

Appendix D

Case Study 4: Dairy Setback

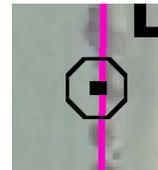
- a: Elements of the Figures**
- I: Four Week Passive Project Results, Complete**
- II: Passive Results, July 6 – July 13, 2010**
- III: Passive Results, July 13 – July 20, 2010**
- IV: Passive Results, July 20 – July 27, 2010**
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Elements of the Figures

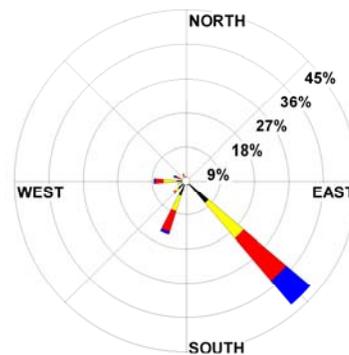
Proportional bars represent weekly passive ammonia concentrations in the summary figure, as well as the short term active ammonia (green) and hydrogen sulfide (pink) concentrations. The pink line in all of the figures represent the study boundary, which in most cases should be the property boundary of the farms.



Proportional symbols represent passive ammonia concentrations in the weekly figures. Each case study has its own concentration scale and can not be directly compared with other farms. Actual concentrations associated with the symbols are shown in the tables on each figure page.



Wind roses are a device to illustrate the direction and speed of the wind. The direction of the bar indicates where the wind is blowing **from**, with the colors indicating the speed of the wind and the length of the bar showing what percentage of the time the wind was coming from that direction. In the figure to the right, wind was coming from the southeast close to 45% of the time, with a wind speed of 11 – 17 knots about 9% of the time, a speed of 7 – 11 knots about 15% of the time, a speed of 4 – 7 knots about 11% of the time, and 1 – 4 knots about 8% of the time. In addition, winds were from the west 9% of the time, and from the southwest about 15% of the time. At the bottom of the wind speed scale to the right, the percentage of the time that the wind was calm is recorded, in this case, 16.67% of the time.

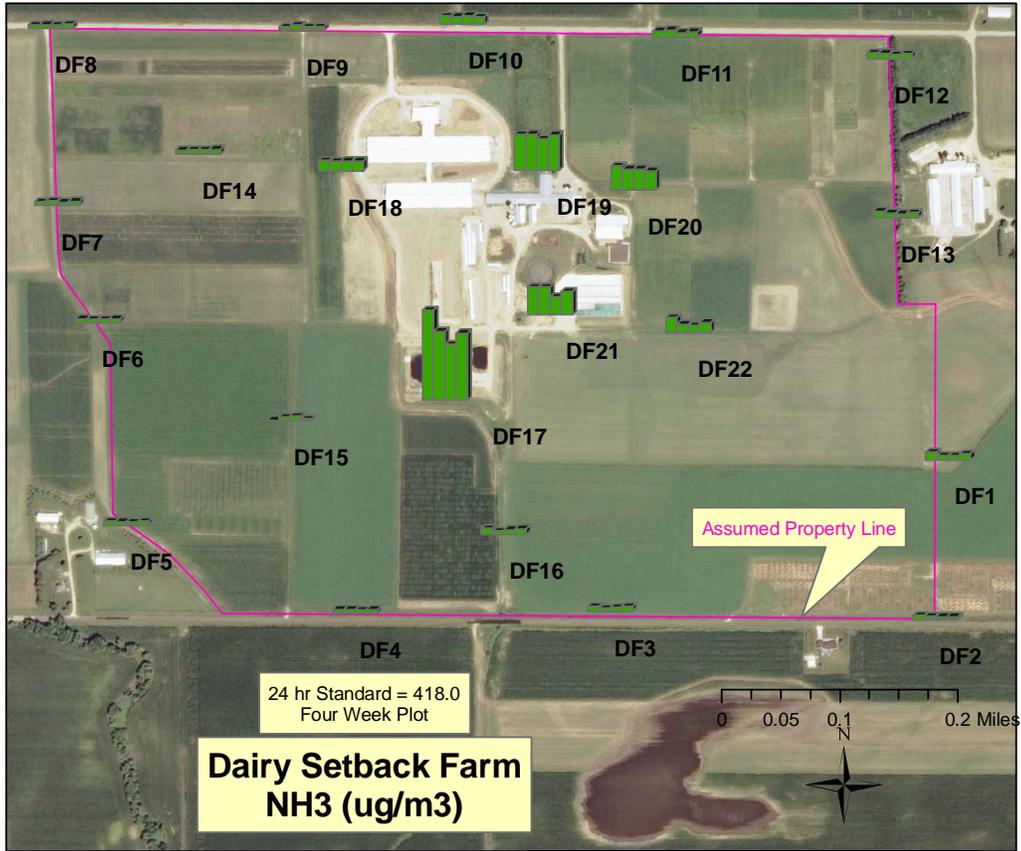


WIND SPEED (Knots)

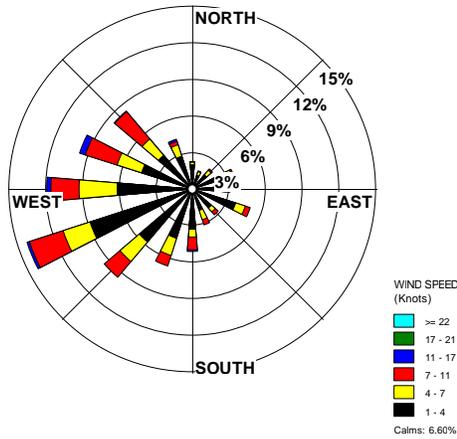


Calms: 16.67%

Figure D-I: Four Week Passive Project Results, Complete

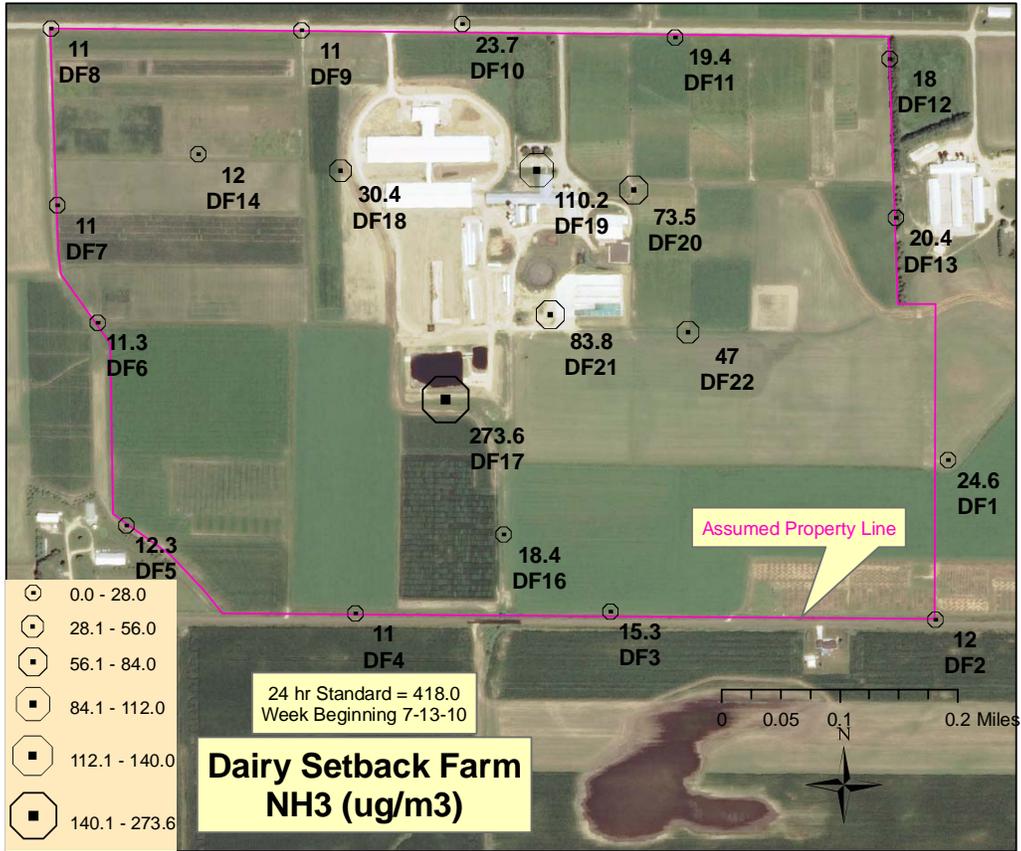


Dairy Setback Passive Ammonia Samples, 7/6 – 8/5/2010
Ambient Air Concentrations in Micrograms per Cubic Meter.
Asterisk denotes values calculated from results
below lab reporting limit.



Location	07/06/2010	07/13/2010	07/20/2010	07/27/2010
DF1	24.6	13.5*	13.7*	19.5
DF2	12.0*	9.7*	8.3*	9.0*
DF3	15.3*	9.1*	12.1*	14.0
DF4	11.0*	10.8*	9.6*	11.1*
DF5	12.3*	10.4*	9.9*	11.7*
DF6	11.3*	10.1*	10.2*	11.1*
DF7	11.0*	13.8*	10.2*	13.0*
DF8	11.0*	11.8*	11.2*	14.3
DF9	11.0*	17.1	11.2*	11.4*
DF10	23.7	23.2	25.5	20.9
DF11	19.4	22.2	14.0*	17.2
DF12	18.0	16.1*	12.1*	14.8
DF13	20.4	15.5*	12.8*	17.0
DF14	12.0*	12.5*	13.4*	15.1
DF15		10.4*	12.4*	5.0*
DF16	18.4	10.1*	14.7*	17.0
DF17	273.6	209.4	168.9	204.2
DF18	30.4	27.7	29.3	29.2
DF19	110.2	111.4	95.6	108.7
DF20	73.5	64.2	63.7	58.3
DF21	83.8	84.4	54.2	71.6
D422	47.0	26.0	21.4	31.8

Figure D-II: Passive Results, July 6 – July 13, 2010



Dairy Setback Fenceline Passive Ammonia Samples, 7/6 – 7/13/2010
Ambient Air Concentrations in Micrograms per Cubic Meter. An asterisk denotes values calculated from results below lab reporting limit.

Location	07/06/2010
DF1	24.6
DF2	12.0*
DF3	15.3*
DF4	11.0*
DF5	12.3*
DF6	11.3*
DF7	11.0*
DF8	11.0*
DF9	11.0*
DF10	23.7
DF11	19.4
DF12	18.0
DF13	20.4
DF14	12.0*
DF15	
DF16	18.4
DF17	273.6
DF18	30.4
DF19	110.2
DF20	73.5
DF21	83.8
D422	47.0

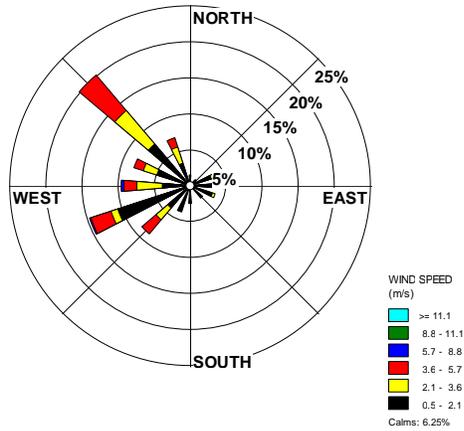
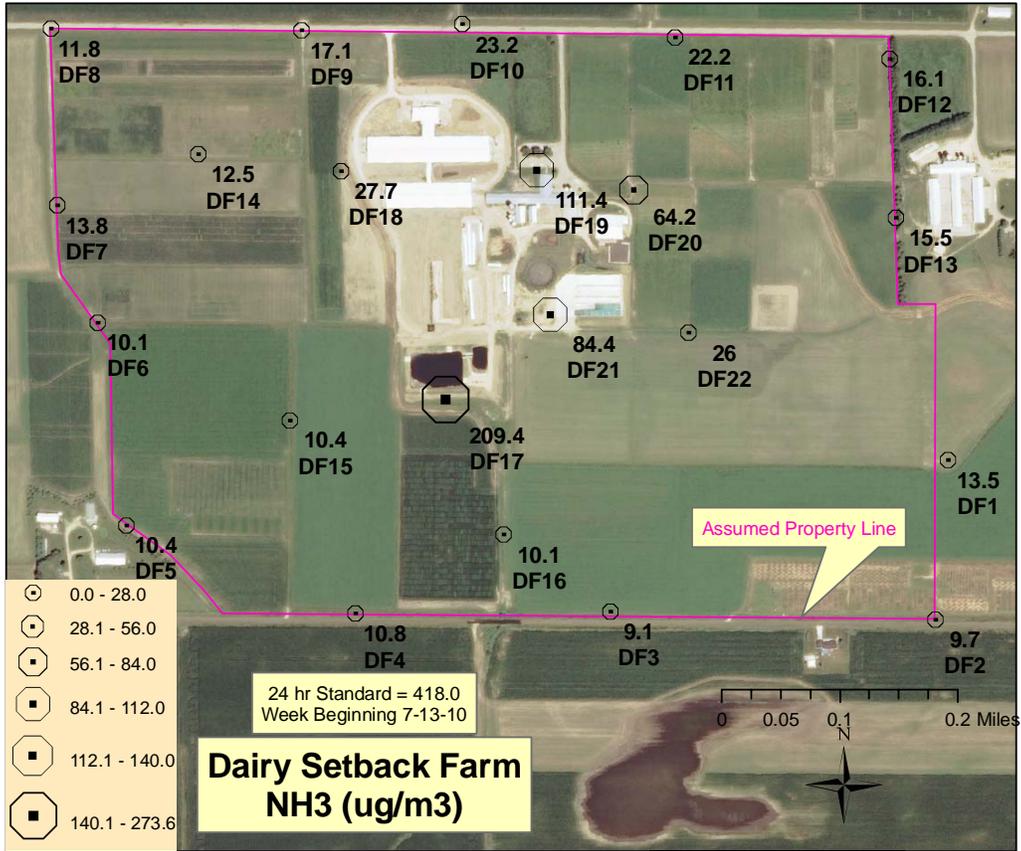
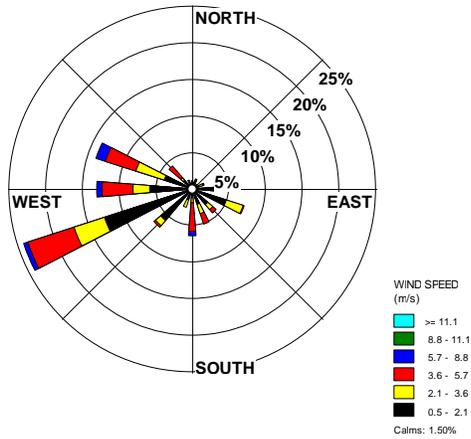


Figure D-III: Passive Results, July 13 – July 20, 2010

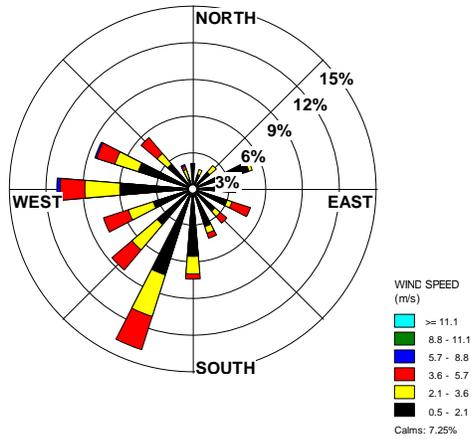
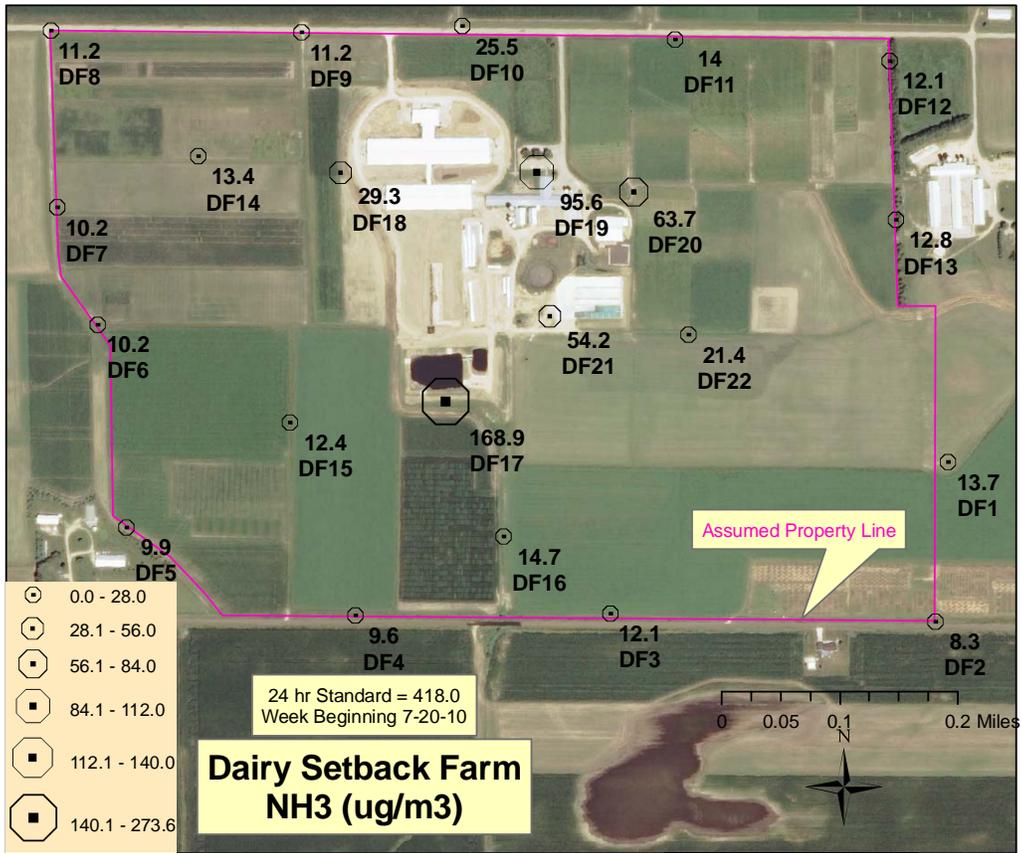


Dairy Setback Fenceline Passive Ammonia Samples, 7/13 – 7/20/2010
Ambient Air Concentrations in Micrograms per Cubic Meter. An asterisk denotes values calculated from results below lab reporting limit.



Location	07/13/2010
DF1	13.5*
DF2	9.7*
DF3	9.1*
DF4	10.8*
DF5	10.4*
DF6	10.1*
DF7	13.8*
DF8	11.8*
DF9	17.1
DF10	23.2
DF11	22.2
DF12	16.1*
DF13	15.5*
DF14	12.5*
DF15	10.4*
DF16	10.1*
DF17	209.4
DF18	27.7
DF19	111.4
DF20	64.2
DF21	84.4
D422	26.0

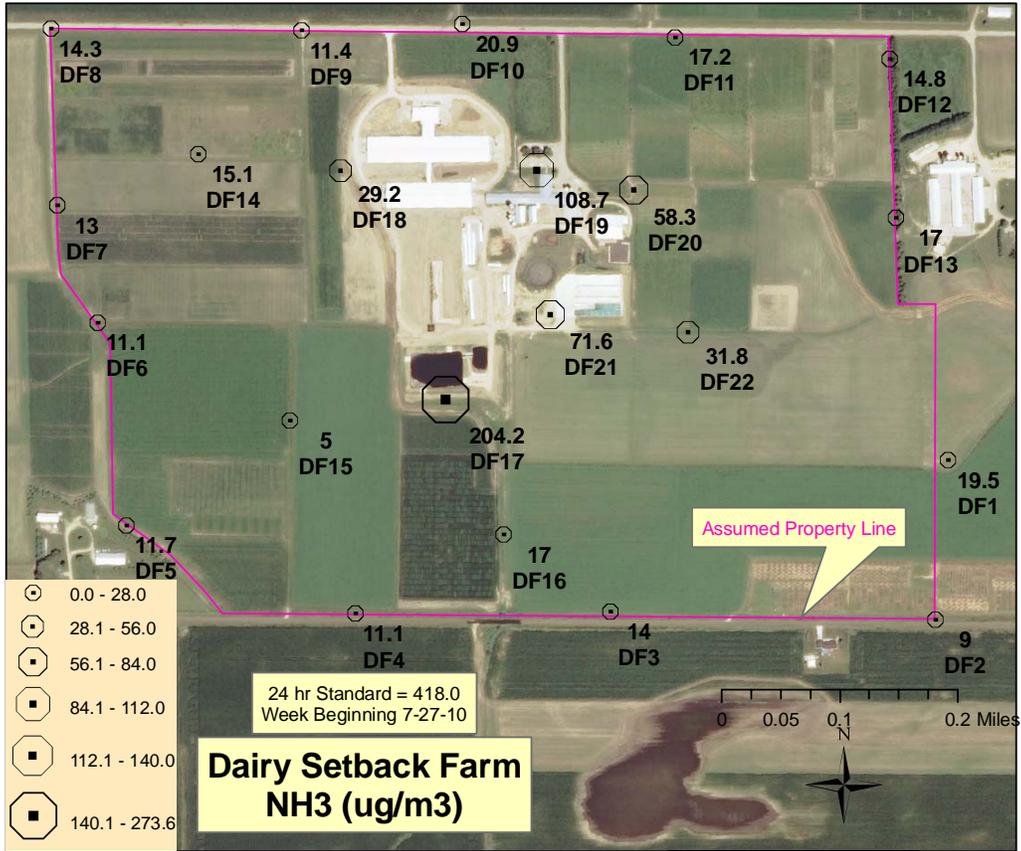
Figure D-IV: Passive Results, July 20 – July 27, 2010



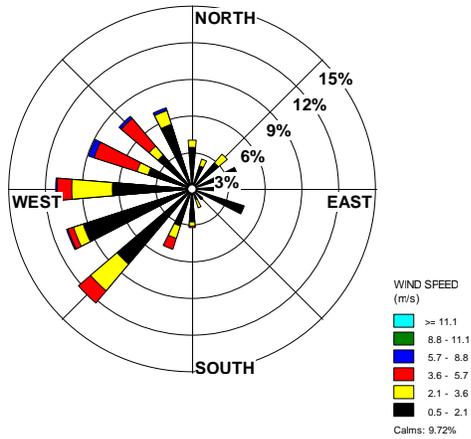
Dairy Setback Fenceline Passive Ammonia Samples, 7/20 – 7/27/2010
Ambient Air Concentrations in Micrograms per Cubic Meter. An asterisk denotes values calculated from results below lab reporting limit.

Location	07/20/2010
DF1	13.7'
DF2	8.3'
DF3	12.1'
DF4	9.6'
DF5	9.9'
DF6	10.2'
DF7	10.2'
DF8	11.2'
DF9	11.2'
DF10	25.5
DF11	14.0'
DF12	12.1'
DF13	12.8'
DF14	13.4'
DF15	12.4'
DF16	14.7'
DF17	168.9
DF18	29.3
DF19	95.6
DF20	63.7
DF21	54.2
D422	21.4

Figure D-V: Passive Results, July 27 – August 5, 2010



Dairy Setback Fenceline Passive Ammonia Samples, 7/27 - 8/05/2010
Ambient Air Concentrations in Micrograms per Cubic Meter. An asterisk denotes values calculated from results below lab reporting limit.



Location	07/27/2010
DF1	19.5
DF2	9.0*
DF3	14.0
DF4	11.1*
DF5	11.7*
DF6	11.1*
DF7	13.0*
DF8	14.3
DF9	11.4*
DF10	20.9
DF11	17.2
DF12	14.8
DF13	17.0
DF14	15.1
DF15	5.0*
DF16	17.0
DF17	204.2
DF18	29.2
DF19	108.7
DF20	58.3
DF21	71.6
D422	31.8

Figure D-VI: Active Sampling Site Locations

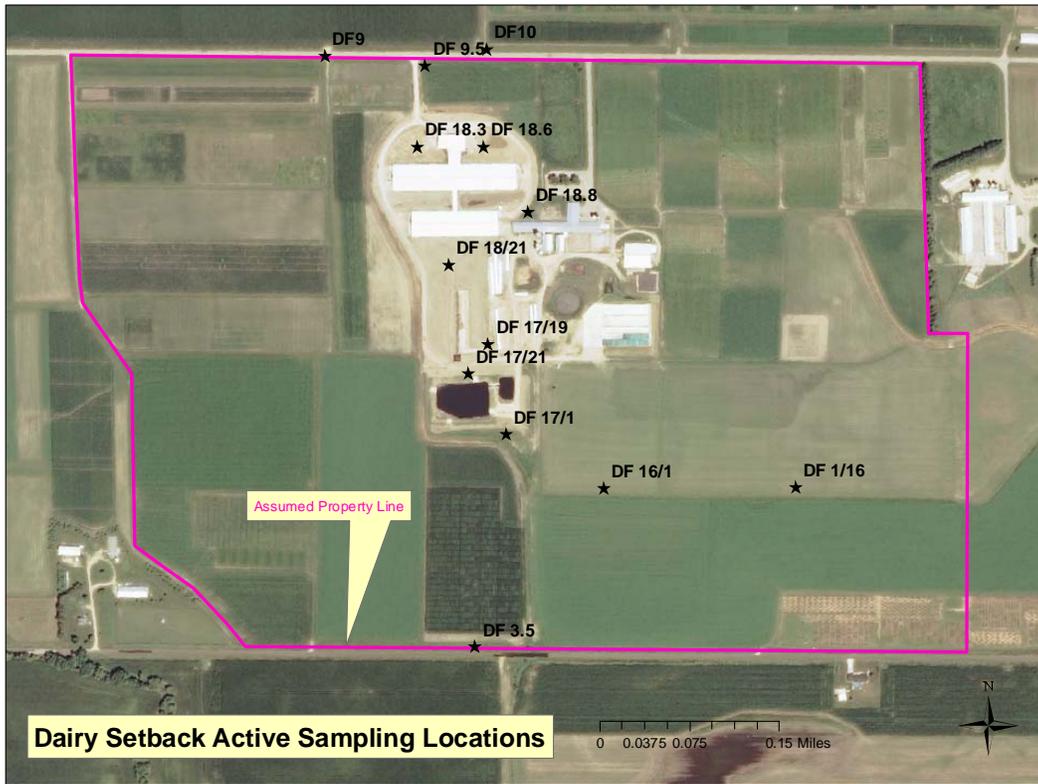
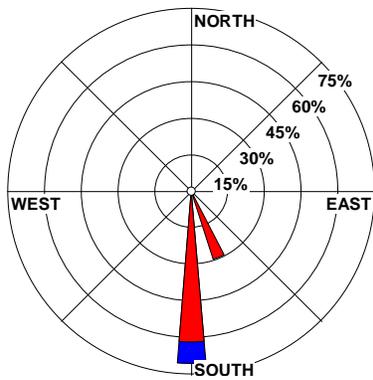
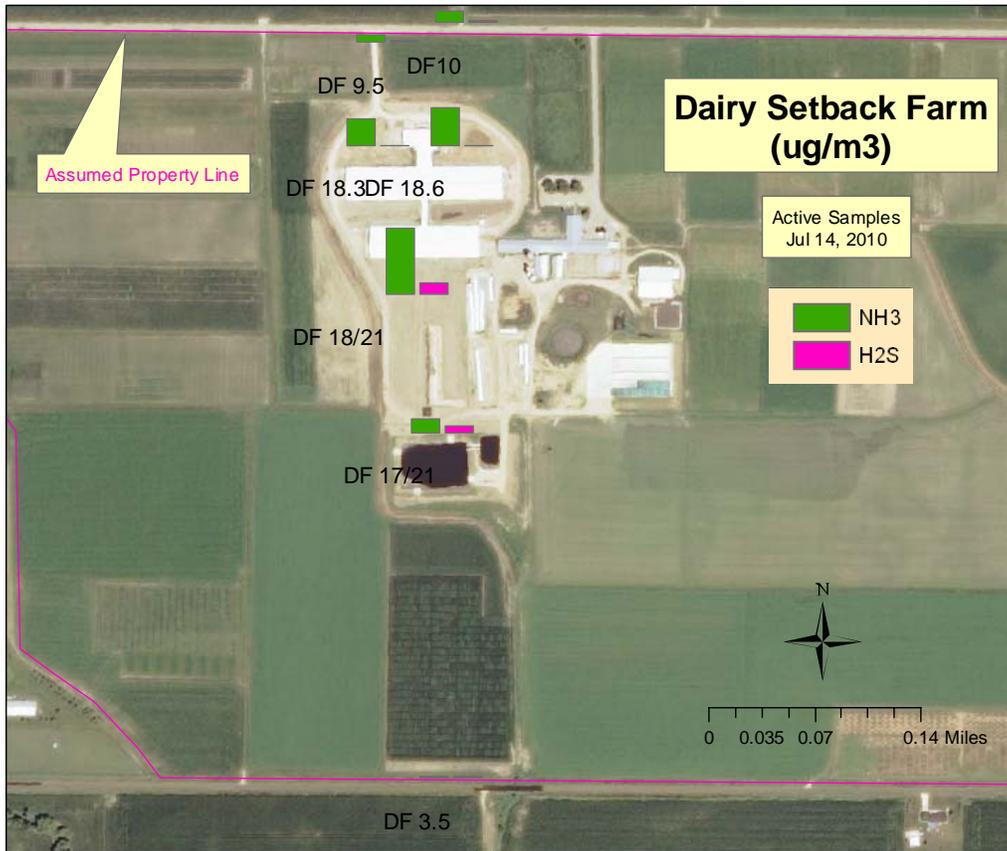


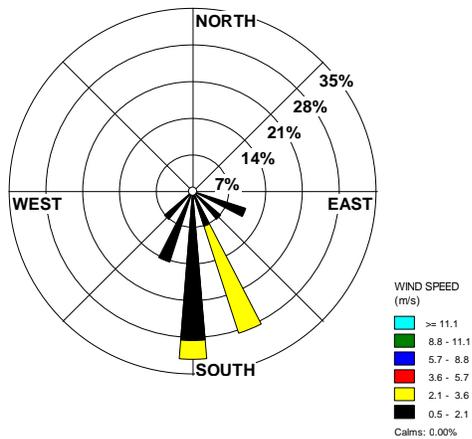
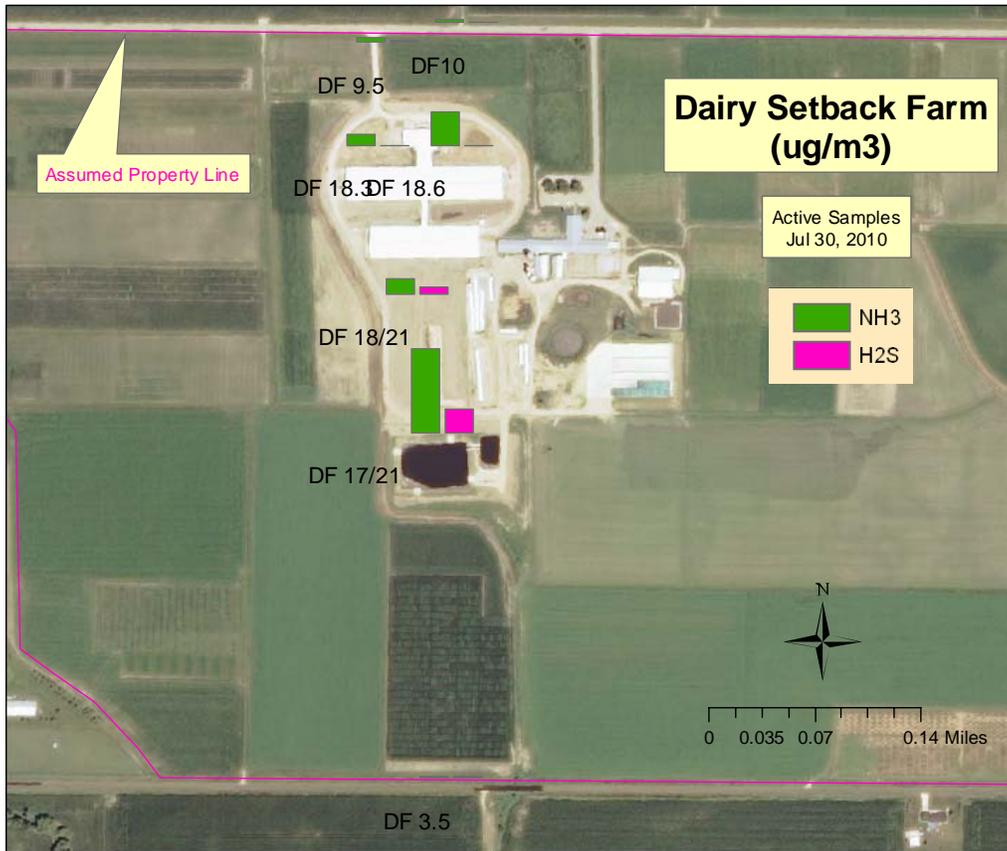
Figure D-VII: Active Sampling Results, July 14, 2010



Dairy Setback Active Sample Results 07/14/2010

Location	NH3	H2S
DF 17/21	68.4	32.8
DF 18.3	125.2	
DF 18.6	180.9	
DF 18/21	329.2	55.6
DF 3.5	<8.7	<5.6
DF 9.5	37.1	<6.1
DF10	54.2	<6.1

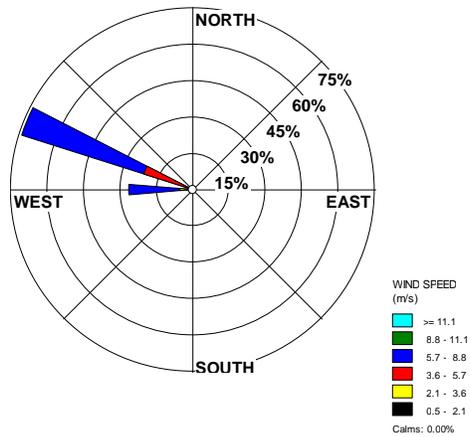
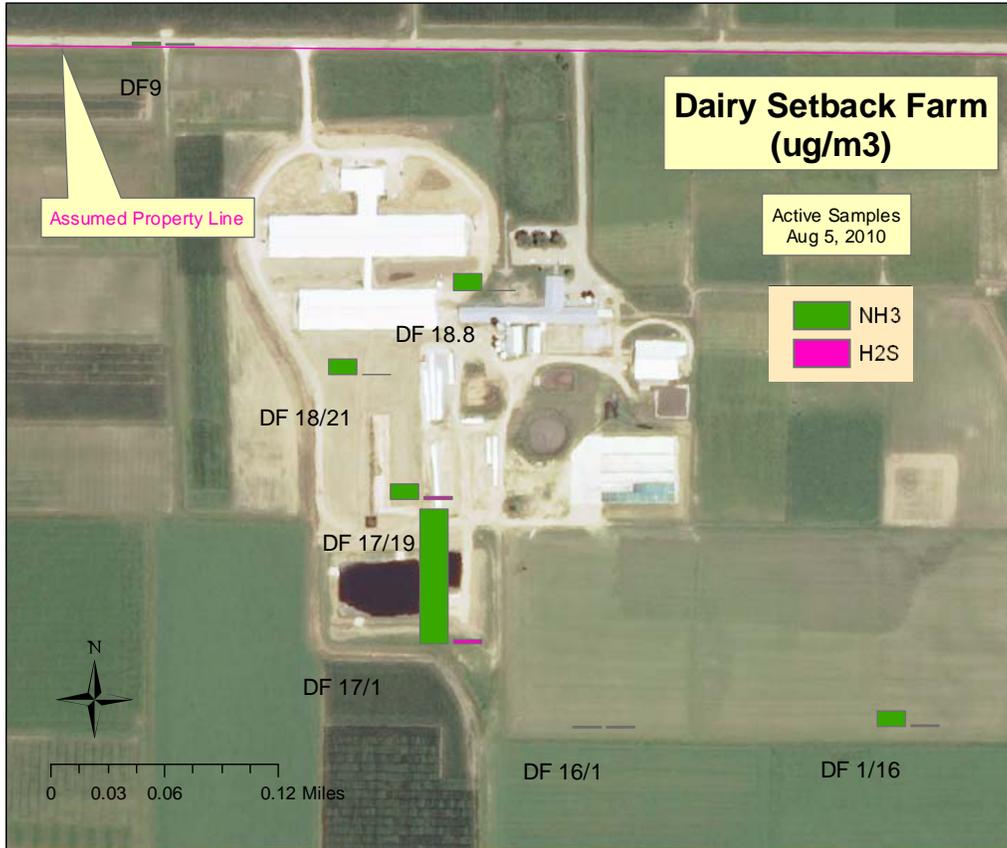
Figure D-VIII: Active Sampling Results, July 30, 2010



**Dairy Setback Active Sample Results
07/30/2010**

Location	NH3	H2S
DF 17/21	410.0	117.4
DF 18.3	52.9	
DF 18.6	163.1	
DF 18/21	77.7	38.6
DF 3.5	<9.2	<6.3
DF 9.5	24.2	<7.2
DF10	11.9	

Figure D-IX: Active Sampling Results, August 5, 2010



**Dairy Setback Active Sample Results
08/05/2010**

Location	NH3	H2S
DF 1/16	72.9	<6.0
DF 16/1	<9.4	<5.4
DF 17/1	662.8	16.3
DF 17/19	80.0	17.3
DF 18.8	87.1	
DF 18/21	79.2	
DF9	<7.6	<4.8