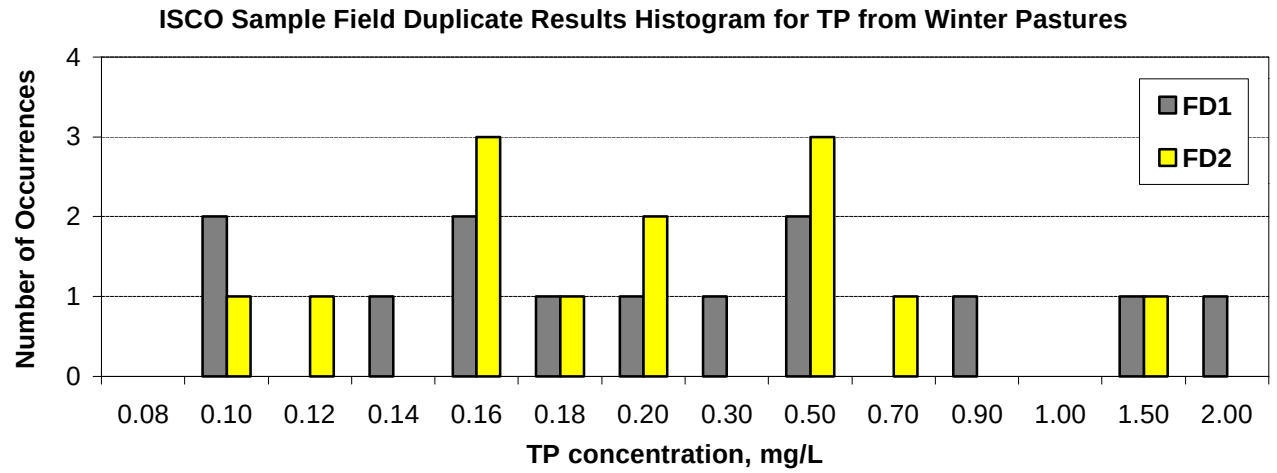

Figure 1.2a Frequency distribution for magnitudes of TP concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

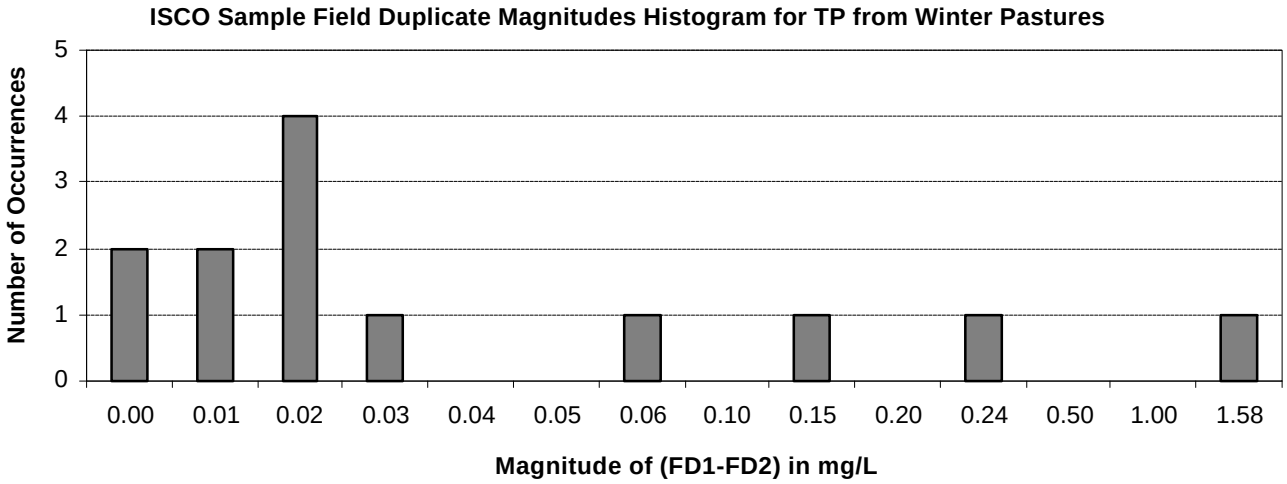

Figure 1.2b Frequency distribution for differences (FD1-FD2) between paired TP concentration measurements for field duplicates from *winter* pastures during the year 2000.

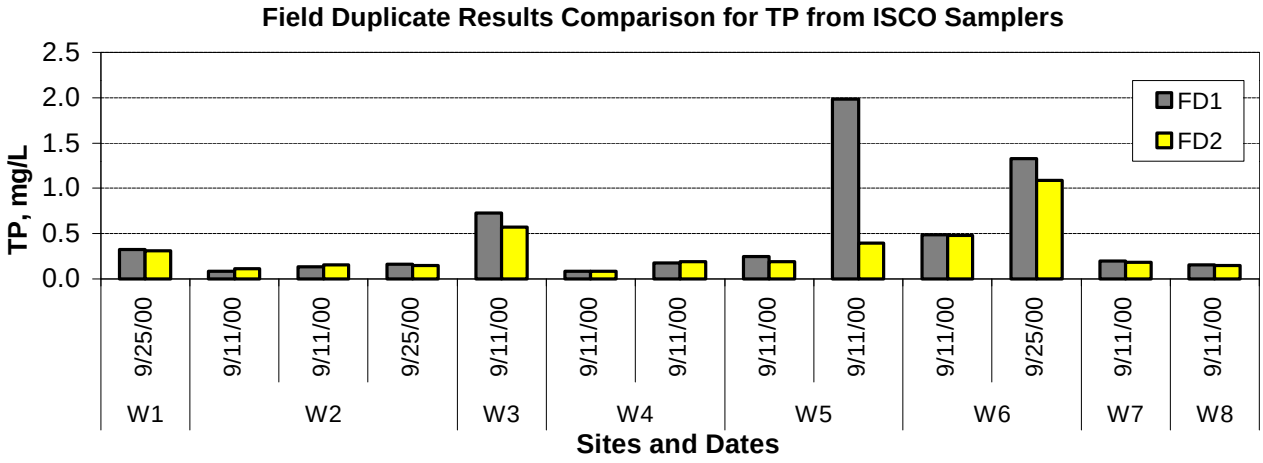

Figure 1.2c Comparison of paired TP concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

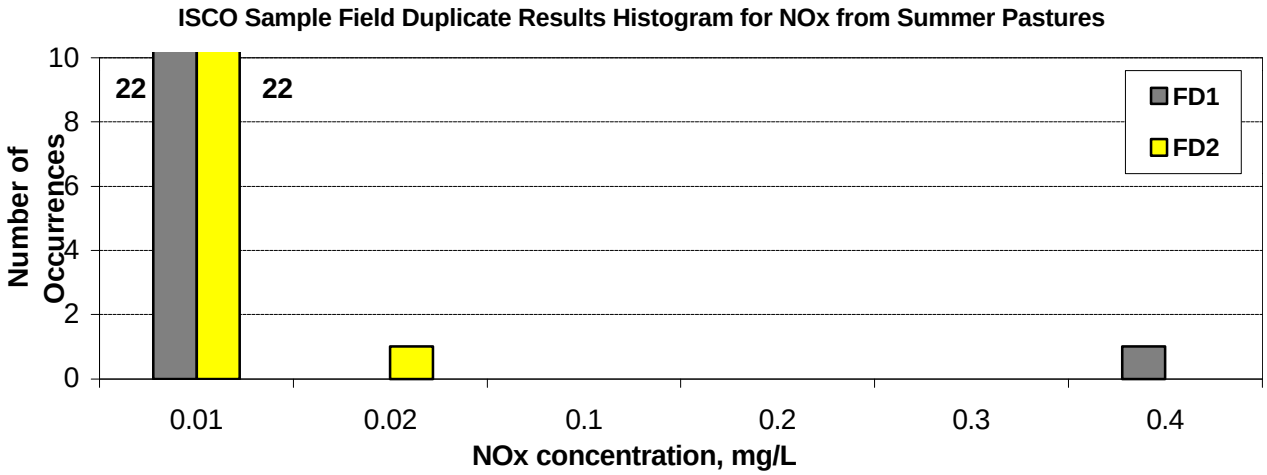

Figure 2.1a Frequency distribution for magnitudes of NOx concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

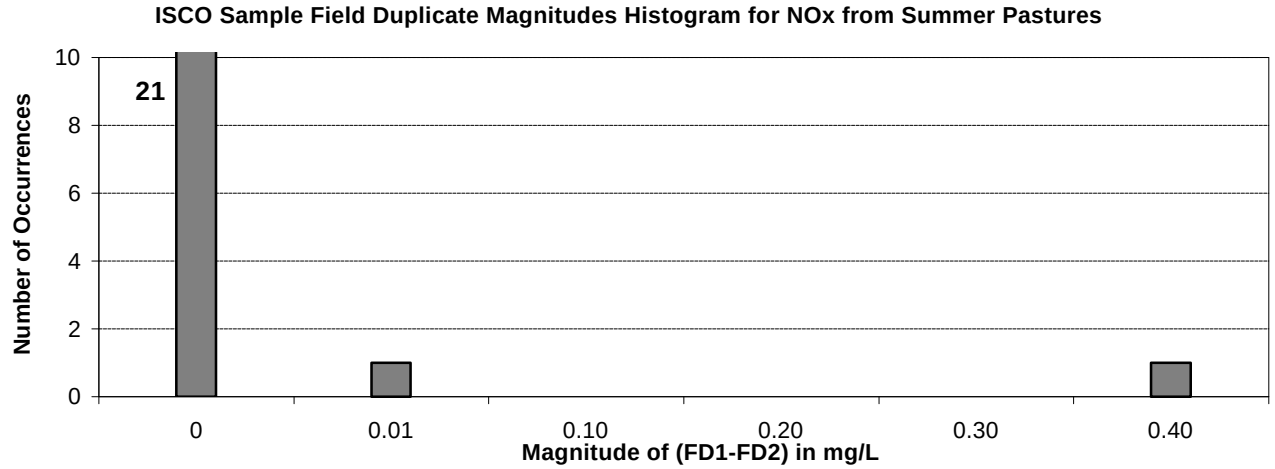

Figure 2.1b Frequency distribution for differences (FD1-FD2) between paired NOx concentration measurements for field duplicates from *summer* pastures during the year 2000.

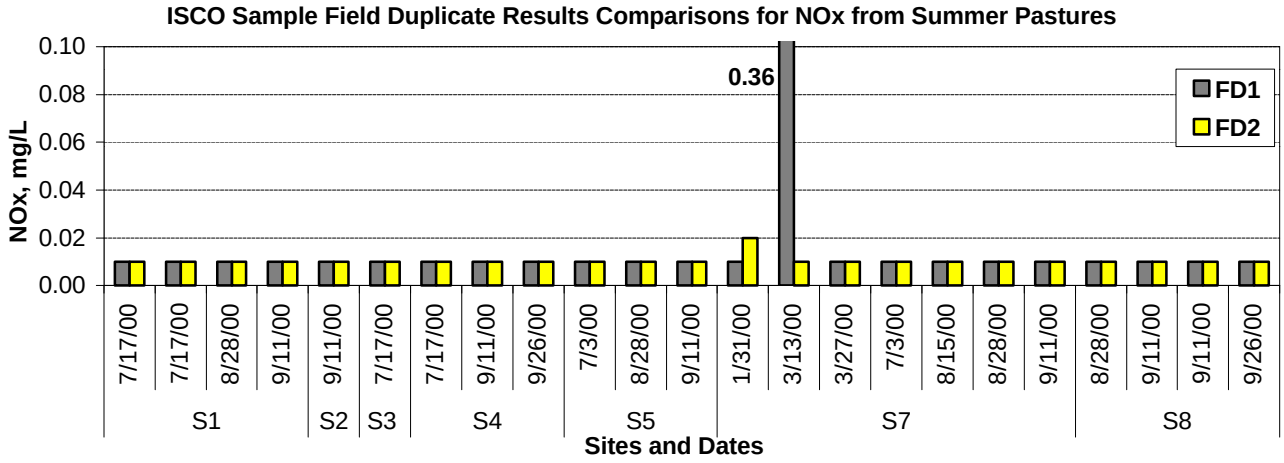

Figure 2.1c Comparison of paired NOx concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

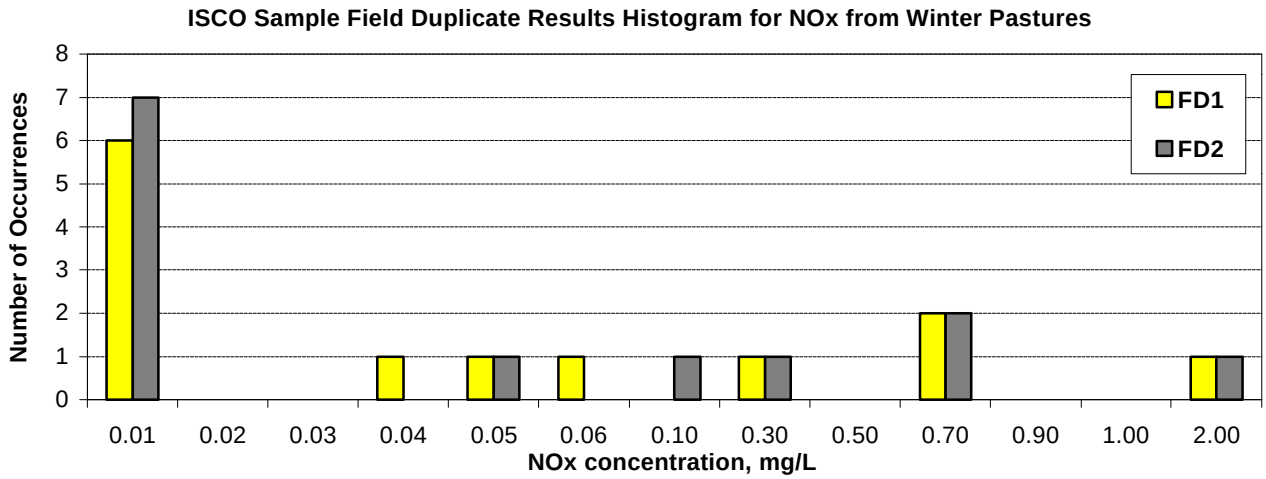

Figure 2.2a Frequency distribution for magnitudes of NOx concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

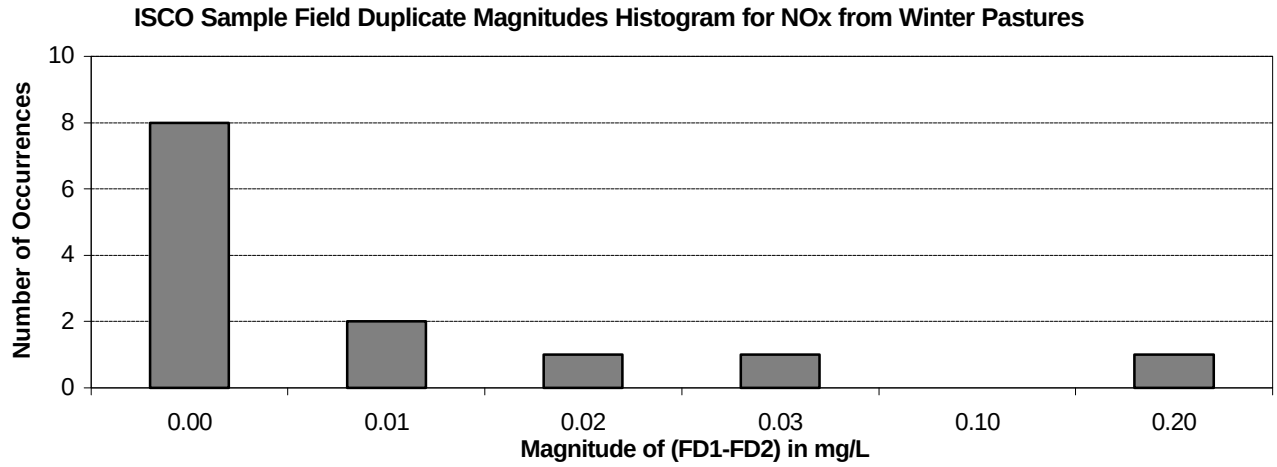

Figure 2.2b Frequency distribution for differences (FD1-FD2) between paired NOx concentration measurements for field duplicates from *winter* pastures during the year 2000.

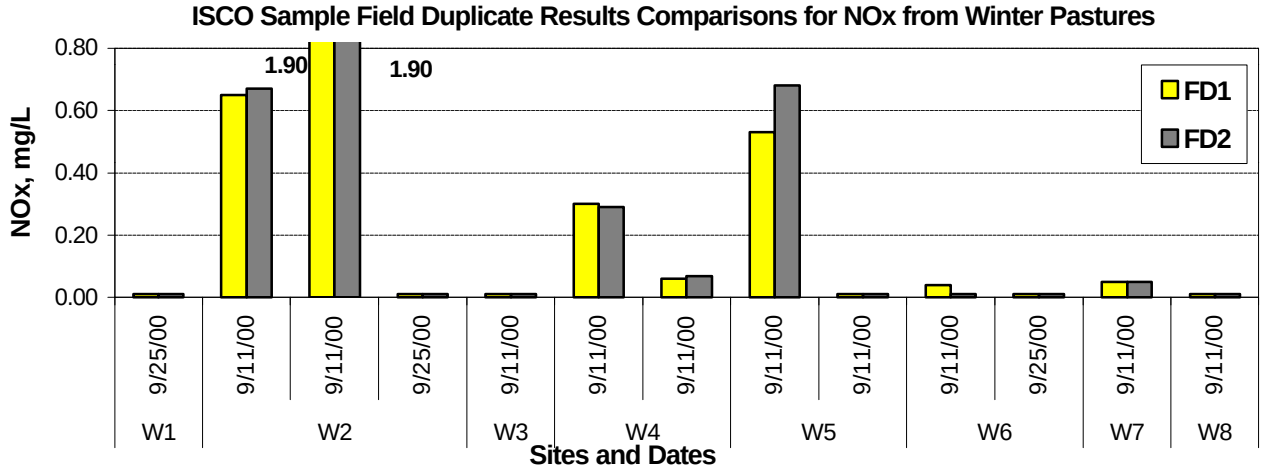

Figure 2.2c Comparison of paired NOx concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

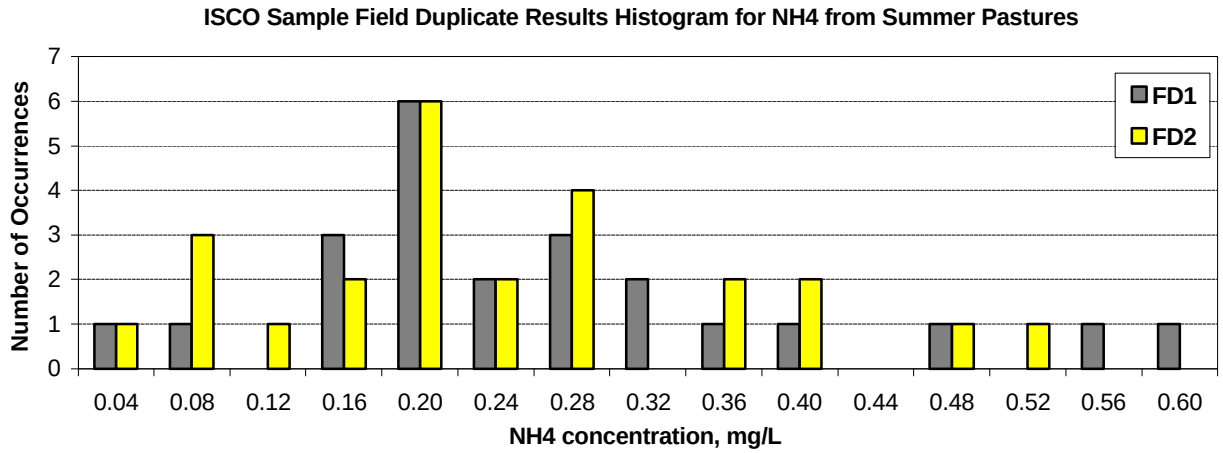

Figure 3.2a Frequency distribution for magnitudes of NH_4 concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

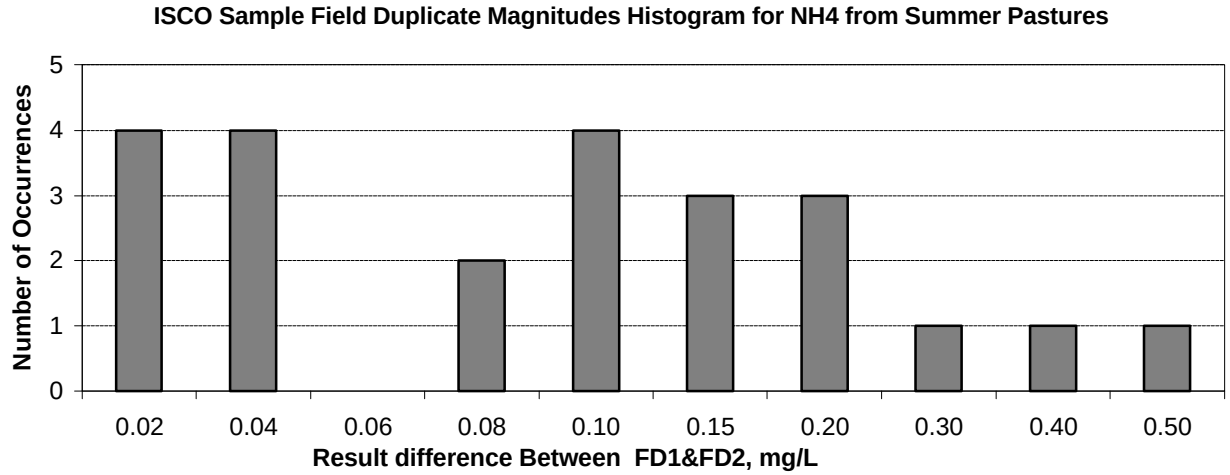

Figure 3.2b Frequency distribution for differences (FD1-FD2) between paired NH_4 concentration measurements for field duplicates from *winter* pastures during the year 2000.

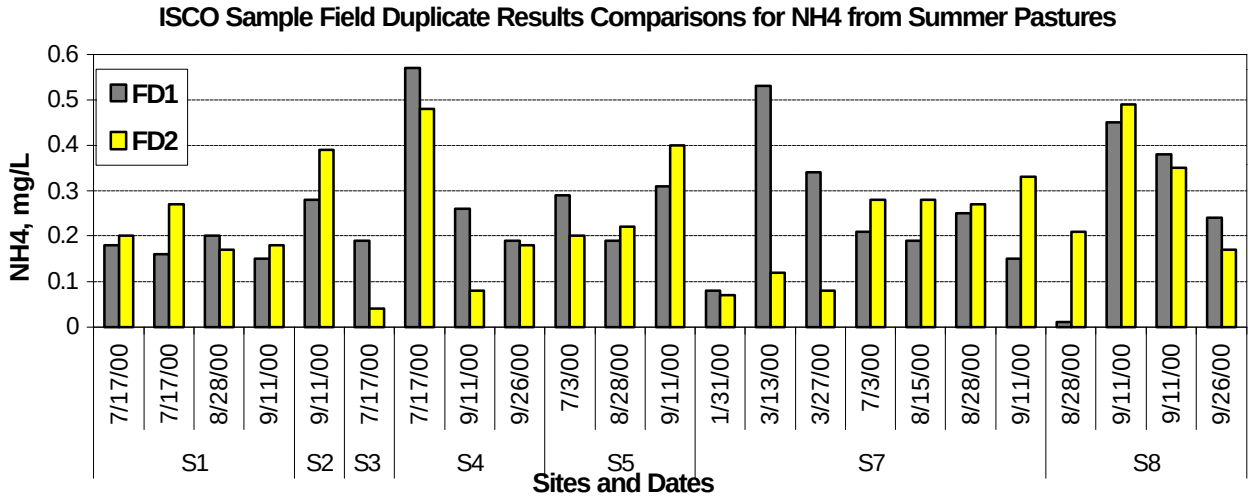

Figure 3.2c Comparison of paired NH4 concentration measurements for field duplicates (FD1 and FD2) from w*inter* pastures during the year 2000.

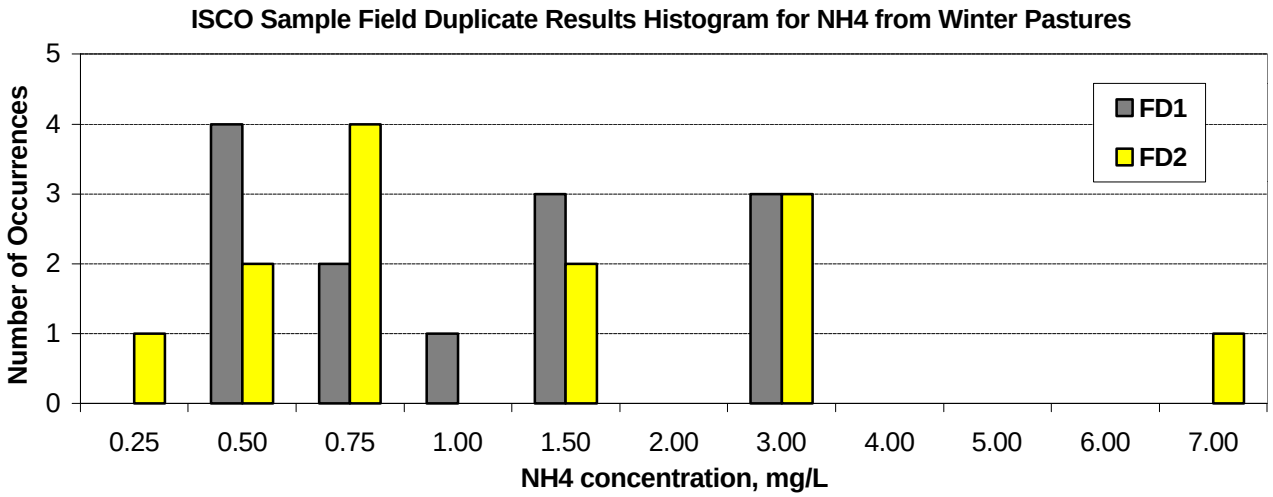

Figure 3.2a Frequency distribution for magnitudes of NH_4 concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

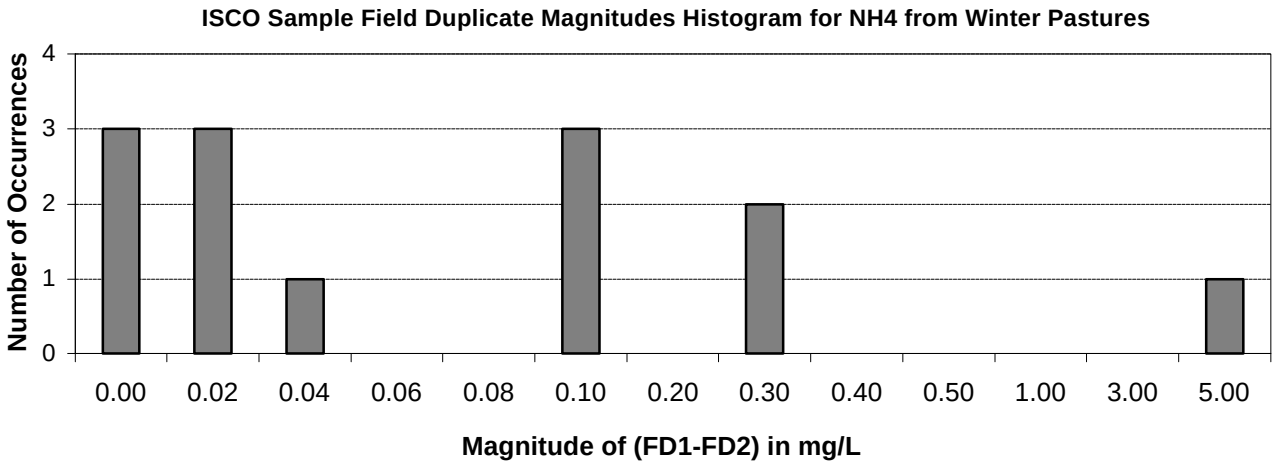

Figure 3.2b Frequency distribution for differences (FD1-FD2) between paired NH_4 concentration measurements for field duplicates from *winter* pastures during the year 2000.

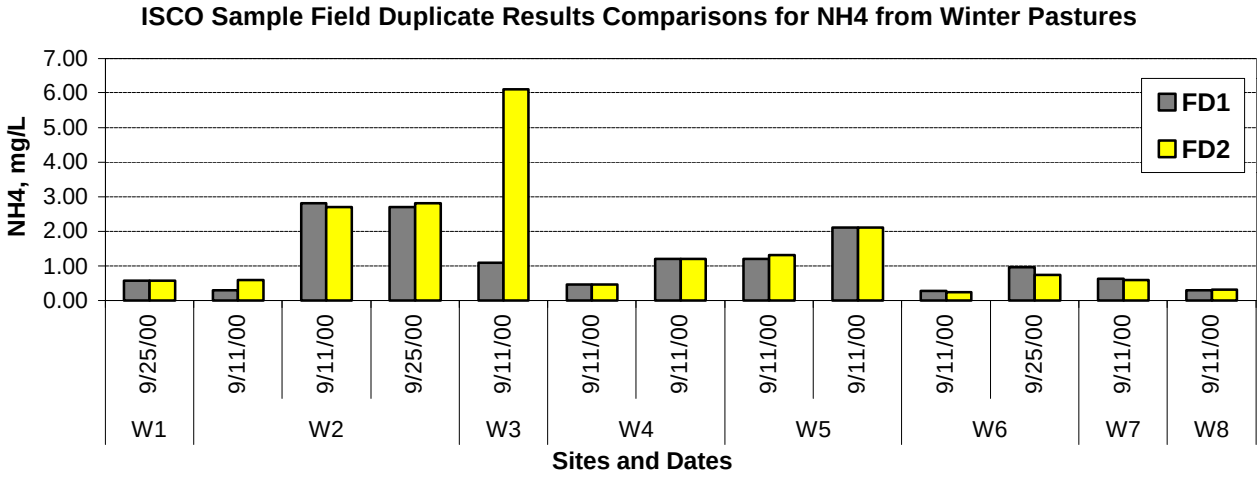

Figure 3.2c Comparison of paired NH4 concentration measurements for field duplicates (FD1 and FD2) from w*inter* pastures during the year 2000.

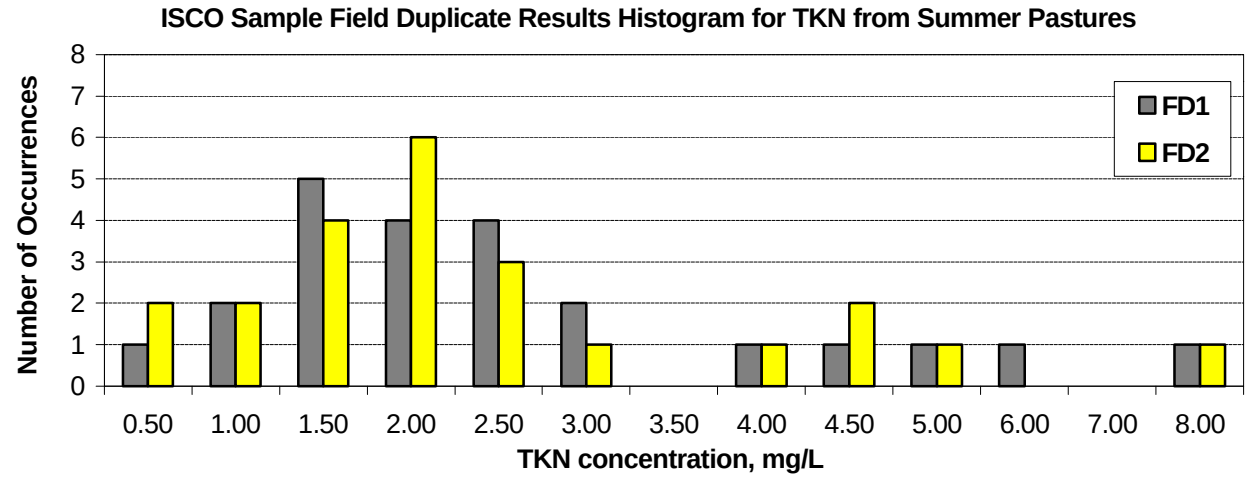

Figure 4.1a Frequency distribution for magnitudes of TKN concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000

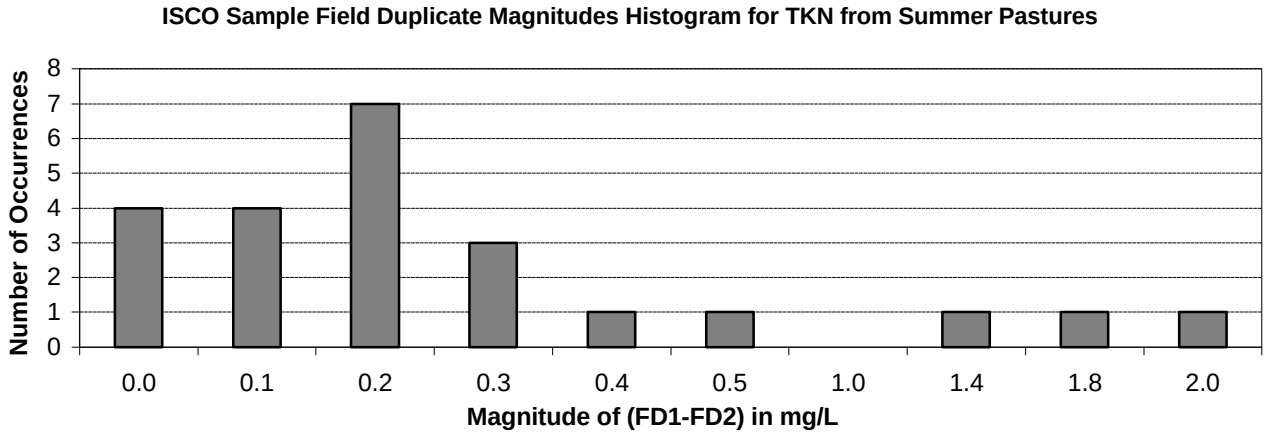

Figure 4.1b Frequency distribution for differences (FD1-FD2) between paired TKN concentration measurements for field duplicates from *summer* pastures during the year 2000.

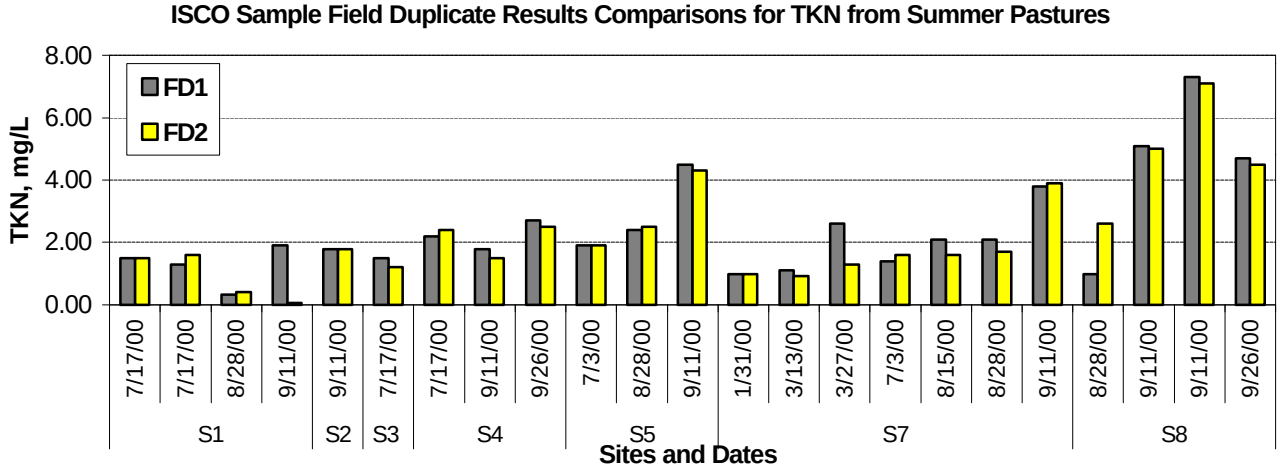

Figure 4.1c Comparison of paired TKN concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

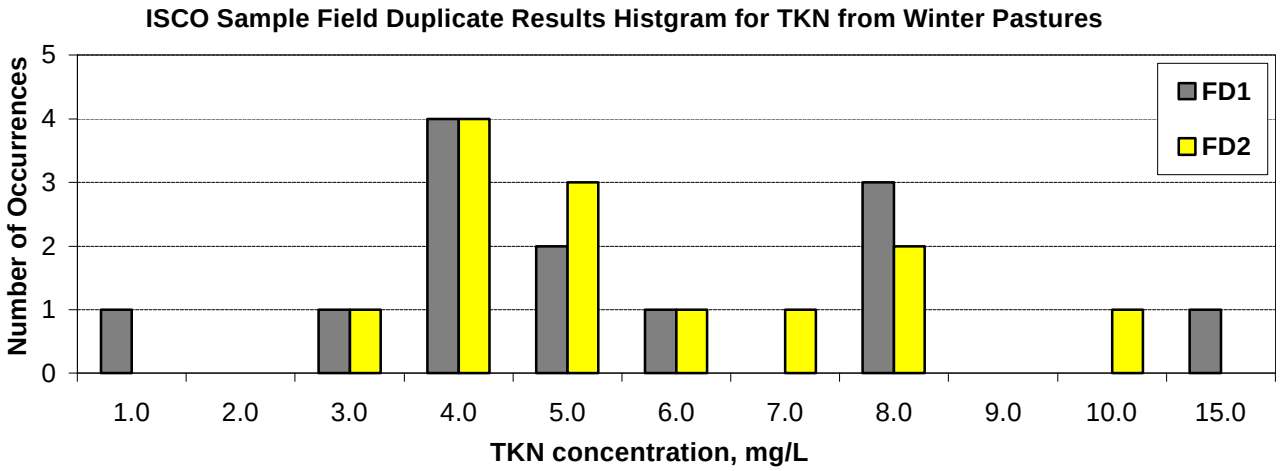

Figure 4.1a Frequency distribution for magnitudes of TKN concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000

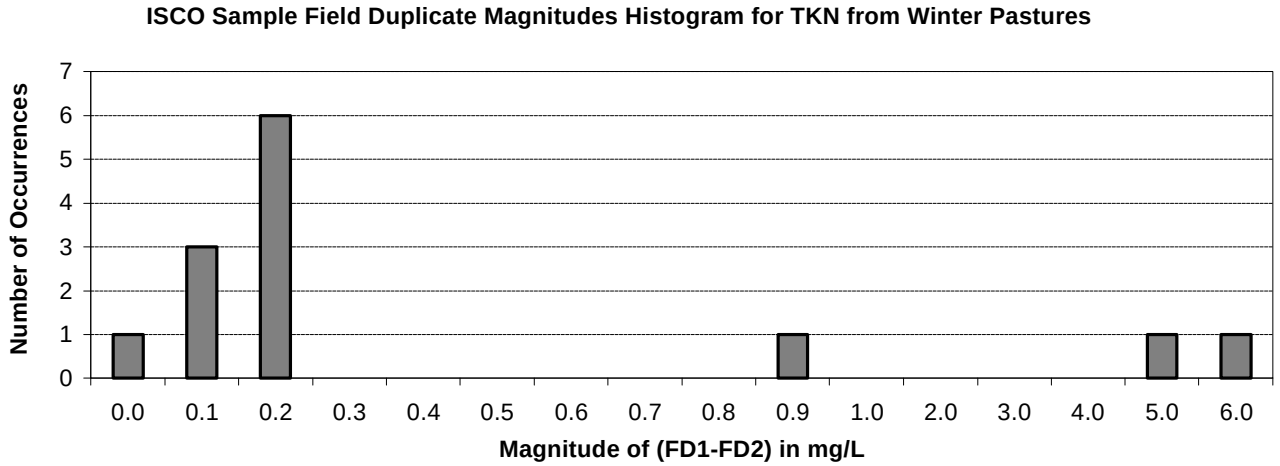

Figure 4.1b Frequency distribution for differences (FD1-FD2) between paired TKN concentration measurements for field duplicates from *winter* pastures during the year 2000.

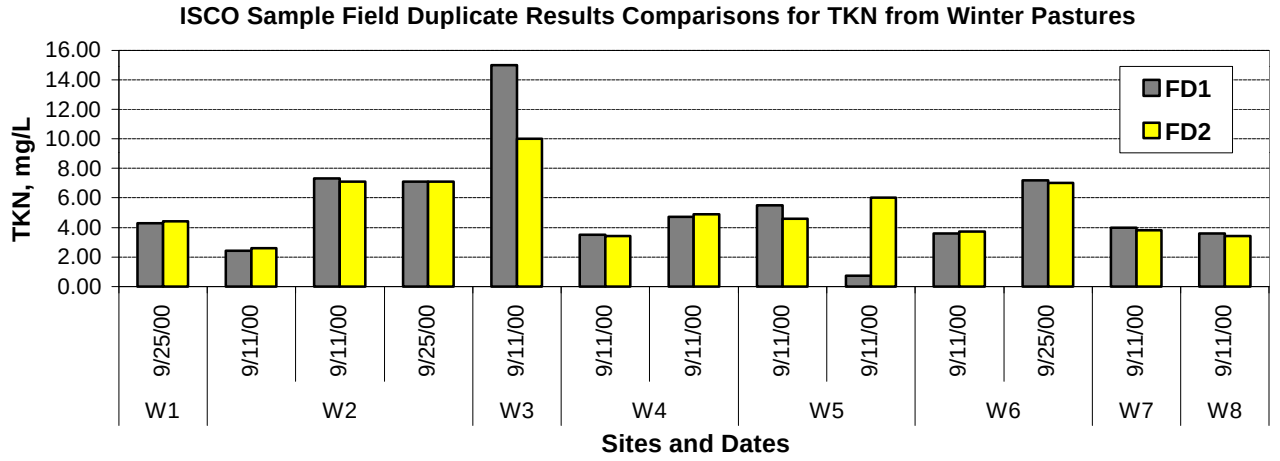

Figure 4.1c Comparison of paired TKN concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

Appendix D

Tables

Describing Results for

Field Duplicates

Collected by

ISCO Samples

Table 1.1 Summary of **ISCO** field duplicate (FD1 and FD2) for all paired TP concentration measurements and statistics for *summer* pastures during the year 2000.

File	Project	Field Number		Station	Set	Sampling	Result TP		Statistics			
Number	Code	FD1	FD2	Code	Date	Date	FD1	FD2	diff	/diff/	avg	CV%
23	BIR	**2799**	**2800**	S1	7/17/00	7/23/00	**0.06**	**0.05**	0.01	0.01	0.06	10%
21	BIR	**2803**	**2804**	S1	7/17/00	7/30/00	**0.04**	**0.05**	-0.01	0.01	0.05	18%
18	BIR	**2850**	**2851**	S1	8/28/00	9/5/00	**0.03**	**0.03**	0	0	0.03	0%
18	BIR	**3046**	**3047**	S1	9/11/00	9/17/00	**0.13**	**0.05**	0.08	0.08	0.09	65%
23	BIR	**3052**	**3053**	S2	9/11/00	9/17/00	**0.17**	**0.18**	-0.01	0.01	0.18	3%
23	BIR	**2812**	**2813**	S3	7/17/00	7/30/00	**0.07**	**0.02**	0.05	0.05	0.05	71%
18	BIR	**2816**	**2817**	S4	7/17/00	7/30/00	**0.40**	**0.43**	-0.03	0.03	0.42	5%
23	BIR	**3066**	**3067**	S4	9/11/00	9/17/00	**0.15**	**0.14**	0.01	0.01	0.14	3%
25	BIR	**3209**	**3210**	S4	9/26/00	10/4/00	**0.28**	**0.28**	0.01	0.01	0.28	2%
18	BIR	**2765**	**2766**	S5	7/3/00	7/3/00	**0.25**	**0.17**	0.08	0.08	0.21	25%
23	BIR	**2858**	**2859**	S5	8/28/00	9/8/00	**0.24**	**0.26**	-0.02	0.02	0.25	6%
16	BIR	**3081**	**3082**	S5	9/11/00	9/19/00	**1.44**	**1.56**	-0.12	0.12	1.50	6%
23	BIR	**2671**	**2672**	S7	1/31/00	1/31/00	**0.06**	**0.06**	0	0	0.06	0%
13	BIR	**2709**	**2710**	S7	3/13/00	4/11/00	**0.08**	**0.07**	0.01	0.01	0.08	9%
13	BIR	**2716**	**2717**	S7	3/27/00	4/4/00	**0.23**	**0.23**	0	0	0.23	0%
20	BIR	**2768**	**2769**	S7	7/3/00	7/3/00	**0.1**	**0.2**	-0.10	0.10	0.15	47%
16	BIR	**2821**	**2822**	S7	8/15/00	8/26/01	**0.21**	**0.09**	0.12	0.12	0.15	57%
13	BIR	**2867**	**2869**	S7	8/28/00	9/5/00	**0.12**	**0.05**	0.07	0.07	0.09	58%
21	BIR	**3094**	**3095**	S7	9/11/00	9/17/00	**0.85**	**0.92**	-0.07	0.07	0.88	6%
23	BIR	**2881**	**2882**	S8	8/28/00	9/6/00	**0.07**	**0.28**	-0.21	0.21	0.18	85%
23	BIR	**3102**	**3103**	S8	9/11/00	9/11/00	**1.14**	**1.15**	-0.01	0.01	1.15	1%
21	BIR	**3113**	**3114**	S8	9/11/00	9/23/00	**2.33**	**2.32**	0.01	0.01	2.33	0%
25	BIR	**3226**	**3227**	S8	9/26/00	10/4/00	**0.68**	**0.64**	0.04	0.04	0.66	4%

Table 1.2. Summary of **ISCO** field duplicate (FD1 and FD2) for all paired TP concentration measurements and statistics for *winter* pastures during the year 2000.

File	Project	Field Number		Station	Set	Sampling	Result TP		Statistics			
Number	Code	FD1	FD2	Code	Date	Date	FD1	FD2	diff	/diff/	avg	CV%
25	BIR	**3173**	**3174**	W1	9/25/00	9/25/00	**0.33**	**0.31**	0.02	0.02	0.32	4%
23	BIR	**2944**	**2945**	W2	9/11/00	9/18/00	**0.09**	**0.11**	-0.03	0.03	0.10	21%
23	BIR	**2954**	**2955**	W2	9/11/00	9/20/00	**0.14**	**0.16**	-0.02	0.02	0.15	10%
25	BIR	**3180**	**3181**	W2	9/25/00	9/25/00	**0.16**	**0.15**	0.01	0.01	0.15	6%
23	BIR	**2972**	**2973**	W3	9/11/00	9/23/00	**0.72**	**0.57**	0.15	0.15	0.65	17%
23	BIR	**2977**	**2978**	W4	9/11/00	9/18/00	**0.09**	**0.09**	0	0	0.09	0%
23	BIR	**2988**	**2989**	W4	9/11/00	9/20/00	**0.17**	**0.20**	-0.02	0.02	0.18	9%
23	BIR	**2993**	**2994**	W5	9/11/00	9/18/00	**0.25**	**0.19**	0.06	0.06	0.22	18%
23	BIR	**3005**	**3006**	W5	9/11/00	9/21/00	**1.98**	**0.40**	1.58	1.58	1.19	94%
23	BIR	**3011**	**3012**	W6	9/11/00	9/19/00	**0.48**	**0.48**	0	0	0.48	0%
25	BIR	**3198**	**3199**	W6	9/25/00	10/5/00	**1.33**	**1.09**	0.24	0.24	1.21	14%
23	BIR	**3018**	**3019**	W7	9/11/00	9/18/00	**0.20**	**0.18**	0.02	0.02	0.19	6%
23	BIR	**3040**	**3041**	W8	9/11/00	9/25/00	**0.16**	**0.15**	0.01	0.01	0.15	3%

Table 2.1. Summary of **ISCO** field duplicate (FD1 and FD2) for all paired NOx concentration measurements and statistics for *summer* pastures during the year 2000.

File	Project	Field Number		Station	Set	Sampling	Result NOx		Statistics			
Number	Code	FD1	FD2	Code	Date	Date	FD1	FD2	diff	/diff/	avg	CV%
18	BIR	**2799**	**2800**	S1	7/17/00	7/23/00	**0.01**	**0.01**	0	0	0.01	0%
18	BIR	**2803**	**2804**	S1	7/17/00	7/30/00	**0.01**	**0.01**	0	0	0.01	0%
21	BIR	**2850**	**2851**	S1	8/28/00	9/5/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**3046**	**3047**	S1	9/11/00	9/17/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**3052**	**3053**	S2	9/11/00	9/17/01	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**2812**	**2813**	S3	7/17/00	7/30/00	**0.01**	**0.01**	0	0	0.01	0%
25	BIR	**2816**	**2817**	S4	7/17/00	7/30/00	**0.01**	**0.01**	0	0	0.01	0%
18	BIR	**3066**	**3067**	S4	9/11/00	9/17/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**3209**	**3210**	S4	9/26/00	10/4/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**2765**	**2766**	S5	7/3/00	7/3/00	**0.01**	**0.01**	0	0	0.01	0%
16	BIR	**2858**	**2859**	S5	8/28/00	9/8/00	**0.01**	**0.01**	0	0	0.01	0%
18	BIR	**3081**	**3082**	S5	9/11/00	9/19/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**2671**	**2672**	S7	1/31/00	1/31/00	**0.01**	**0.02**	-0.01	0.01	0.02	47%
13	BIR	**2709**	**2710**	S7	3/13/00	4/11/00	**0.36**	**0.01**	0.35	0.35	0.19	130%
13	BIR	**2716**	**2717**	S7	3/27/00	3/27/00	**0.01**	**0.01**	0	0	0.01	0%
13	BIR	**2768**	**2769**	S7	7/3/00	7/3/00	**0.01**	**0.01**	0	0	0.01	0%
20	BIR	**2821**	**2822**	S7	8/15/00	8/26/00	**0.01**	**0.01**	0	o	0.01	0%
16	BIR	**2867**	**2868**	S7	8/28/00	9/5/00	**0.01**	**0.01**	0	0	0.01	0%
21	BIR	**3094**	**3095**	S7	9/11/00	9/17/00	**0.01**	**0.01**	0	0	0.01	0%
21	BIR	**2881**	**2882**	S8	8/28/00	9/6/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**3102**	**3103**	S8	9/11/00	9/11/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**3113**	**3114**	S8	9/11/00	9/23/00	**0.01**	**0.01**	0	0	0.01	0%
25	BIR	**3226**	**3227**	S8	9/26/00	10/4/00	**0.01**	**0.01**	0	0	0.01	0%

Table 2.2. Summary of **ISCO** field duplicate (FD1 and FD2) for all paired NOx concentration measurements and statistics for *winter* pastures during the year 2000.

File	Project	Field Number		Station	Set	Sampling	Result NOx		Statistics			
Number	Code	FD1	FD2	Code	Date	Date	FD1	FD2	diff	/diff/	avg	CV%
25	BIR	**3173**	**3174**	W1	9/25/00	9/25/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**2944**	**2945**	W2	9/11/00	9/18/00	**0.65**	**0.67**	-0.02	0.02	0.66	2%
23	BIR	**2954**	**2955**	W2	9/11/00	9/20/00	**1.90**	**1.90**	0	0	1.90	0%
25	BIR	**3180**	**3181**	W2	9/25/00	9/25/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**2972**	**2973**	W3	9/11/00	9/23/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**2977**	**2978**	W4	9/11/00	9/18/00	**0.30**	**0.29**	0.01	0.01	0.30	2%
23	BIR	**2988**	**2989**	W4	9/11/00	9/20/00	**0.06**	**0.07**	-0.01	0.01	0.07	11%
23	BIR	**2993**	**2994**	W5	9/11/00	9/18/00	**0.53**	**0.68**	-0.15	0.15	0.61	18%
23	BIR	**3005**	**3006**	W5	9/11/00	9/21/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**3011**	**3012**	W6	9/11/00	9/19/00	**0.04**	**0.01**	0.03	0.03	0.03	85%
25	BIR	**3198**	**3199**	W6	9/25/00	10/5/00	**0.01**	**0.01**	0	0	0.01	0%
23	BIR	**3018**	**3019**	W7	9/11/00	9/18/00	**0.05**	**0.05**	0	0	0.05	0%
23	BIR	**3040**	**3041**	W8	9/11/00	9/25/00	**0.01**	**0.01**	0	0	0.01	0%

Table 3.1. Summary of **ISCO** field duplicate (FD1 and FD2) for all paired NH4 concentration measurements and statistics for *summer* pastures during the year 2000.

File	Project	Field Number		Station	Set	Sampling	Result NH4		Statistics			
Number	Code	FD1	FD2	Code	Date	Date	FD1	FD2	diff	/diff/	avg	CV%
18	BIR	**2799**	**2800**	S1	7/17/00	7/23/00	**0.18**	**0.20**	-0.02	0.02	0.19	7%
18	BIR	**2803**	**2804**	S1	7/17/00	7/30/00	**0.16**	**0.27**	-0.11	0.11	0.22	36%
21	BIR	**2850**	**2851**	S1	8/28/00	9/5/00	**0.20**	**0.17**	0.03	0.03	0.19	11%
23	BIR	**3046**	**3047**	S1	9/11/00	9/17/00	**0.15**	**0.18**	-0.03	0.03	0.17	13%
23	BIR	**3052**	**3053**	S2	9/11/00	9/17/00	**0.28**	**0.39**	-0.11	0.11	0.34	23%
18	BIR	**2812**	**2813**	S3	7/17/00	7/30/00	**0.19**	**0.04**	0.15	0.15	0.12	92%
18	BIR	**2816**	**2817**	S4	7/17/00	7/30/00	**0.57**	**0.48**	0.09	0.09	0.53	12%
23	BIR	**3066**	**3067**	S4	9/11/00	9/17/00	**0.26**	**0.08**	0.18	0.18	0.17	75%
25	BIR	**3209**	**3210**	S4	9/26/00	10/4/00	**0.19**	**0.18**	0.01	0.01	0.19	4%
16	BIR	**2765**	**2766**	S5	7/3/00	7/3/00	**0.29**	**0.20**	0.09	0.09	0.25	26%
21	BIR	**2858**	**2859**	S5	8/28/00	9/8/00	**0.19**	**0.22**	-0.03	0.03	0.21	10%
23	BIR	**3081**	**3082**	S5	9/11/00	9/19/00	**0.31**	**0.40**	-0.09	0.09	0.36	18%
12	BIR	**2671**	**2672**	S7	1/31/00	1/31/00	**0.08**	**0.07**	0.01	0.01	0.08	9%
13	BIR	**2709**	**2710**	S7	3/13/00	4/11/00	**0.53**	**0.12**	0.41	0.41	0.33	89%
13	BIR	**2716**	**2717**	S7	3/27/00	4/4/00	**0.34**	**0.08**	0.26	0.26	0.21	88%
16	BIR	**2768**	**2769**	S7	7/3/00	7/3/00	**0.21**	**0.28**	-0.07	0.07	0.25	20%
20	BIR	**2821**	**2822**	S7	8/15/00	8/26/00	**0.19**	**0.28**	-0.09	0.09	0.24	27%
21	BIR	**2867**	**2868**	S7	8/28/00	9/5/00	**0.25**	**0.27**	-0.02	0.02	0.26	5%
23	BIR	**3094**	**3095**	S7	9/11/00	9/17/00	**0.15**	**0.33**	-0.18	0.18	0.24	53%
21	BIR	**2881**	**2882**	S8	8/28/00	9/6/00	**0.01**	**0.21**	-0.20	0.20	0.11	129%
23	BIR	**3102**	**3103**	S8	9/11/00	9/11/00	**0.45**	**0.49**	-0.04	0.40	0.47	6%
23	BIR	**3113**	**3114**	S8	9/11/00	9/23/00	**0.38**	**0.35**	0.03	0.03	0.37	6%
25	BIR	**3226**	**3227**	S8	9/26/00	10/4/00	**0.24**	**0.17**	0.07	0.07	0.21	24%

Table 3.2. Summary of **ISCO** field duplicate (FD1 and FD2) for all paired NH4 concentration measurements and statistics for *winter* pastures during the year 2000.

File	Project	Field Number		Station	Set	Sampling	Result NH4		Statistics			
Number	Code	FD1	FD2	Code	Date	Date	FD1	FD2	diff	/diff/	avg	CV%
25	BIR	**3173**	**3174**	W1	9/25/00	9/25/00	**0.57**	**0.57**	0	0	0.57	0%
23	BIR	**2944**	**2945**	W2	9/11/00	9/18/00	**0.29**	**0.58**	-0.29	0.29	0.44	47%
23	BIR	**2954**	**2955**	W2	9/11/00	9/20/00	**2.80**	**2.70**	0.10	0.10	2.75	3%
25	BIR	**3180**	**3181**	W2	9/25/00	9/25/00	**2.70**	**2.80**	-0.10	0.10	2.75	3%
23	BIR	**2972**	**2973**	W3	9/11/00	9/23/00	**1.10**	**6.10**	-5.00	5.00	3.60	98%
23	BIR	**2977**	**2978**	W4	9/11/00	9/18/00	**0.46**	**0.45**	0.01	0.01	0.46	2%
23	BIR	**2988**	**2989**	W4	9/11/00	9/20/00	**1.20**	**1.20**	0	0	1.20	0%
23	BIR	**2993**	**2994**	W5	9/11/00	9/18/00	**1.20**	**1.30**	-0.10	0.10	1.25	6%
23	BIR	**3005**	**3006**	W5	9/11/00	9/21/00	**2.10**	**2.10**	0	0	2.10	0%
23	BIR	**3011**	**3012**	W6	9/11/00	9/19/00	**0.27**	**0.25**	0.02	0.02	0.26	5%
25	BIR	**3198**	**3199**	W6	9/25/00	10/5/00	**0.97**	**0.73**	0.24	0.24	0.85	20%
23	BIR	**3018**	**3019**	W7	9/11/00	9/18/00	**0.62**	**0.59**	0.03	0.03	0.61	4%
23	BIR	**3040**	**3041**	W8	9/11/00	9/25/00	**0.29**	**0.31**	-0.02	0.02	0.30	5%

Table 4.1. Summary of **ISCO** field duplicate (FD1 and FD2) for all aired TKN concentration measurements and statistics) for *summer* pastures during the year 2000.

File	Project	Field Number		Station	Set	Sampling	Sampling	Result TKN		Statistics			
Number	Code	FD1	FD2	Code	Date	Date	Time	FD1	FD2	diff	/diff/	avg	CV%
18	BIR	**2799**	**2800**	S1	7/17/00	7/23/00	19:00	**1.50**	**1.50**	0	0	1.50	0%
18	BIR	**2803**	**2804**	S1	7/17/00	7/30/00	18:40	**1.30**	**1.60**	-0.30	0.30	1.45	15%
21	BIR	**2850**	**2851**	S1	8/28/00	9/5/00	11:39	**0.34**	**0.41**	-0.07	0.07	0.38	13%
23	BIR	**3046**	**3047**	S1	9/11/00	9/17/00	18:19	**1.90**	**0.05**	1.85	1.85	0.98	134%
23	BIR	**3052**	**3053**	S2	9/11/00	9/17/00	16:36	**1.80**	**1.80**	0	0	1.80	0%
18	BIR	**2812**	**2813**	S3	7/17/00	7/30/00	19:01	**1.50**	**1.20**	0.30	0.30	1.35	16%
18	BIR	**2816**	**2817**	S4	7/17/00	7/30/00	19:08	**2.20**	**2.40**	-0.20	0.20	2.30	6%
23	BIR	**3066**	**3067**	S4	9/11/00	9/17/00	17:38	**1.80**	**1.50**	0.30	0.30	1.65	13%
25	BIR	**3209**	**3210**	S4	9/26/00	10/4/00	4:37	**2.70**	**2.50**	0.20	0.20	2.60	5%
16	BIR	**2765**	**2766**	S5	7/3/00	7/3/00	10:27	**1.90**	**1.90**	0	0	1.90	0%
21	BIR	**2858**	**2859**	S5	8/28/00	9/8/00	1:17	**2.40**	**2.50**	-0.10	0.10	2.45	3%
23	BIR	**3081**	**3082**	S5	9/11/00	9/19/00	6:57	**4.50**	**4.30**	0.20	0.20	4.40	3%
12	BIR	**2671**	**2672**	S7	1/31/00	1/31/00	11:41	**1.00**	**1.00**	0	0	1.00	0%
13	BIR	**2709**	**2710**	S7	3/13/00	4/11/00	8:00	**1.10**	**0.93**	0.17	0.17	1.02	12%
13	BIR	**2716**	**2717**	S7	3/27/00	4/4/00	16:24	**2.60**	**1.30**	1.30	1.30	1.95	47%
16	BIR	**2768**	**2769**	S7	7/3/00	7/3/00	10:50	**1.40**	**1.60**	-0.20	0.20	1.50	9%
20	BIR	**2821**	**2822**	S7	8/15/00	8/26/00	4:17	**2.10**	**1.60**	0.50	0.50	1.85	19%
21	BIR	**2867**	**2868**	S7	8/28/00	9/5/00	6:37	**2.10**	**1.70**	0.40	0.40	1.90	15%
23	BIR	**3094**	**3095**	S7	9/11/00	9/17/00	20:57	**3.80**	**3.90**	-0.10	0.10	3.85	2%
21	BIR	**2881**	**2882**	S8	8/28/00	9/6/00	12:50	**0.98**	**2.60**	-1.62	1.62	1.79	64%
23	BIR	**3102**	**3103**	S8	9/11/00	9/11/00	14:31	**5.10**	**5.00**	0.10	0.10	5.05	1%
23	BIR	**3113**	**3114**	S8	9/11/00	9/23/00	6:37	**7.30**	**7.10**	0.20	0.20	7.20	2%
25	BIR	**3226**	**3227**	S8	9/26/00	10/4/00	6:17	**4.70**	**4.50**	0.20	0.20	4.60	3%

Table 4.2. Summary of **ISCO** field duplicate (FD1 and FD2) for all paired TKN concentrations measurements and statistics for *winter* pastures during the year 2000.

File	Project	Field Number		Station	Set	Sampling	Result TKN		Statistics			
Number	Code	FD1	FD2	Code	Date	Date	FD1	FD2	diff	/diff/	avg	CV%
25	BIR	**3173**	**3174**	W1	9/25/00	9/25/00	**4.30**	**4.40**	-0.10	0.10	4.35	2%
23	BIR	**2944**	**2945**	W2	9/11/00	9/18/00	**2.40**	**2.60**	-0.20	0.20	2.50	6%
23	BIR	**2954**	**2955**	W2	9/11/00	9/20/00	**7.30**	**7.10**	0.20	0.20	7.20	2%
25	BIR	**3180**	**3181**	W2	9/25/00	9/25/00	**7.10**	**7.10**	0	0	7.10	0%
23	BIR	**2972**	**2973**	W3	9/11/00	9/23/00	**15.00**	**10.00**	5.00	5.00	12.50	28%
23	BIR	**2977**	**2978**	W4	9/11/00	9/18/00	**3.50**	**3.40**	0.10	0.10	3.45	2%
23	BIR	**2988**	**2989**	W4	9/11/00	9/20/00	**4.70**	**4.90**	-0.20	0.20	4.80	3%
23	BIR	**2993**	**2994**	W5	9/11/00	9/18/00	**5.50**	**4.60**	0.90	0.90	5.05	13%
23	BIR	**3005**	**3006**	W5	9/11/00	9/21/00	**0.75**	**6.00**	-5.25	5.25	3.38	110%
23	BIR	**3011**	**3012**	W6	9/11/00	9/19/00	**3.60**	**3.70**	-0.10	0.10	3.65	2%
25	BIR	**3198**	**3199**	W6	9/25/00	10/5/00	**7.20**	**7.00**	0.20	0.20	7.10	2%
23	BIR	**3018**	**3019**	W7	9/11/00	9/18/00	**4.00**	**3.80**	0.20	0.20	3.90	4%
23	BIR	**3040**	**3041**	W8	9/11/00	9/25/00	**3.60**	**3.40**	0.20	0.20	3.50	4%

Appendix E

Graphs

Describing Results for

Field Duplicates

Collected by

Grab Samples

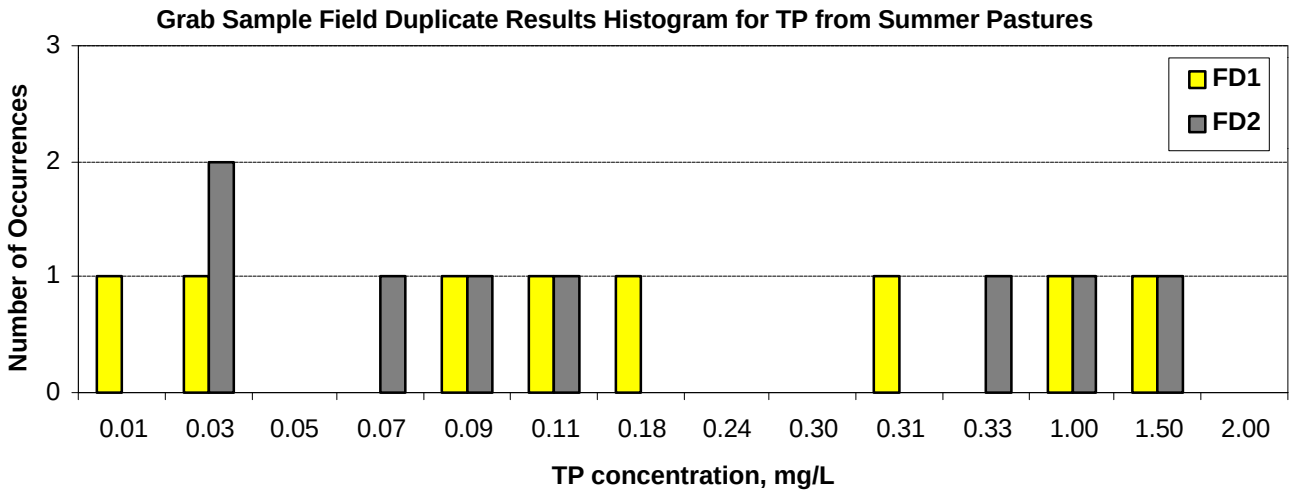

Figure 1.3a Frequency distribution for magnitude of TP concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

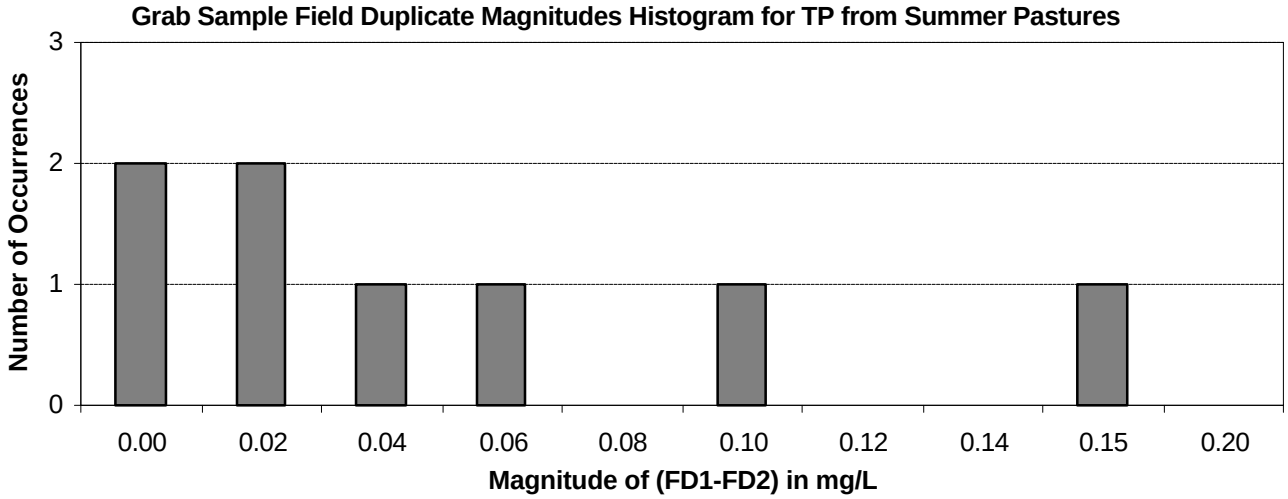

Figure 1.3b Frequency distribution for differences (FD1-FD2) between paired TP concentration measurements for field duplicates from *summer* pastures during the year 2000.

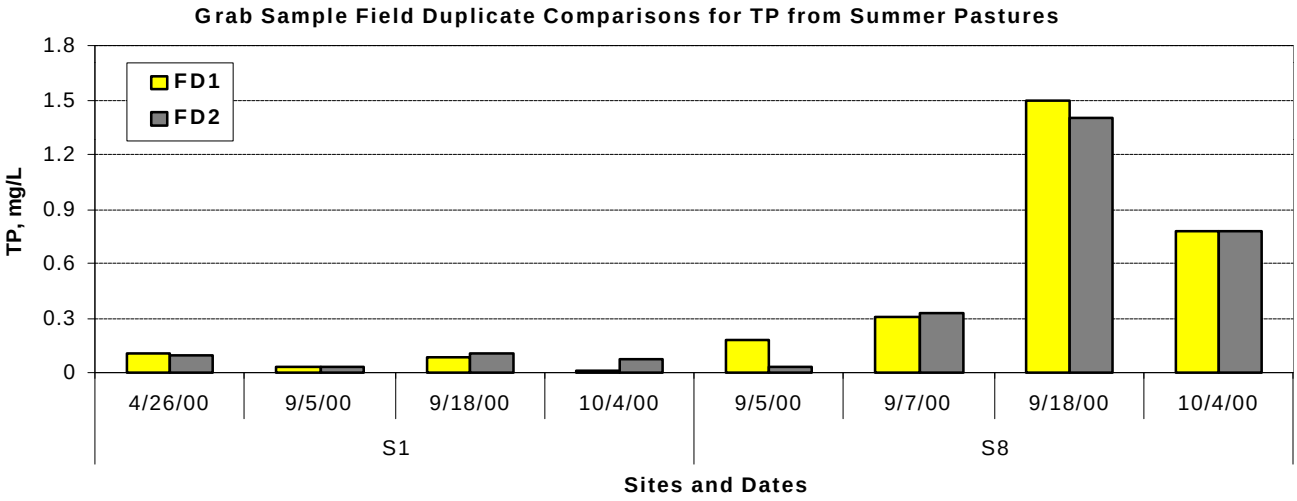

Figure 1.3c Comparison of paired TP concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

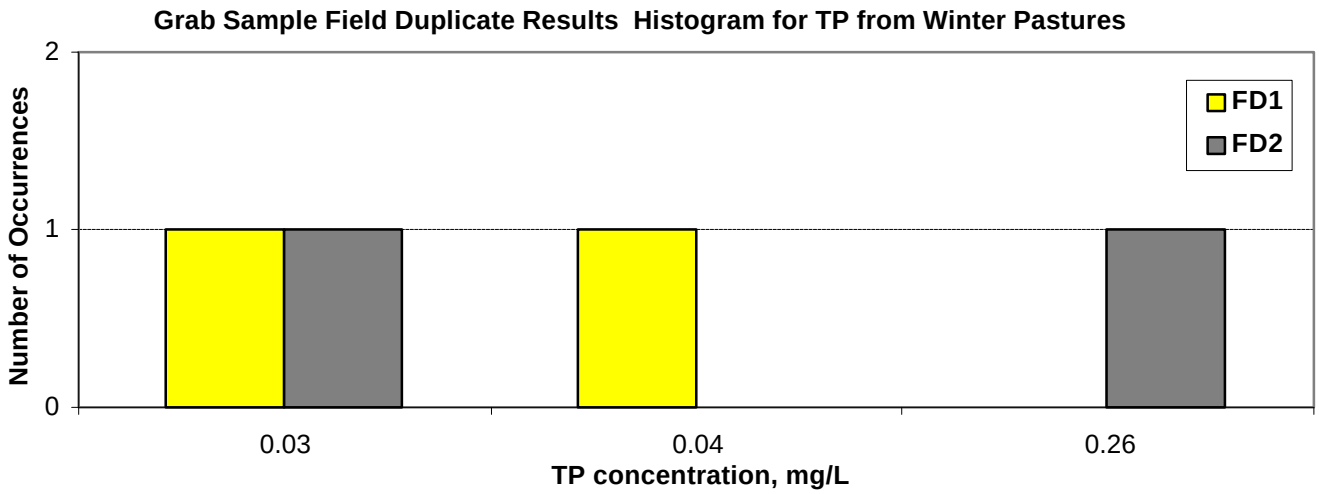

Figure 1.4a Frequency distribution for magnitude of TP concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

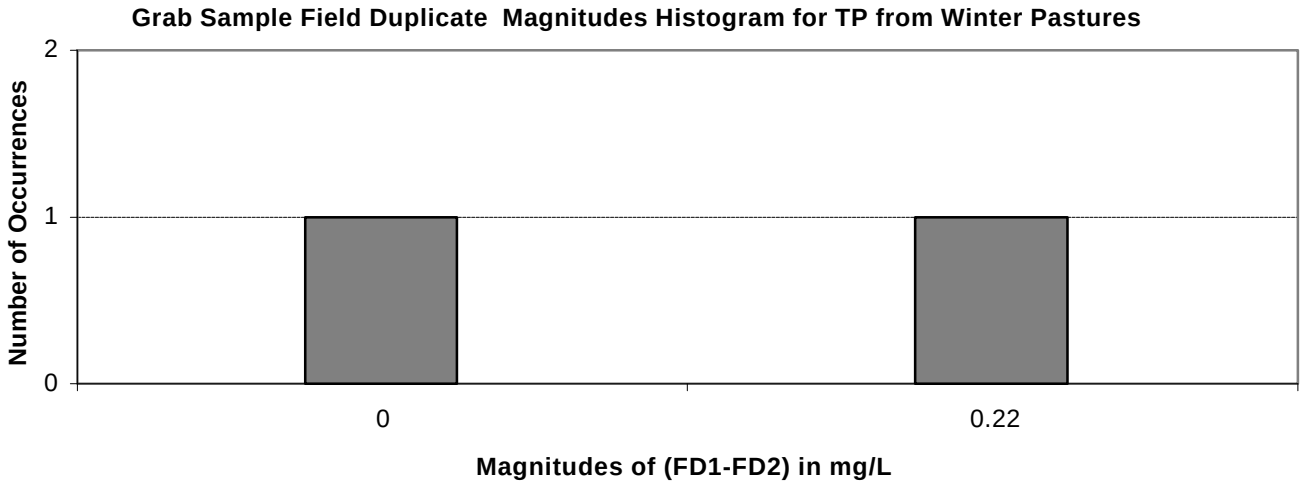

Figure 1.4b Frequency distribution for differences (FD1-FD2) between paired TP concentration measurements for field duplicates from *winter* pastures during the year 2000.

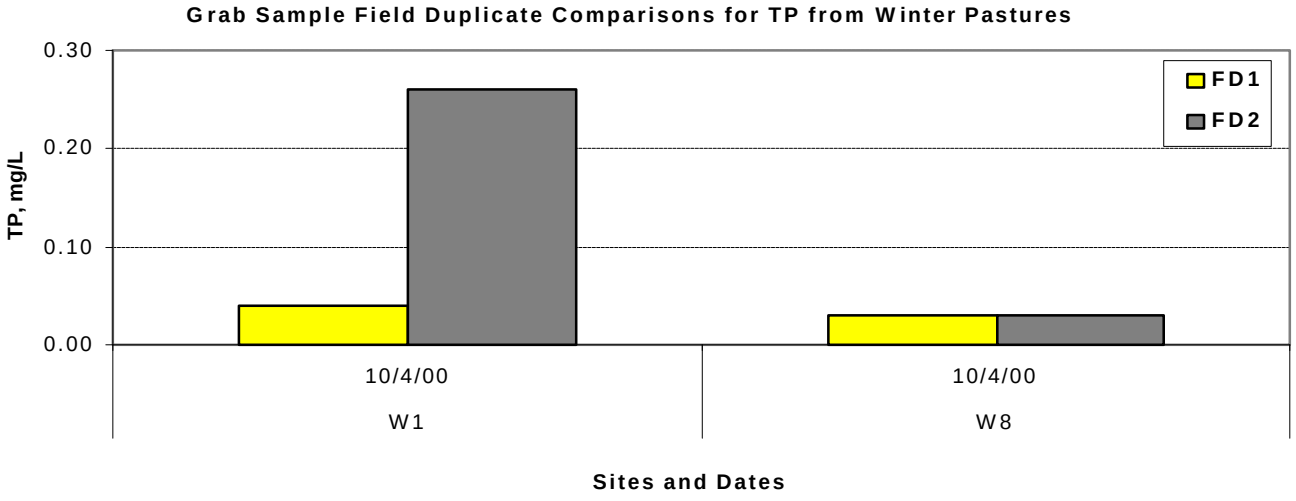

Figure 1.4c Comparison of paired TP concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

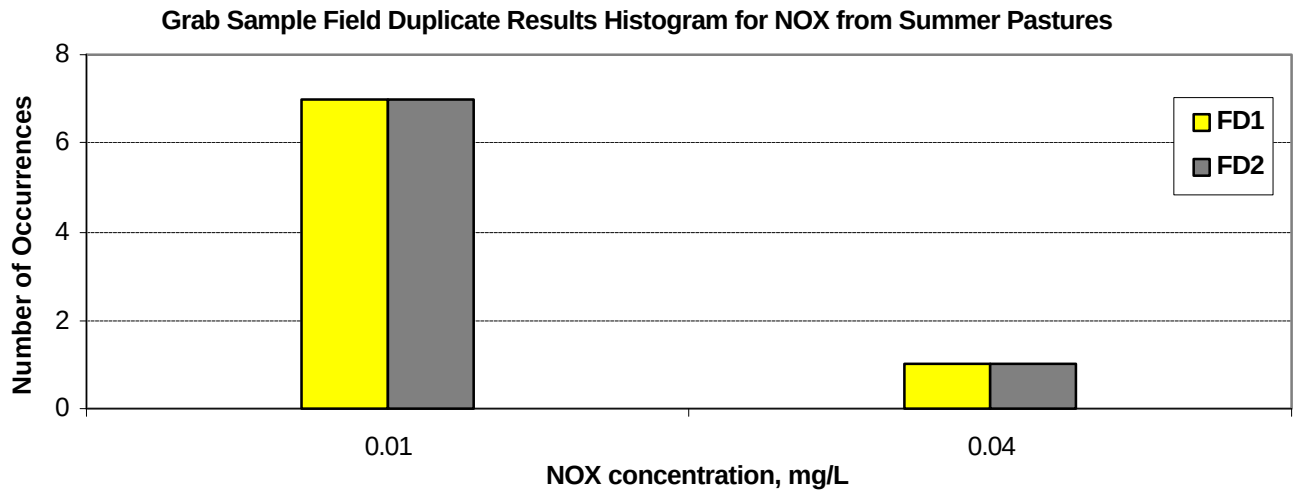

Figure 2.3a Frequency distribution for magnitude of NOx concentration measurements for field duplicates (FD1 and FD2) for *summer* pastures during the year 2000.

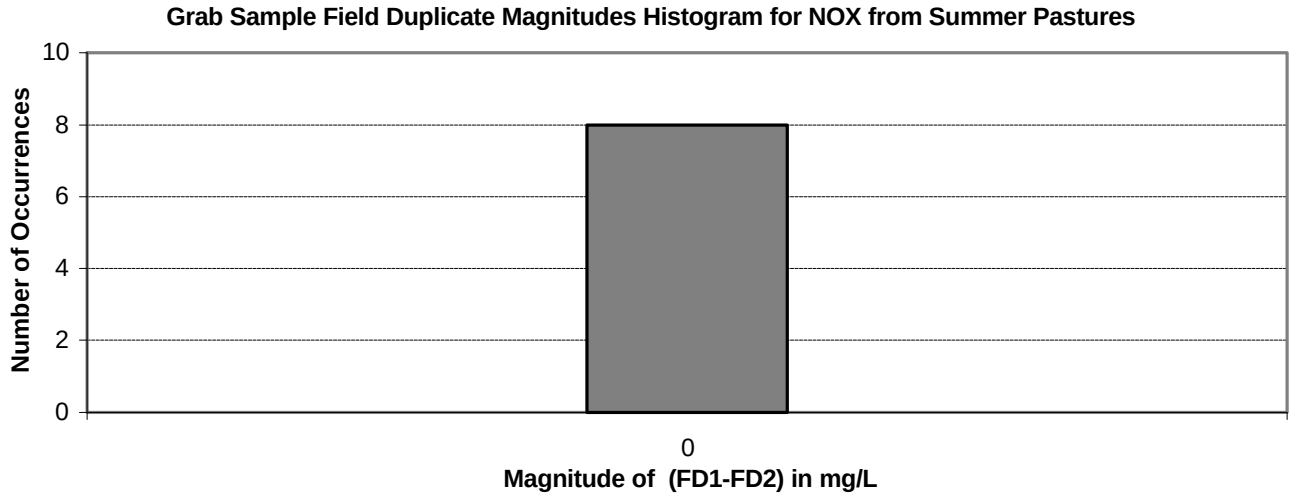

Figure 2.3b Frequency distribution for differences (FD1-FD2) between paired NOx concentration measurements for field duplicates from *summer* pastures during the year 2000.

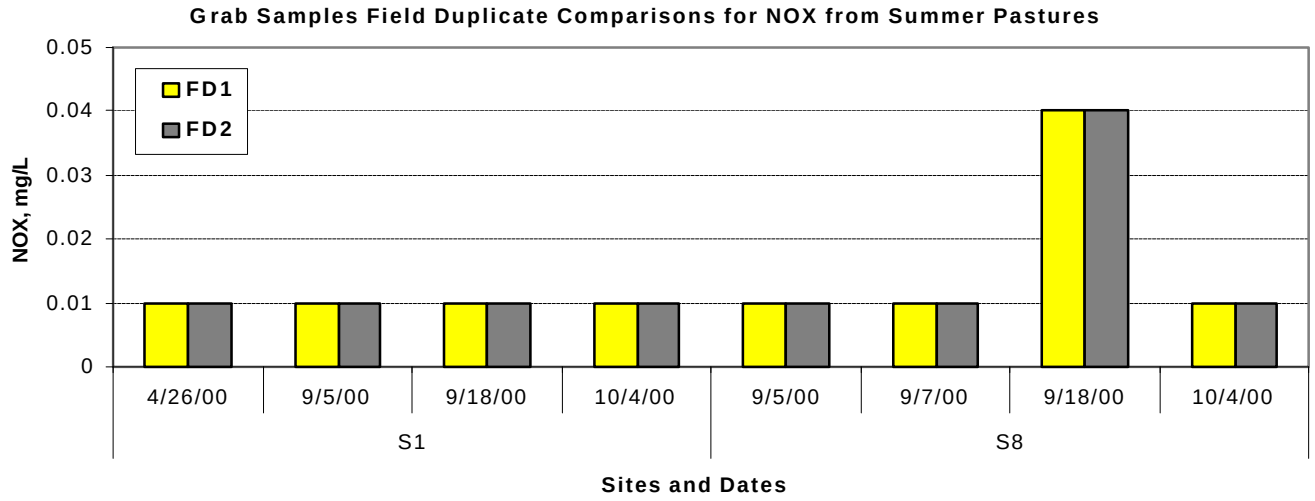

Figure 2.3c Comparison of paired NOx concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

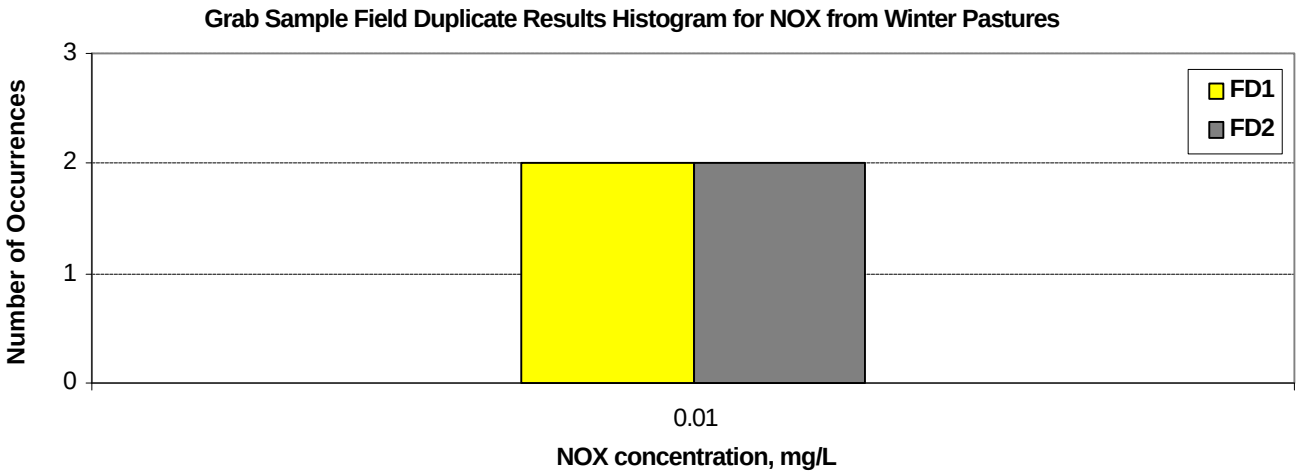

Figure 2.4a Frequency distribution for magnitude of NOx concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

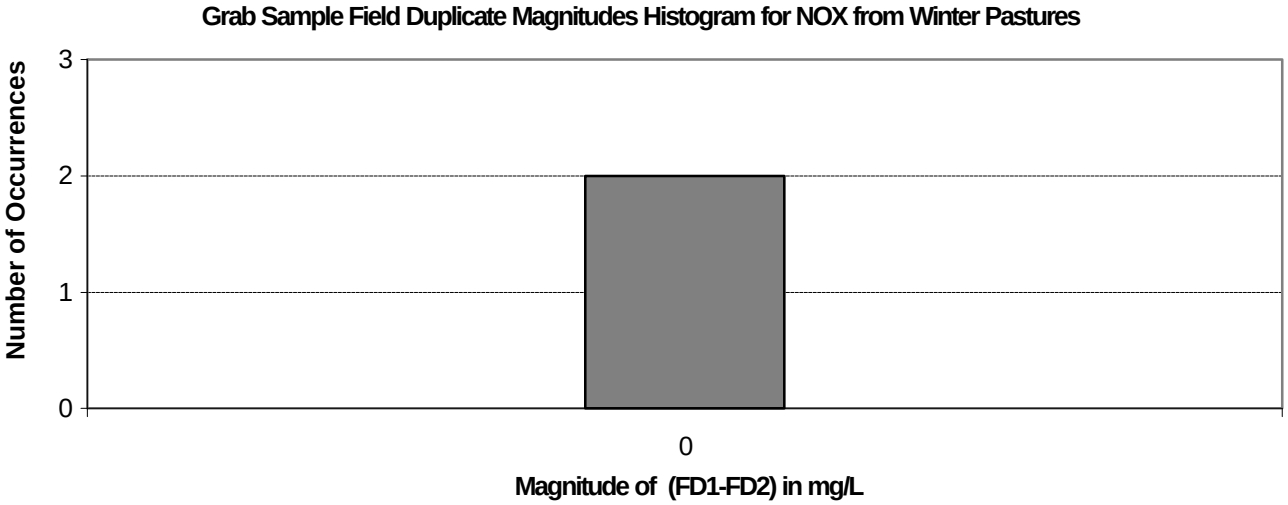

Figure 2.4b Frequency distribution for differences (FD1-FD2) between paired N0x concentration measurements for field duplicates from *winter* pastures during the year 2000.

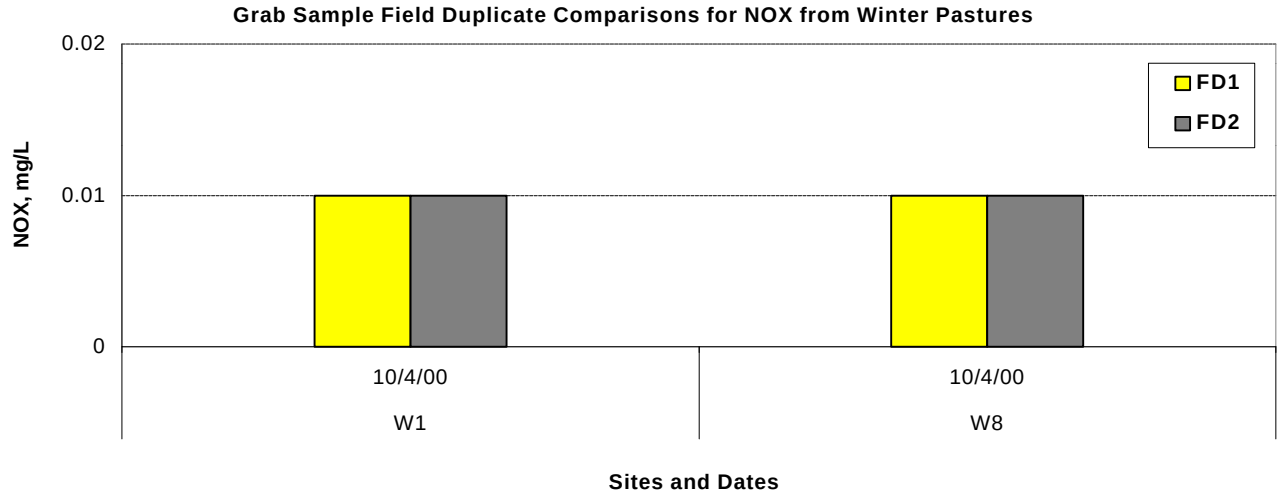

Figure 2.4c Comparison of paired NOx concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

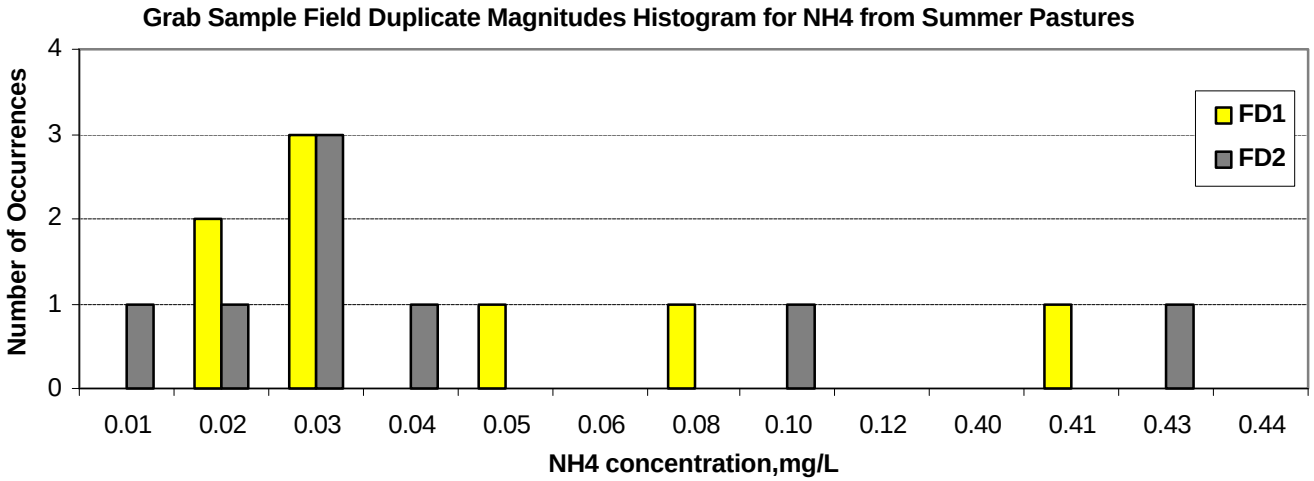

Figure 3.3a Frequency distribution for magnitude of NH_4 concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

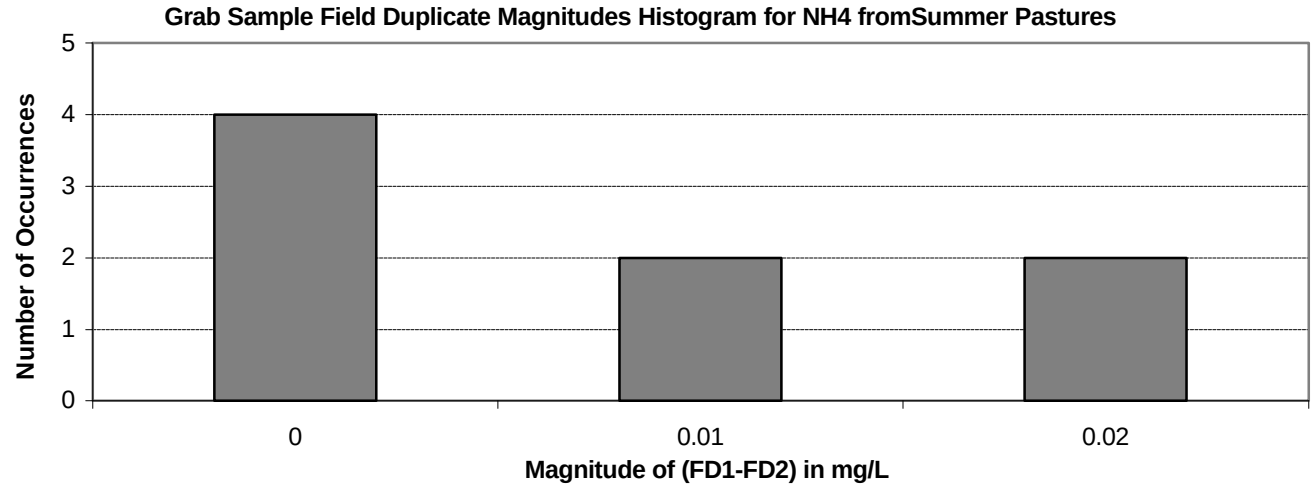

Figure 3.3b Frequency distribution for differences (FD1-FD2) between paired NH_4 concentration measurements for field duplicates from *summer* pastures during the year 2000.

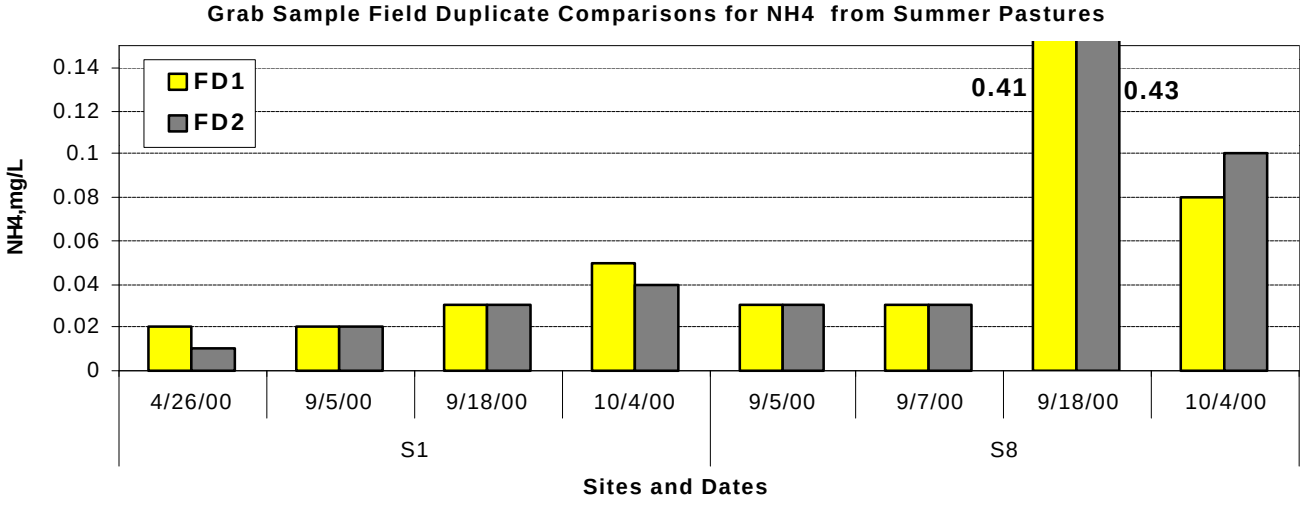

Figure 3.3c Comparison of paired NH_4 concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

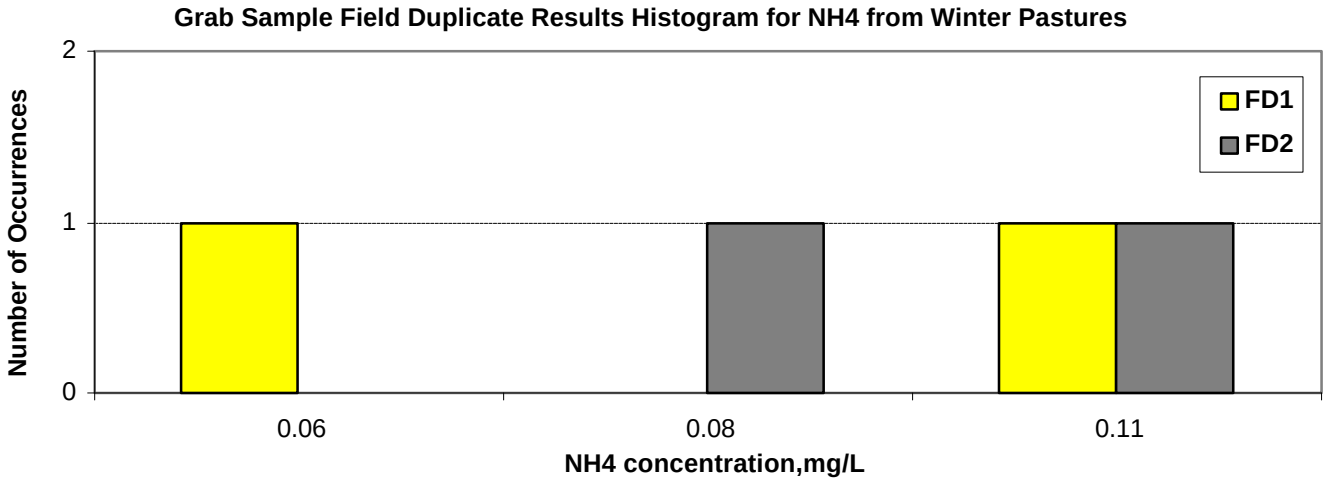

Figure 3.4a Frequency distribution for magnitude of NH_4 concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

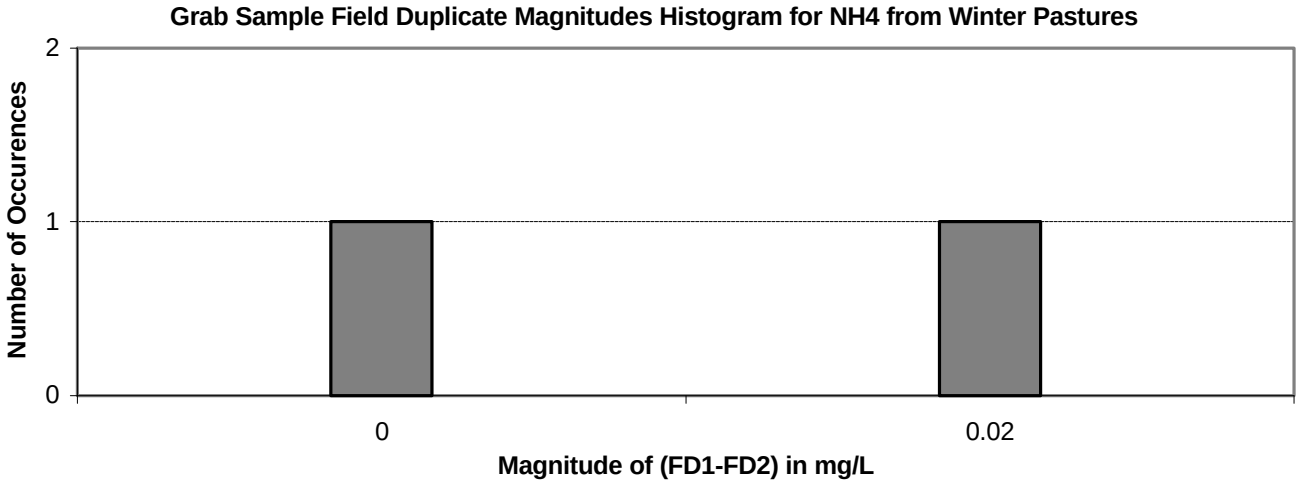

Figure 3.4b Frequency distribution for differences (FD1-FD2) between paired NH_4 concentration measurements for field duplicates from *winter* pastures during the year 2000.

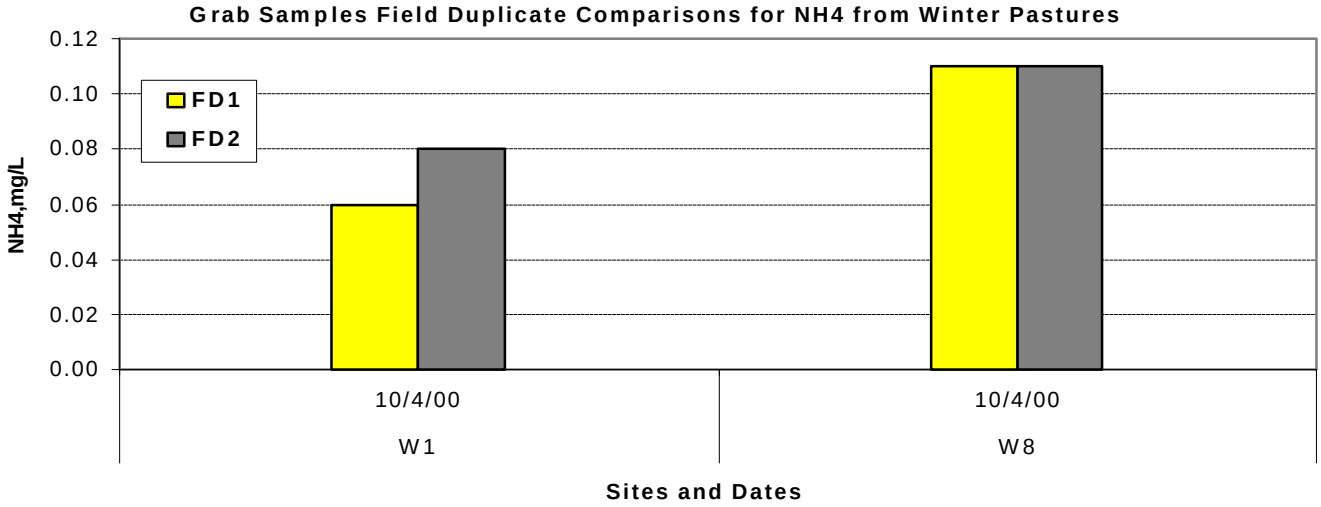

Figure 3.4c Comparison of paired NH_4 concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

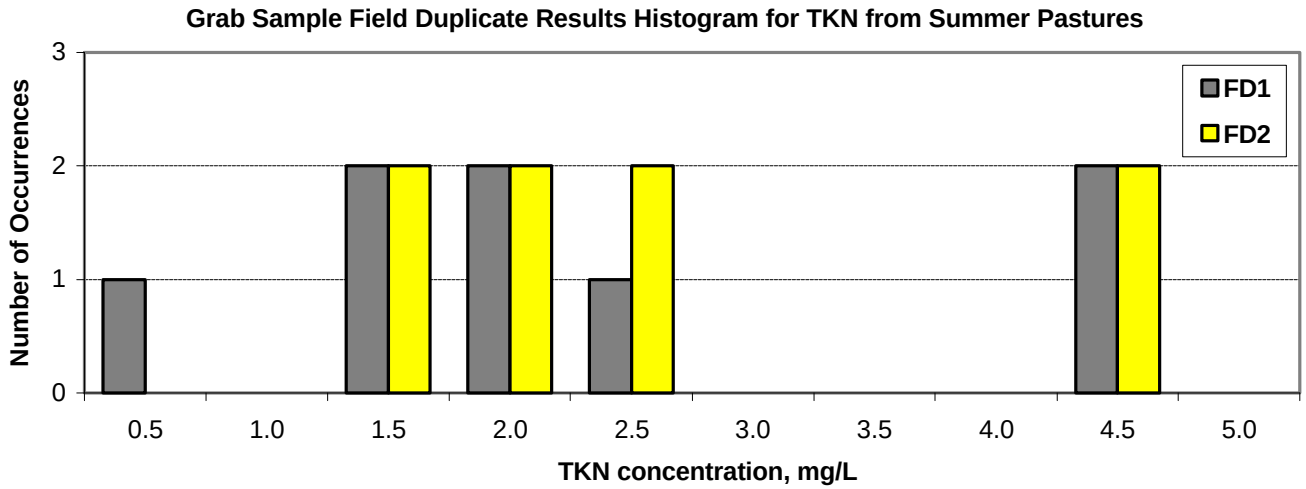

Figure 4.3c Frequency distribution for magnitude of TKN concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

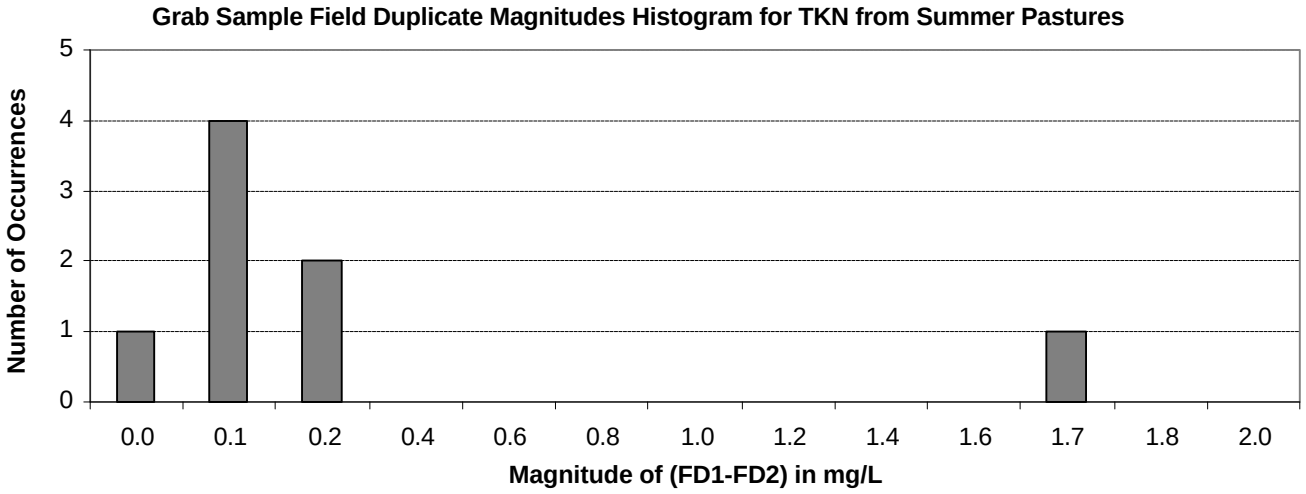

Figure 4.3b Frequency distribution for differences (FD1-FD2) between paired TKN concentration measurements for field duplicates from *summer* pastures during the year 2000.

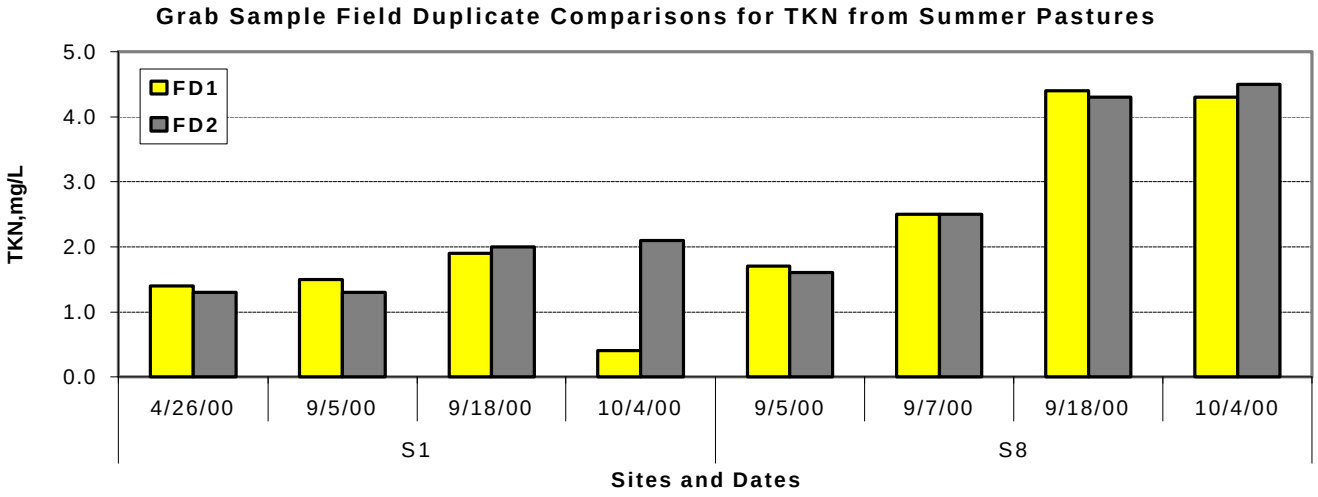

Figure 4.3a Comparison of paired TKN concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

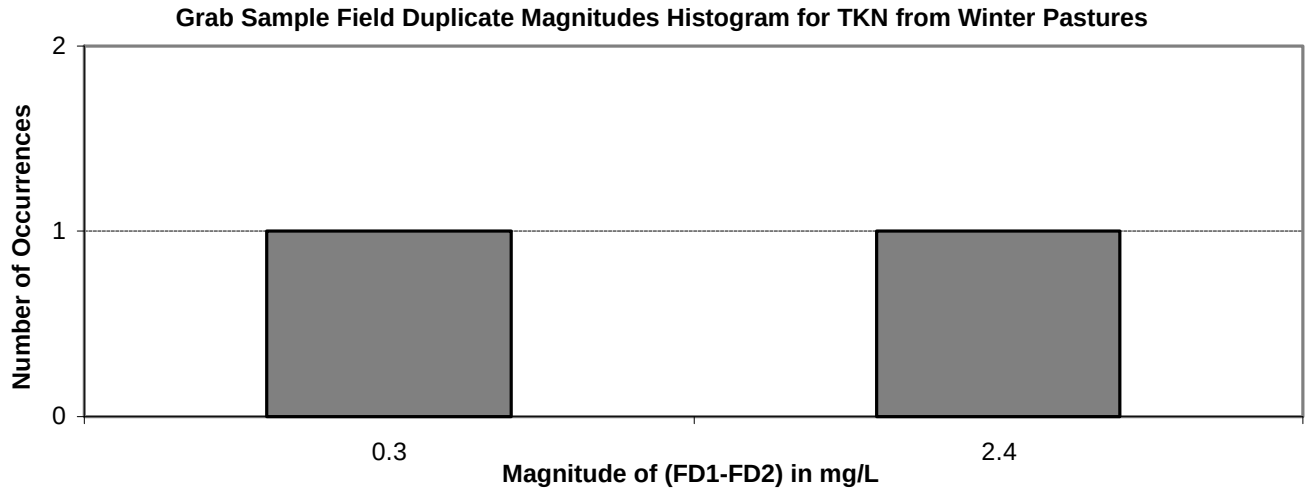

Figure 4.4a Frequency distribution for magnitude of TKN concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

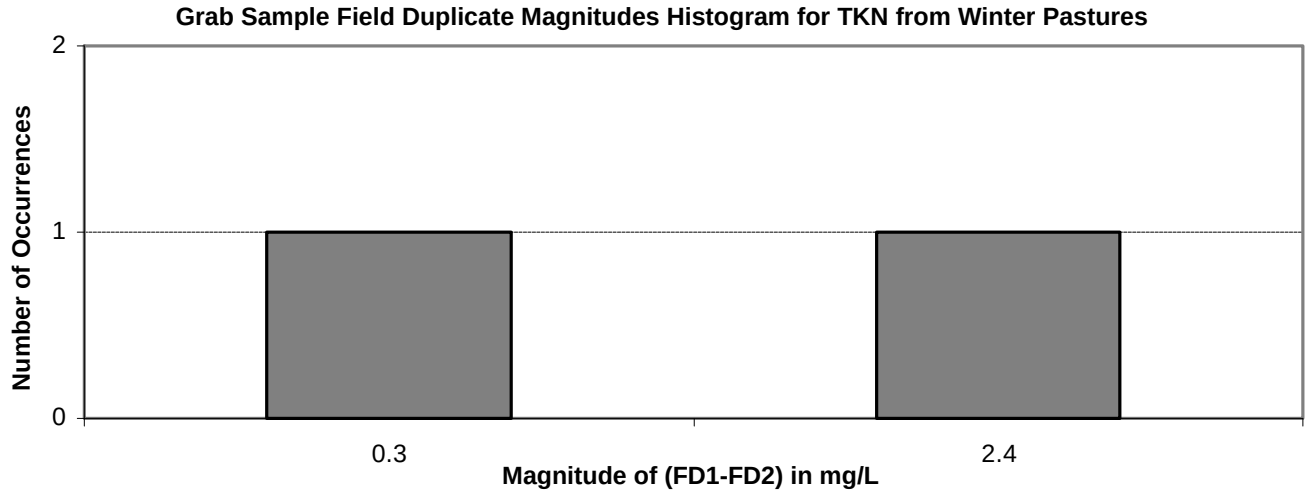

Figure 4.4b Frequency distribution for differences (FD1-FD2) between paired TKN concentration measurements for field duplicates from *winter* pastures during the year 2000.

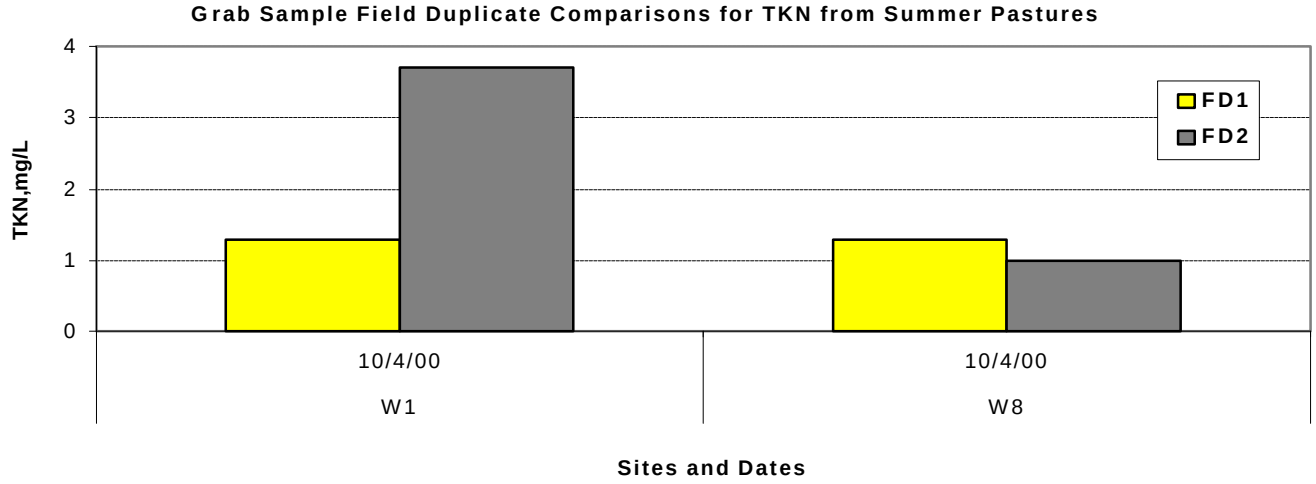

Figure 4.4c Comparison of paired TKN concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

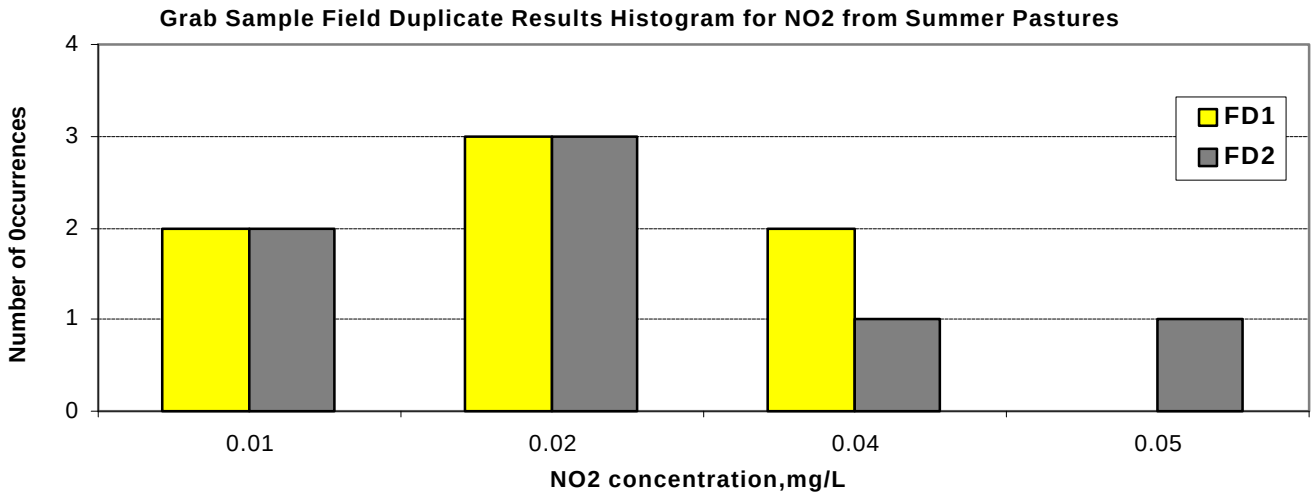

Figure 5.1a Frequency distribution for magnitude of NO_2 concentration measurements for field duplicates (FD1 and FD2) for *summer* pastures during the year 2000.

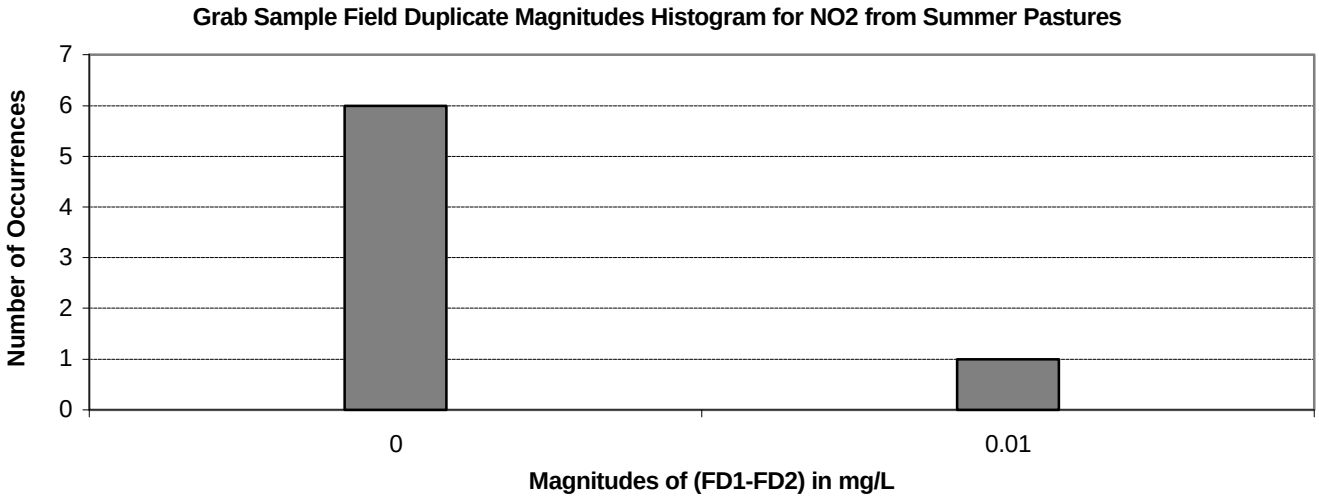

Figure 5.1b Frequency distribution for differences (FD1-FD2) between paired NO_2 concentration measurements for field duplicates for *summer* pastures during the year 2000.

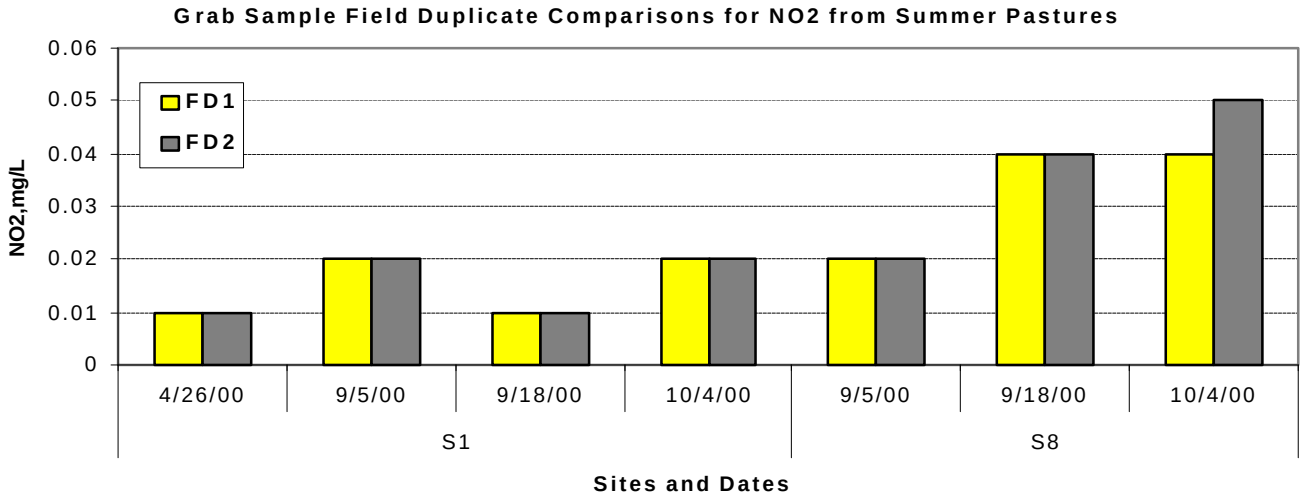

Figure5.1c Comparison of paired NO_2 concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

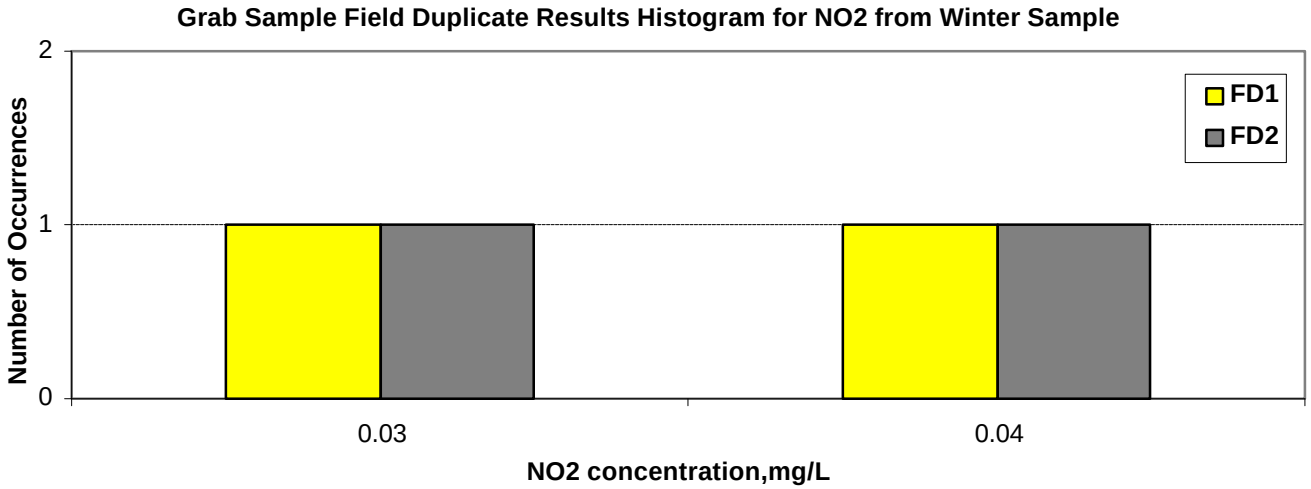

Figure 5.2c Frequency distribution for magnitude of NO_2 concentration measurements for field duplicates (FD1 and FD2) for *winter* pastures during the year 2000.

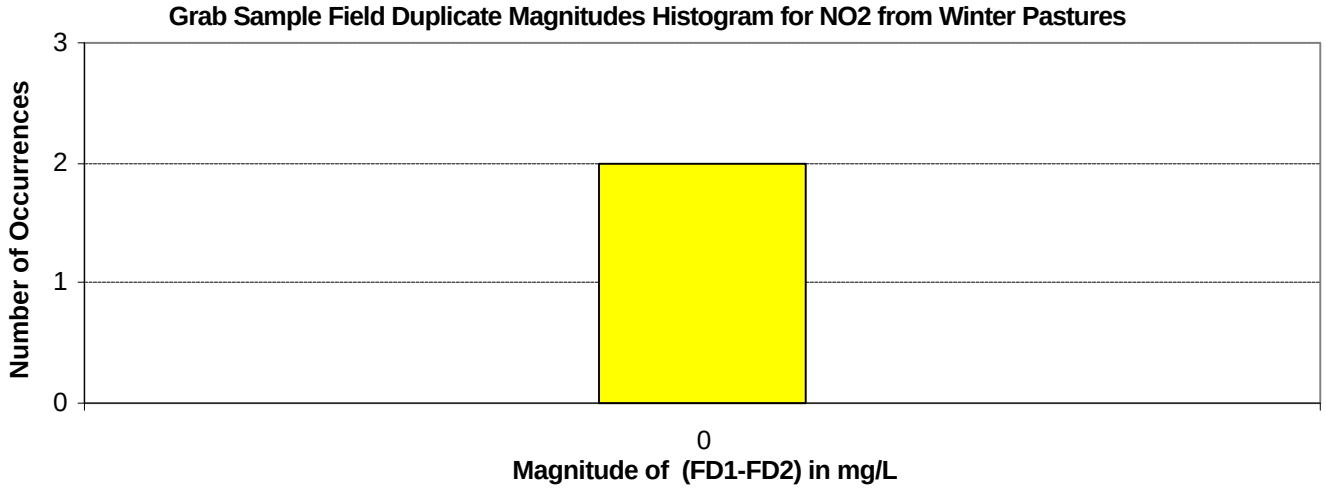

Figure 5.2b Frequency distribution for differences (FD1-FD2) between paired NO_2 concentration measurements for field duplicates for *winter* pastures during the year 2000.

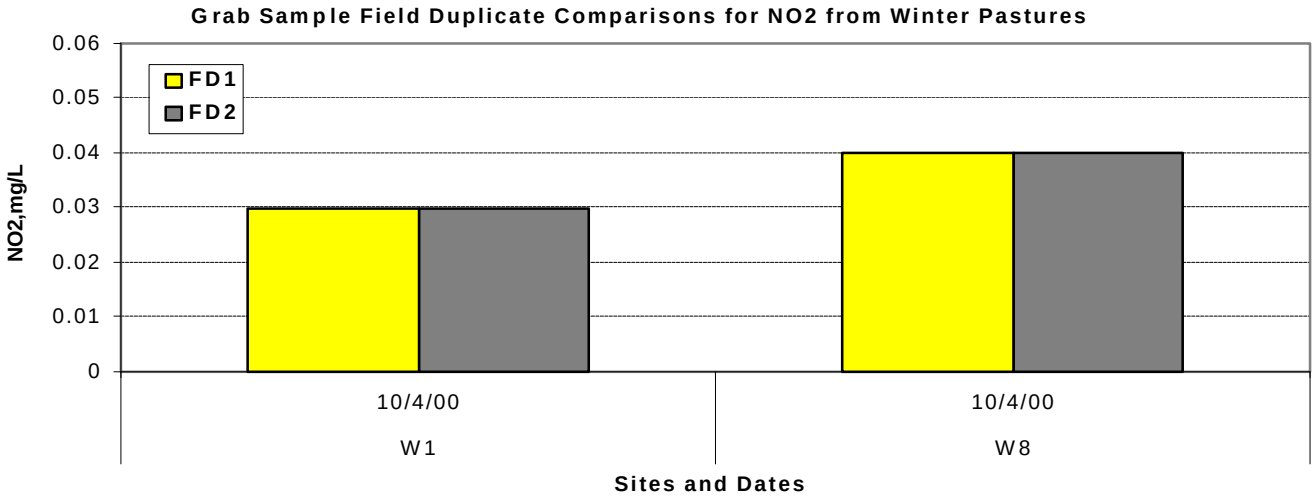

Figure 5.2a Comparison of paired NO_2 concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

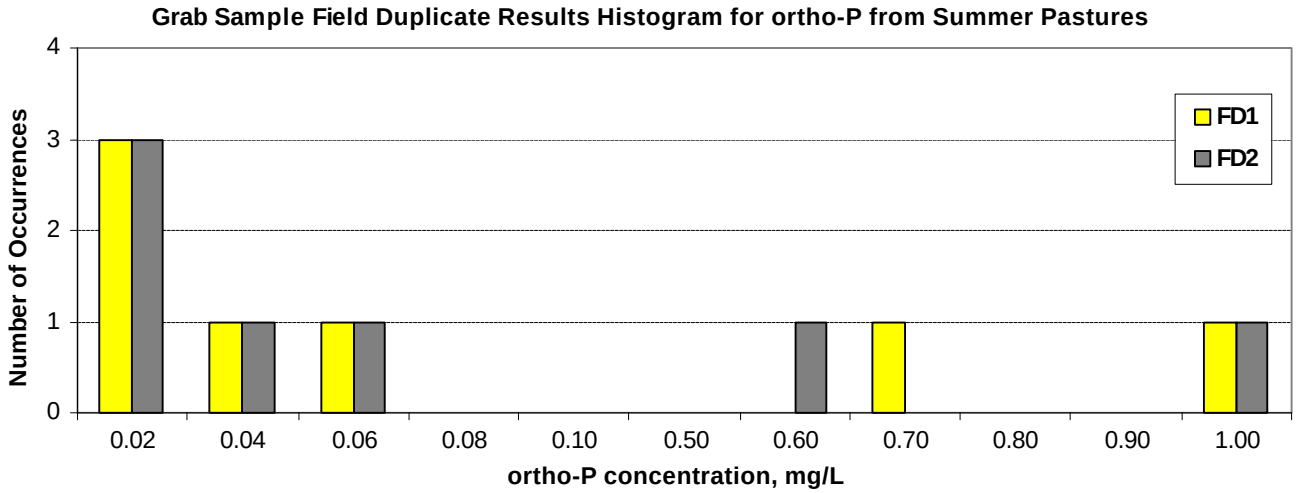

Figure 6.1a Frequency distribution for magnitude of ortho-P concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000

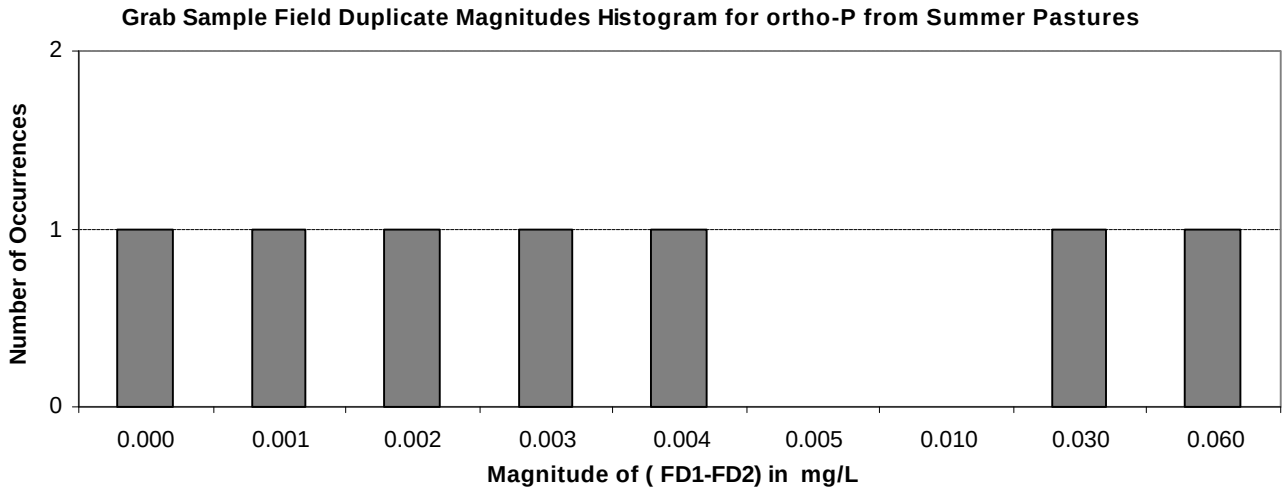

Figure 6.1b Frequency distribution for differences (FD1-FD2) between paired ortho-P concentration measurements for field duplicates from *summer* pastures during the year 2000.

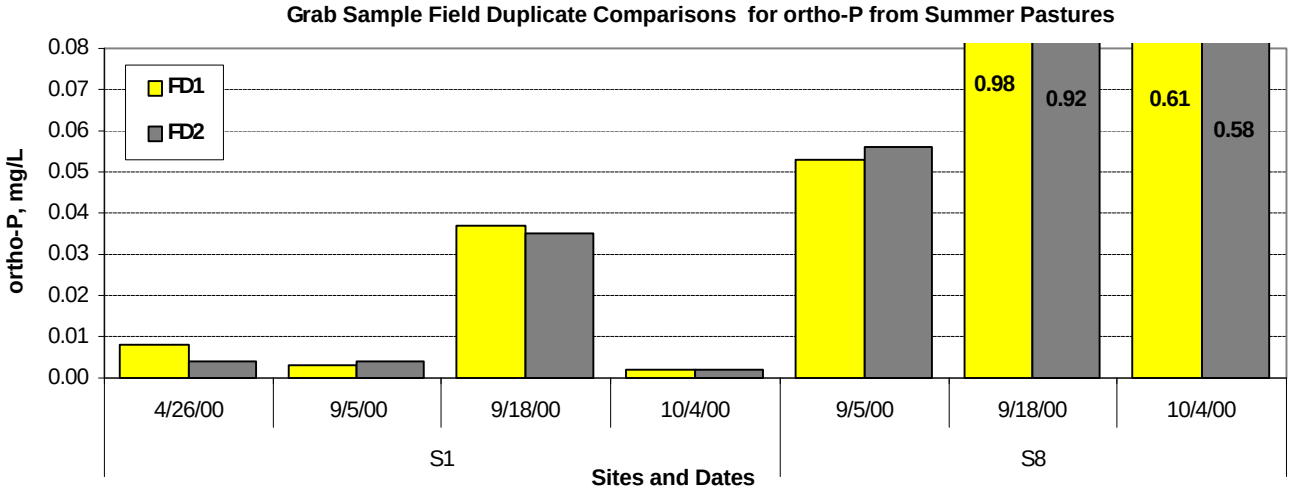

Figure 6.1c Comparison of paired ortho-P concentration measurements for field duplicates (FD1 and FD2) from *summer* pastures during the year 2000.

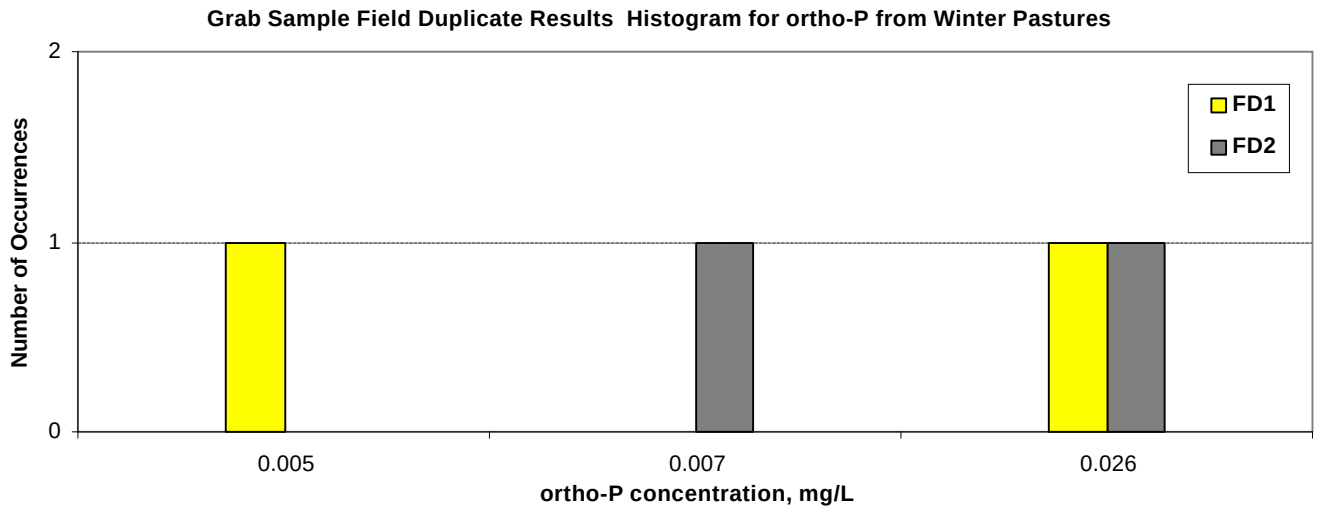

Figure 6.2a Frequency distribution for magnitude of ortho-P concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

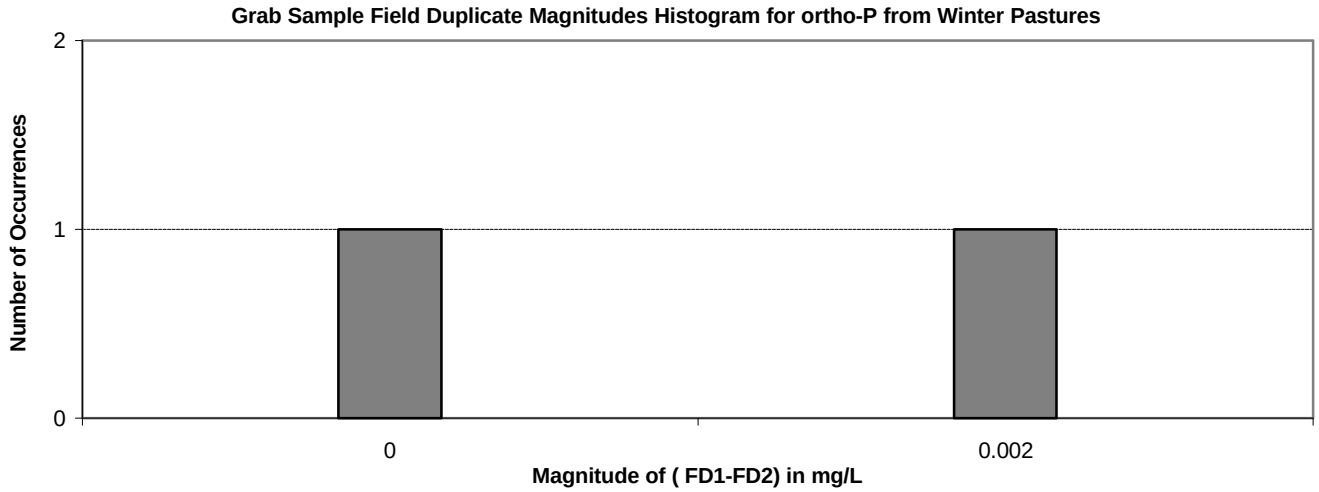

Figure 6.2b Frequency distribution for differences (FD1-FD2) between paired ortho-P concentration measurements for field duplicates from *winter* pastures during the year 2000.

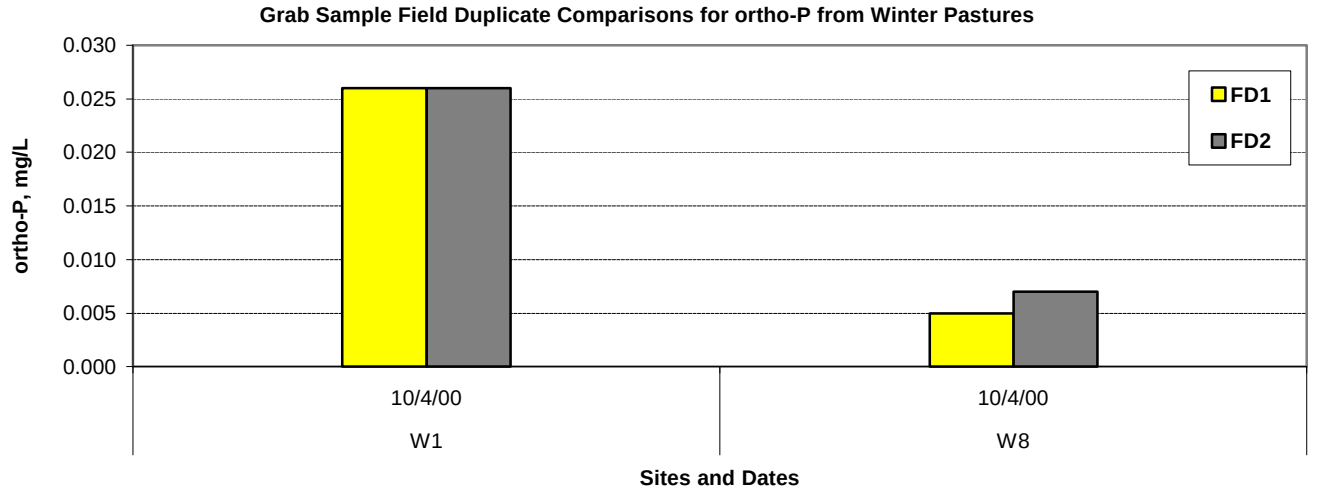

Figure 6.2c Comparison of paired ortho-P concentration measurements for field duplicates (FD1 and FD2) from *winter* pastures during the year 2000.

Appendix F

Tables

Describing Results for

Field Duplicates

Collected by

Grab Samples

Table 1.3. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* TP concentration measurements and statistics from *summer* pastures during the year 2000.

File	Field Number		Station	Set/Sampaling	Result		Statistics			
Number	FD1	FD2	Code	Date	FD1	FD2	diff	/diff/	avg	CV%
14	**2725**	**2726**	S1	4/26/00	**0.11**	**0.09**	0.02	0.02	0.100	14%
19	**2828**	**2829**	S1	9/5/00	**0.03**	**0.03**	0.00	0.00	0.030	0%
22	**2915**	**2916**	S1	9/18/00	**0.08**	**0.11**	-0.03	0.03	0.095	22%
24	**3122**	**3123**	S1	10/4/00	**0.01**	**0.07**	-0.06	0.06	0.040	106%
19	**2836**	**2837**	S8	9/5/00	**0.18**	**0.03**	0.15	0.15	0.105	101%
22	**2923**	**2924**	S8	9/18/00	**1.50**	**1.40**	0.10	0.10	1.450	5%
24	**3128**	**3129**	S8	10/4/00	**0.78**	**0.78**	0.00	0.00	0.780	0%
21	**2890**	**2891**	S8	9/7/00	**0.31**	**0.33**	-0.02	0.02	0.320	4%

Table 1.4. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* TP concentration measurements and statistics from *winter* pastures during the year 2000**.**

File	Field Number		Station	Set/Sampaling	Result		Statistics			
Number	FD1	FD2	Code	Date	FD1	FD2	diff	/diff/	avg	CV%
24	**3116**	**3117**	W1	10/4/00	**0.04**	**0.26**	-0.22	0.22	0.15	104%
24	**3120**	**3121**	W8	10/4/00	**0.03**	**0.03**	0	0	0.03	0%

Table 2.3. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* NO_X concentration measurements and statistics from *summer* pastures during the year 2000.

File Number	Field Number		Station Code	Set/Sampaling Date	Result		Statistics			
	FD1	FD2			FD1	FD2	diff	/diff/	avg	CV%
14	**2725**	**2726**	S1	4/26/00	**0.01**	**0.01**	0	0	0.01	0%
19	**2828**	**2829**	S1	9/5/00	**0.01**	**0.01**	0	0	0.01	0%
22	**2915**	**2916**	S1	9/18/00	**0.01**	**0.01**	0	0	0.01	0%
24	**3122**	**3123**	S1	10/4/00	**0.01**	**0.01**	0	0	0.01	0%
19	**2836**	**2837**	S8	9/5/00	**0.01**	**0.01**	0	0	0.01	0%
22	**2923**	**2924**	S8	9/18/00	**0.04**	**0.04**	0	0	0.04	0%
24	**3128**	**3129**	S8	10/4/00	**0.01**	**0.01**	0	0	0.01	0%
21	**2890**	**2891**	S8	9/7/00	**0.01**	**0.01**	0	0	0.01	0%

Table 2.4. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* NO_X concentration measurements and statistics from *winter* pastures during the year 2000**.**

File Number	Field Number		Station Code	Set/Sampaling Date	Result		Statistics			
	FD1	FD2			FD1	FD2	diff	/diff/	avg	CV%
24	**3116**	**3117**	W1	10/4/00	**0.01**	**0.01**	0	0	0.01	0
24	**3120**	**3121**	W8	10/4/00	**0.01**	**0.01**	0	0	0.01	0

Table 3.3. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* NH_4 concentration measurements and statistics from *summer* pastures during the year 2000.

File Number	Field Number		Station Code	Set/Sampaling Date	Result		Statistics			
	FD1	FD2			FD1	FD2	diff	/diff/	avg	CV%
14	**2725**	**2726**	S1	4/26/00	**0.02**	**0.01**	0.01	0.01	0.015	47%
19	**2828**	**2829**	S1	9/5/00	**0.02**	**0.02**	0	0	0.020	0%
22	**2915**	**2916**	S1	9/18/00	**0.03**	**0.03**	0	0	0.030	0%
24	**3122**	**3123**	S1	10/4/00	**0.05**	**0.04**	0.01	0.01	0.045	16%
19	**2836**	**2837**	S8	9/5/00	**0.03**	**0.03**	0	0	0.030	0%
22	**2923**	**2924**	S8	9/18/00	**0.41**	**0.43**	-0.02	0.02	0.420	3%
24	**3128**	**3129**	S8	10/4/00	**0.08**	**0.10**	-0.02	0.02	0.090	16%
21	**2890**	**2891**	S8	9/7/00	**0.03**	**0.03**	0	0	0.030	0%

Table 3.4. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* NH_4 concentration measurements and statistics from *winter* pastures during the year 2000**.**

File Number	Field Number		Station Code	Set/Sampaling Date	Result		Statistics			
	FD1	FD2			FD1	FD2	diff	/diff/	avg	CV%
24	**3116**	**3117**	W1	10/4/00	**0.06**	**0.08**	-0.02	0.02	0.070	20%
24	**3120**	**3121**	W8	10/4/00	**0.11**	**0.11**	0	0	0.110	0%

Table 4.3. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* TKN concentration measurements and statistics from *summer* pastures during the year 2000.

File Number	Field Number		Station Code	Set/Sampaling Date	Result		Statistics			
	FD1	FD2			FD1	FD2	diff	/diff/	avg	CV%
14	**2725**	**2726**	S1	4/26/00	**1.40**	**1.30**	0.1	0.1	1.350	5%
19	**2828**	**2829**	S1	9/5/00	**1.50**	**1.30**	0.2	0.2	1.400	10%
22	**2915**	**2916**	S1	9/18/00	**1.90**	**2.00**	-0.1	0.2	1.950	4%
24	**3122**	**3123**	S1	10/4/00	**0.40**	**2.10**	-1.7	0.2	1.250	96%
19	**2836**	**2837**	S8	9/5/00	**1.70**	**1.60**	0.1	0.2	1.650	4%
22	**2923**	**2924**	S8	9/18/00	**4.40**	**4.30**	0.1	0.2	4.350	2%
24	**3128**	**3129**	S8	10/4/00	**4.30**	**4.50**	-0.2	0.2	4.400	3%
21	**2890**	**2891**	S8	9/7/00	**2.50**	**2.50**	0	0.2	2.500	0%

Table 4.4. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* TKN concentration measurements and statistics from *winter* pastures during the year 2000**.**

File Number	Field Number		Station Code	Set/Sampaling Date	Result		Statistics			
	FD1	FD2			FD1	FD2	diff	/diff/	avg	CV%
24	**3116**	**3117**	W1	10/4/00	**1.30**	**3.70**	-2.4	2.4	2.500	68%
24	**3120**	**3121**	W8	10/4/00	**1.30**	**1.00**	0.3	0.3	1.150	18%

Table 5.1. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* NO_2 concentration measurements and statistics from *summer* pastures during the year 2000.

File	Field Number		Station	Set/Sampaling	Result		Statistics			
Number	FD1	FD2	Code	Date	FD1	FD2	diff	/diff/	avg	CV%
14	**2718**	**2719**	S1	4/26/00	**0.01**	**0.01**	0	0	0.010	0%
19	**2838**	**2839**	S1	9/5/00	**0.02**	**0.02**	0	0	0.020	0%
22	**2899**	**2900**	S1	9/18/00	**0.01**	**0.01**	0	0	0.010	0%
24	**3137**	**3138**	S1	10/4/00	**0.02**	**0.02**	0	0	0.020	0%
19	**2846**	**2847**	S8	9/5/00	**0.02**	**0.02**	0	0	0.020	0%
22	**2907**	**2908**	S8	9/18/00	**0.04**	**0.04**	0	0	0.040	0%
24	**3143**	**3144**	S8	10/4/00	**0.04**	**0.05**	-0.01	0.01	0.045	16%

Table 5.2. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* NO_2 concentration measurements and statistics from *winter* pastures during the year 2000**.**

File	Field Number		Station	Set/Sampaling	Result		Statistics			
Number	FD1	FD2	Code	Date	FD1	FD2	diff	/diff/	avg	CV%
24	**3131**	**3132**	W1	10/4/00	**0.03**	**0.03**	0	0	0.030	0%
24	**3135**	**3136**	W8	10/4/00	**0.04**	**0.04**	0	0	0.040	0%

Table 6.1. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* ortho-P concentration measurements and statistics from *winter* pastures during the year 2000**.**

File	Field Number		Station	Set/Sampaling	Result		Statistics			
Number	FD1	FD2	Code	Date	FD1	FD2	diff	/diff/	avg	CV%
14	**2718**	**2719**	S1	4/26/00	**0.01**	**0.004**	0.004	0.004	0.006	47%
19	**2838**	**2839**	S1	9/5/00	**0.003**	**0.004**	-0.001	0.001	0.004	20%
22	**2899**	**2900**	S1	9/18/00	**0.04**	**0.04**	0.002	0.002	0.036	4%
24	**3137**	**3138**	S1	10/4/00	**0.00**	**0.00**	0.000	0.000	0.002	0%
19	**2846**	**2847**	S8	9/5/00	**0.05**	**0.06**	-0.003	0.003	0.055	4%
22	**2907**	**2908**	S8	9/18/00	**0.98**	**0.92**	0.060	0.060	0.950	4%
24	**3143**	**3144**	S8	10/4/00	**0.61**	**0.58**	0.030	0.030	0.594	4%

Table 6.2. Summary of **Grab** field duplicates (FD1 and FD2) for all *paired* ortho-P concentration measurements and statistics from *winter* pastures during the year 2000**.**

File	Field Number		Station	Set/Sampaling	Result		Statistics			
Number	FD1	FD2	Code	Date	FD1	FD2	diff	/diff/	avg	CV%
24	**3131**	**3132**	W1	10/4/00	**0.03**	**0.03**	0.000	0	0.026	0%
24	**3135**	**3136**	W8	10/4/00	**0.01**	**0.01**	-0.002	0.002	0.006	24%