LEARNING ABOUT N MOVEMENT AND MANAGEMENT

Howard Brown

Director of **N**utrient **M**anagement and **E**nvironmental **S**tewardship

BACKGROUND

- Pre-Sidedress Nitrate Test (Magdoff, 1984)
- Late-Season Nitrate Test (Blackmer, 1989)
- In-season NO_3-N Test – **12" cores**
- Critical Conc. 6" Corn: **25 ppm NO_3-N**
- Allows for applied, losses, mineralized?
- Rec. System in Iowa (Pm1714)

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KIC 2025
Keep It for the Crop by 2025

BACKGROUND

- Plants utilize NO_3-N and NH_4-N
- NH_4-N is converted to NO_3-N (1-2 wks)
- Soils must be warm (microbially driven)
- Saturated soils promote denitrification
- Water percolation causes leaching
- Microbes can immobilize N

WHAT IS NEEDED

- Determine both NO_3 and NH_4-N over time to observe behavior in soil
  - Residual
  - Applied
  - Loss
  - Remaining

PURPOSE

- Inventory
- Track
- Verify
- Apply

N Management System

Licensed by Illinois Council for Best Management Practices

Only Management Tool

Not a Recommendation System

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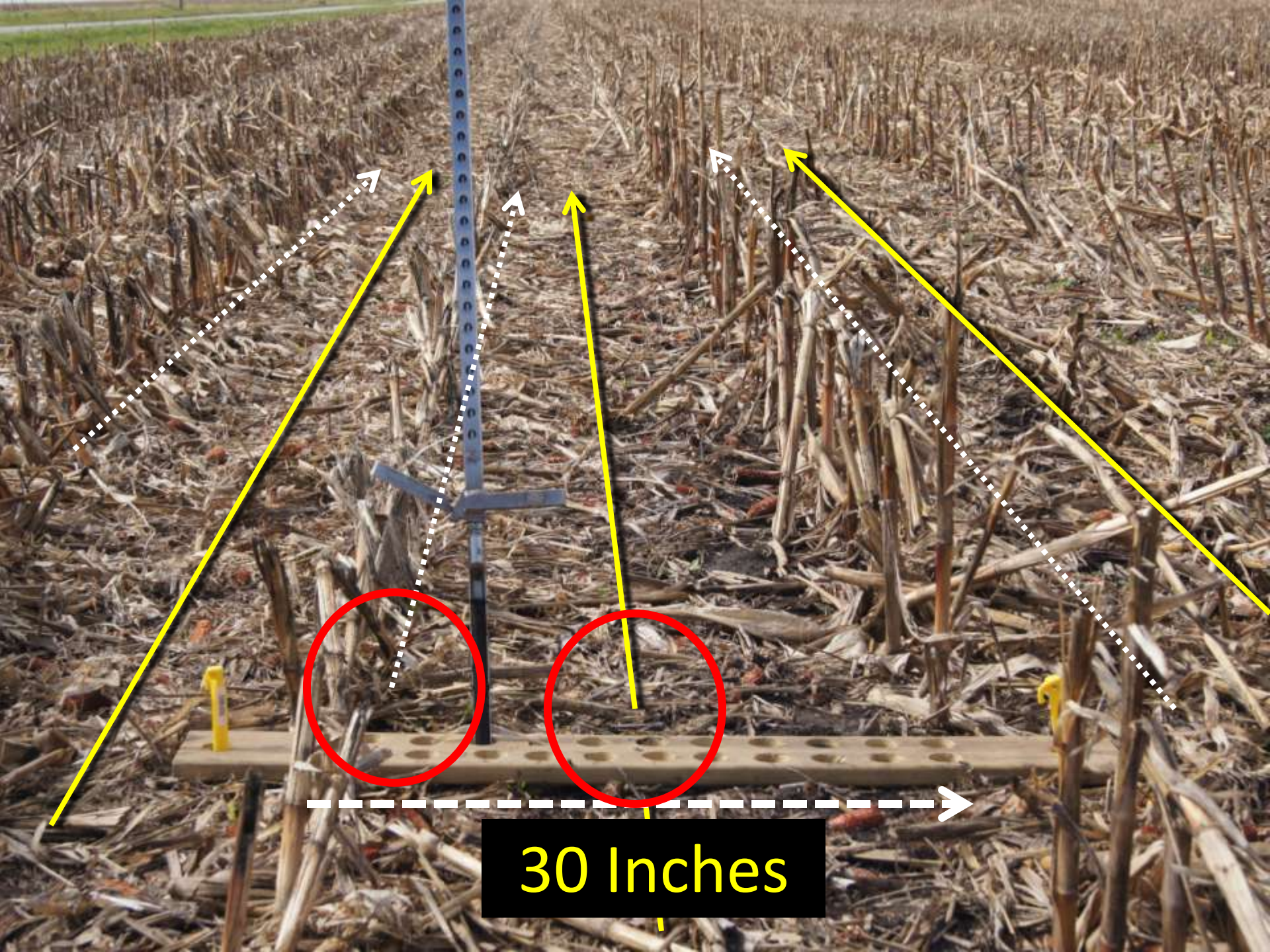
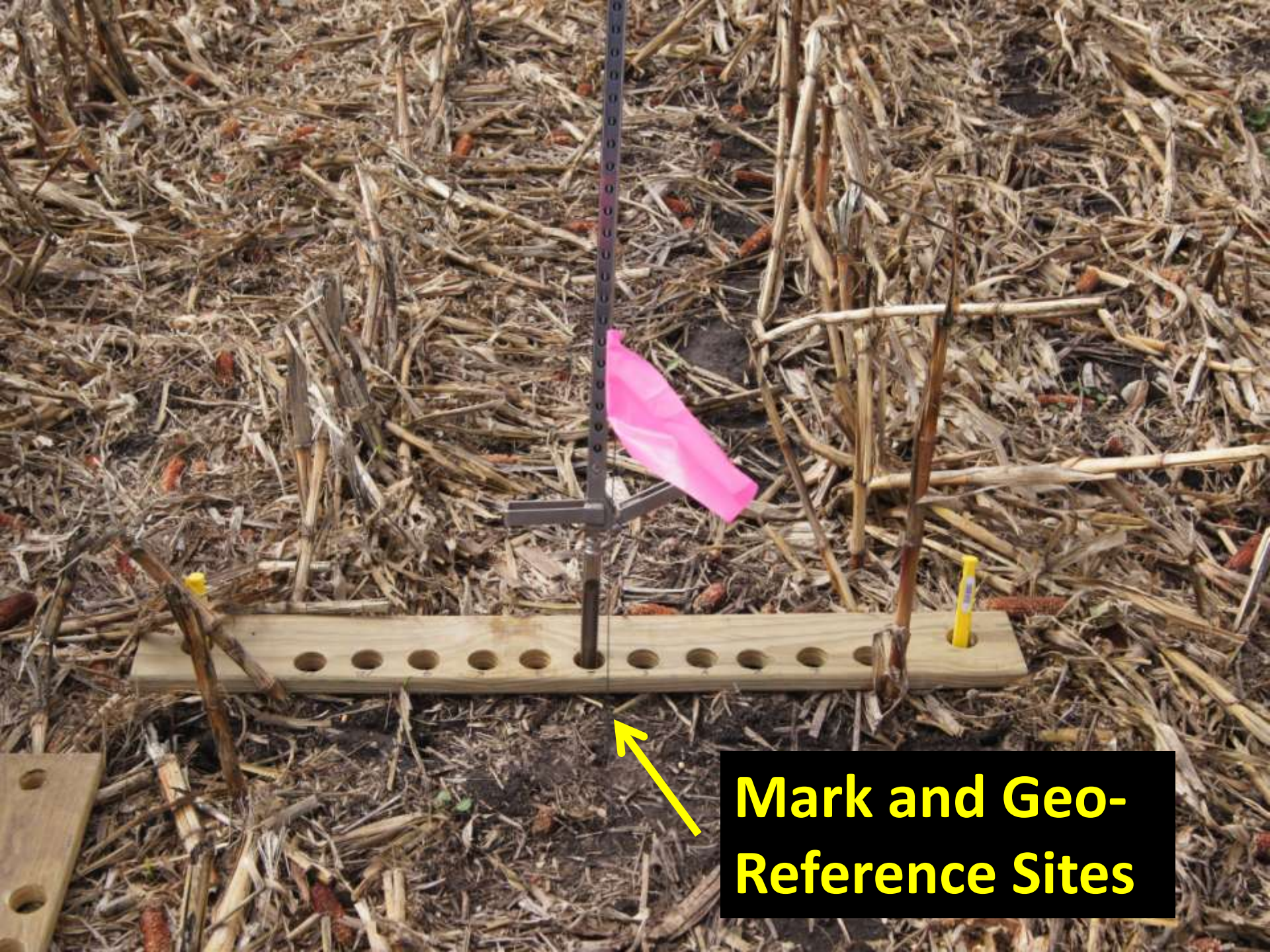

30 Inches


Notch For 12”


Mark for the
24” Depth


Mark and Geo-
Reference Sites

SOIL SAMPLER

COLLECTING THE SAMPLES

Banded Applications

- Collect 11 cores and thoroughly mix
- Submit subsample to lab
- Move template a few inches for next test
- Test every 3-4 weeks (or after heavy rain)
- Using 1 laboratory to simplify process

COLLECTING THE SAMPLES

Broadcast Applications

- Collect 4 - 5 random cores from 20 ft. area
- Place in sample bag and submit to lab
- Move a few inches from each hole for next test
- Test every 3-4 weeks (or after heavy rain)
- Using 1 laboratory to simplify process

NWATCH

FILL OUT FORM COMPLETELY BEFORE SUBMITTING

LOCATION SUBMITTAL FORM

Account No.	
Submitted by	Grower:
Address	
City/State/Zip	
Cell Phone	
E-Mail	
Sampling Date	**Longitude (required):**
Growth Stage of Crop	Rain (in) since last sampling:

Soil Type:

Drainage: ☐ Tiled ☐ Surface ☐ _____

Contact Information - Location

SAMPLES (nit… …monium NO_3NH_4)

Sample Depth	S… …ber r.)	Lab Number (Lab use only)
0 - 1 ft		
1 - 2 ft		

2

Sampling Instructions: Knifed N Applications:

1. Place the template perpendicular to N application.
2. Collect 12" soil cores from each of 11 holes (1 row).
3. Thoroughly mix in bucket.
4. Fill labelled sample bag with soil.
5. Discard remainin… …1-2 ft. sample
6. Mark site for retu…

22

Sampling Instructi… Applications:

1. Identify 20 ft. x 2… collection
2. Collect 4 random… .
3. Mark each sampl… sampling.
4. Place 4 soil cores in labelled sample bag.

Additional Information or Instructions

Ship soil samples and this **completed** from to:

A&L Greate Lakes Laboratories, Inc.

…

FIELD INFORMATION

2013 CROP (History)	Crop:	Harvest Yield:

AST YEAR'S N APPLICATIONS (only needed on first sampling date)

Date	N Source*	Placement	Rate N Applied	Stabilizer

Nutrient History

ILLAGE SINCE LAST TESTING DATE

Date	Type of Implement	Depth (in)	Direction (Relative to N)

Tillage Tracking

NITROGEN APPLIED SINCE LAST TESTING DATE

Date	N Source*	Placement	Rate N Applied	Stablizer

Appl. Tracking

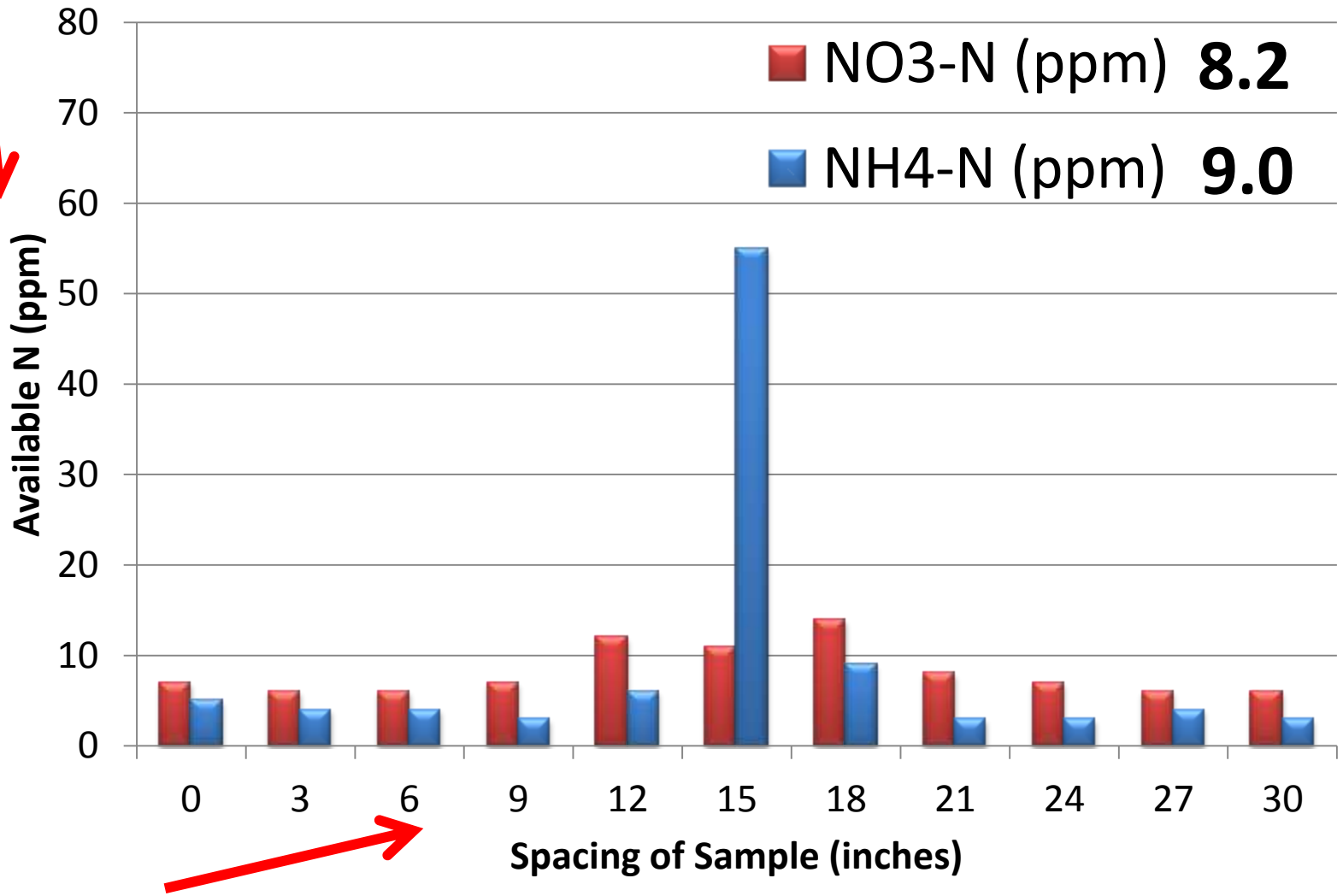
* Include manure (type). Rates are actual N, not product.

INVENTORY

- Used to show producers their N
- Is there any residual N?
- Where is the applied N?
- Is the N distribution even?
- Can you find any N from past applications?

Conc. of N in soil:

Surface

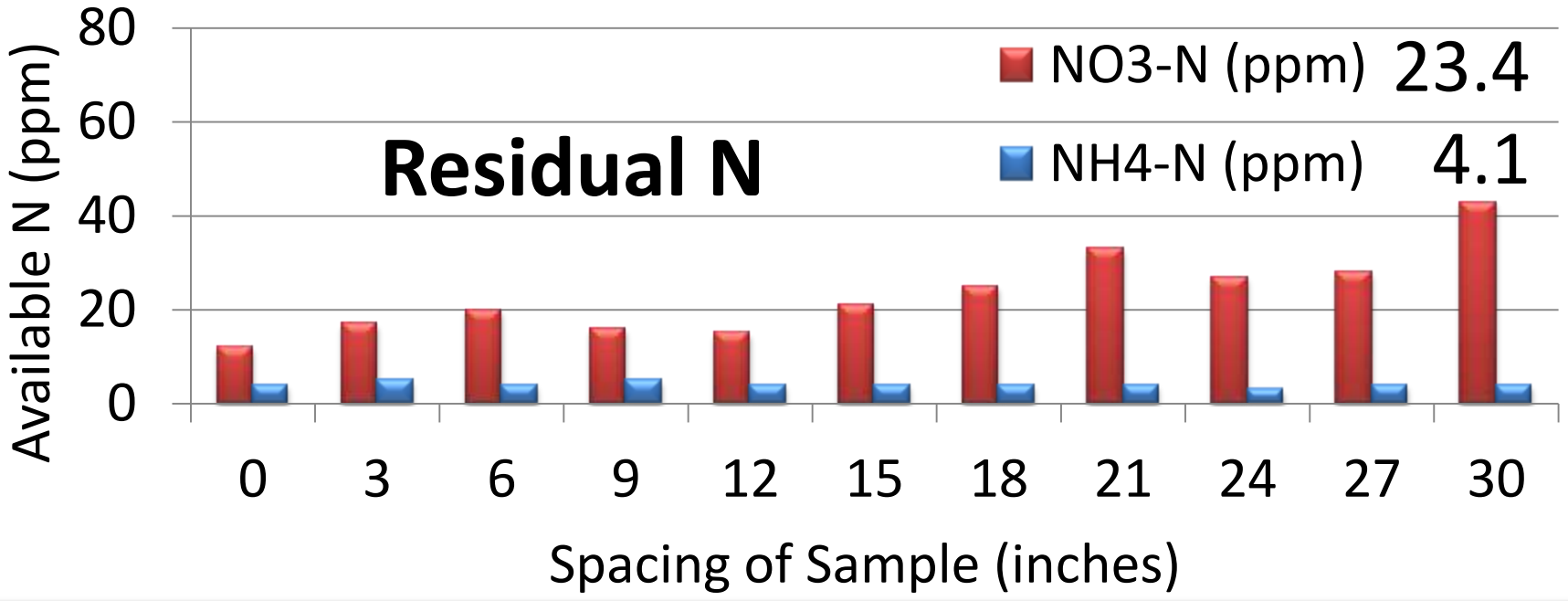


Distance across banded/injected N

Applied: None

Tested: 11/8/12

1’



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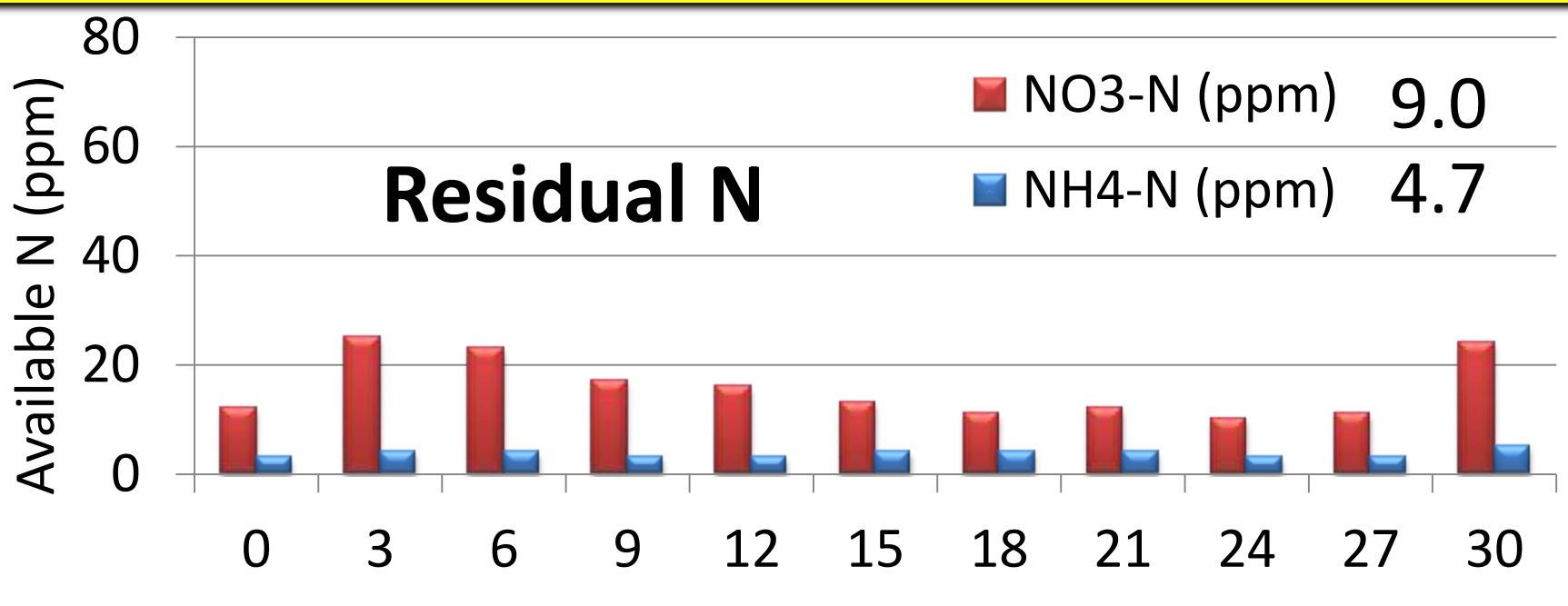
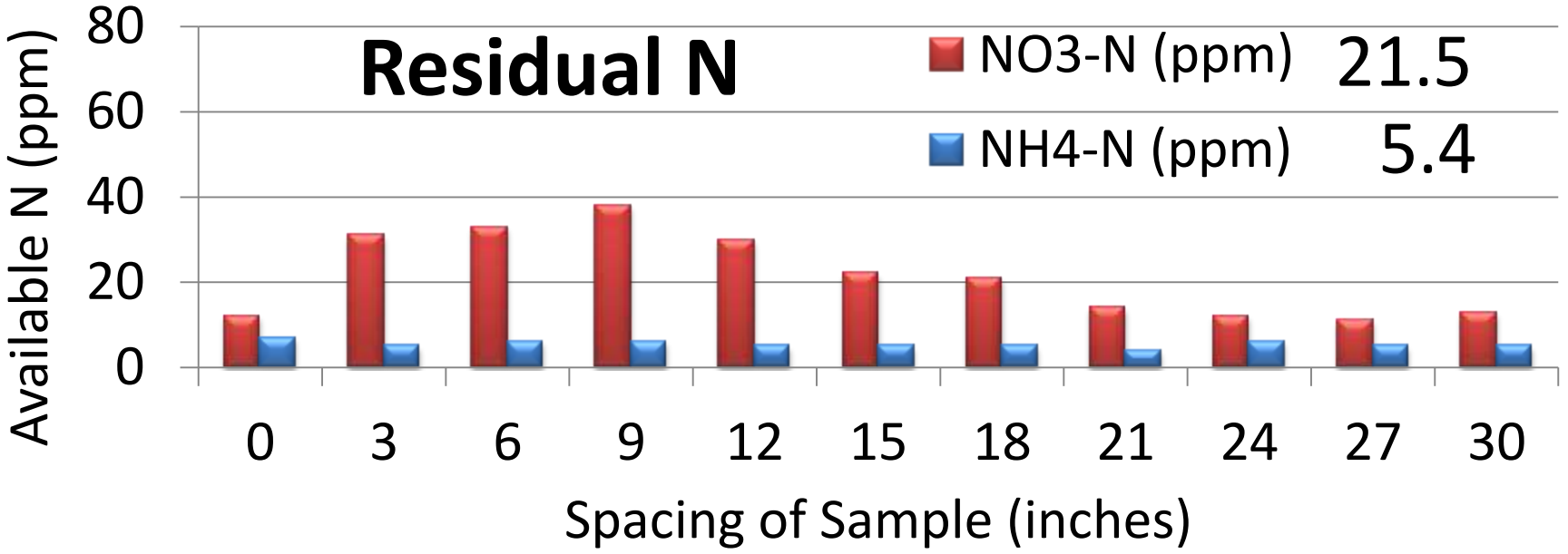


Applied: None

Tested: 10/17/12

1’



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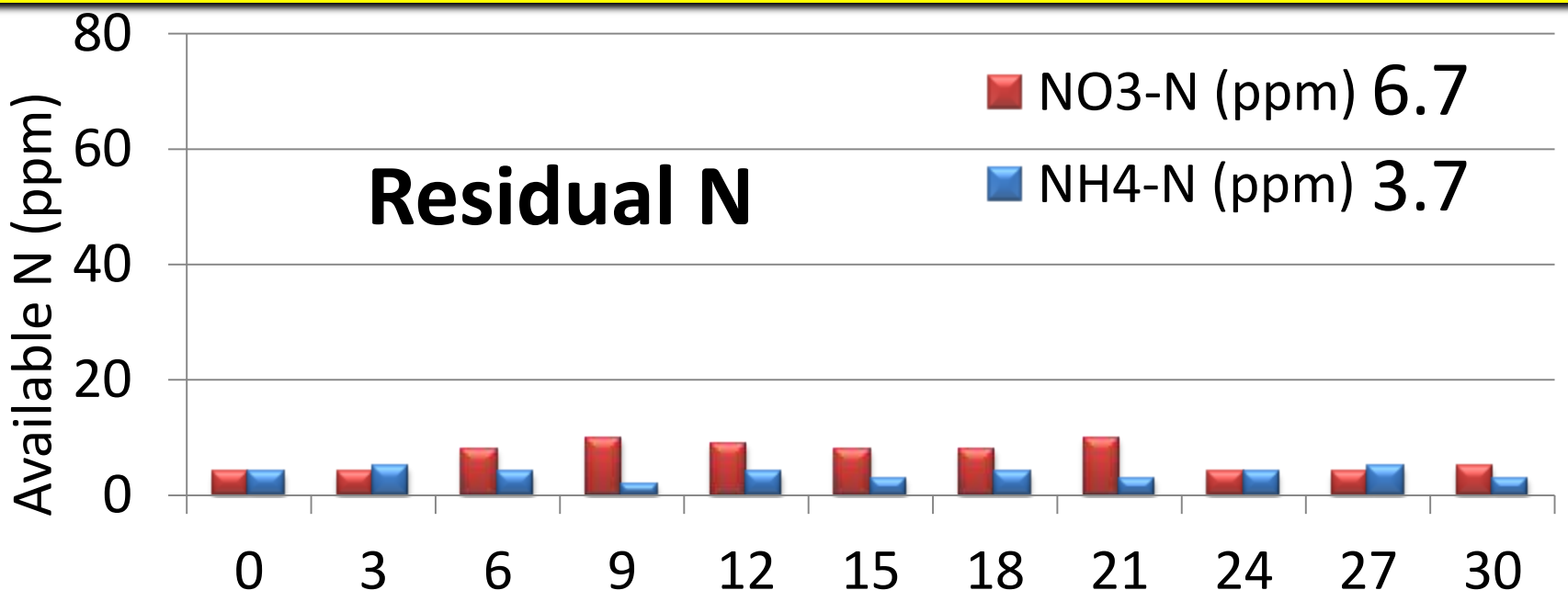
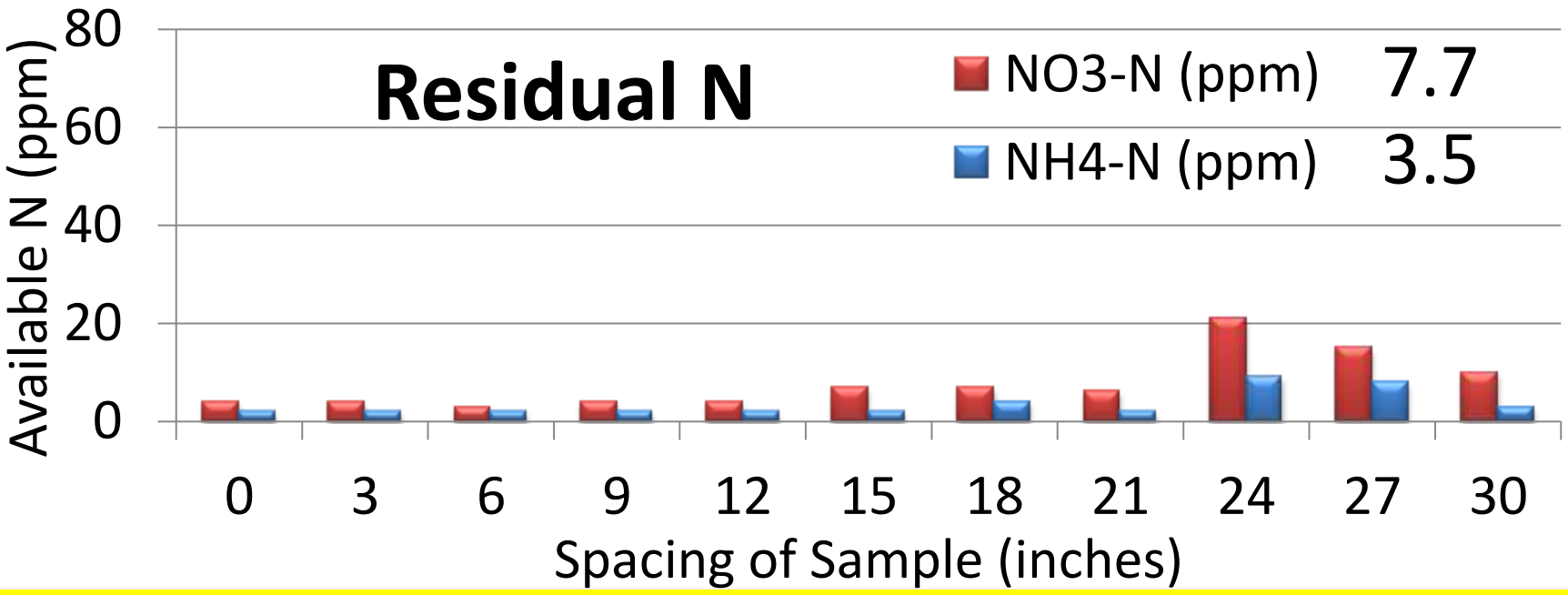


1’

Applied: None

Tested: 2/25/13



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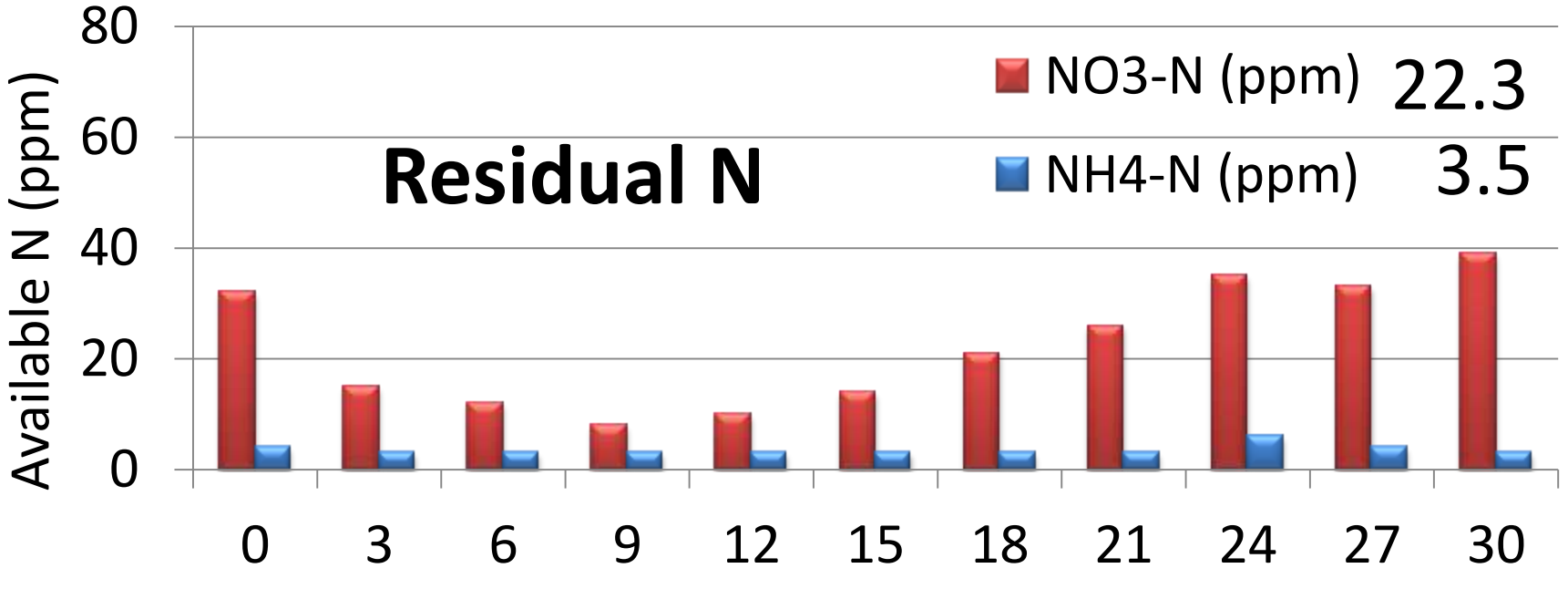
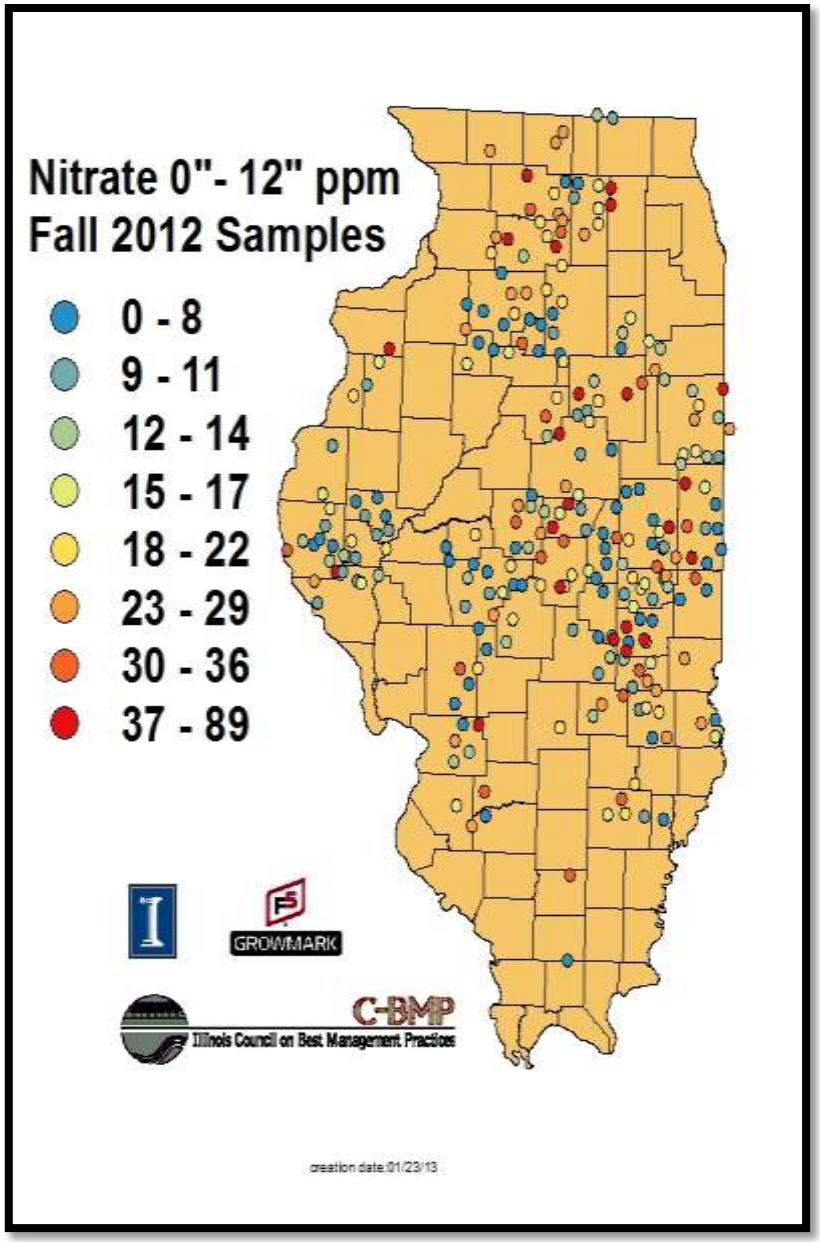


N WATCH

- What was left as a result of the drought?
- Learning more about applied N



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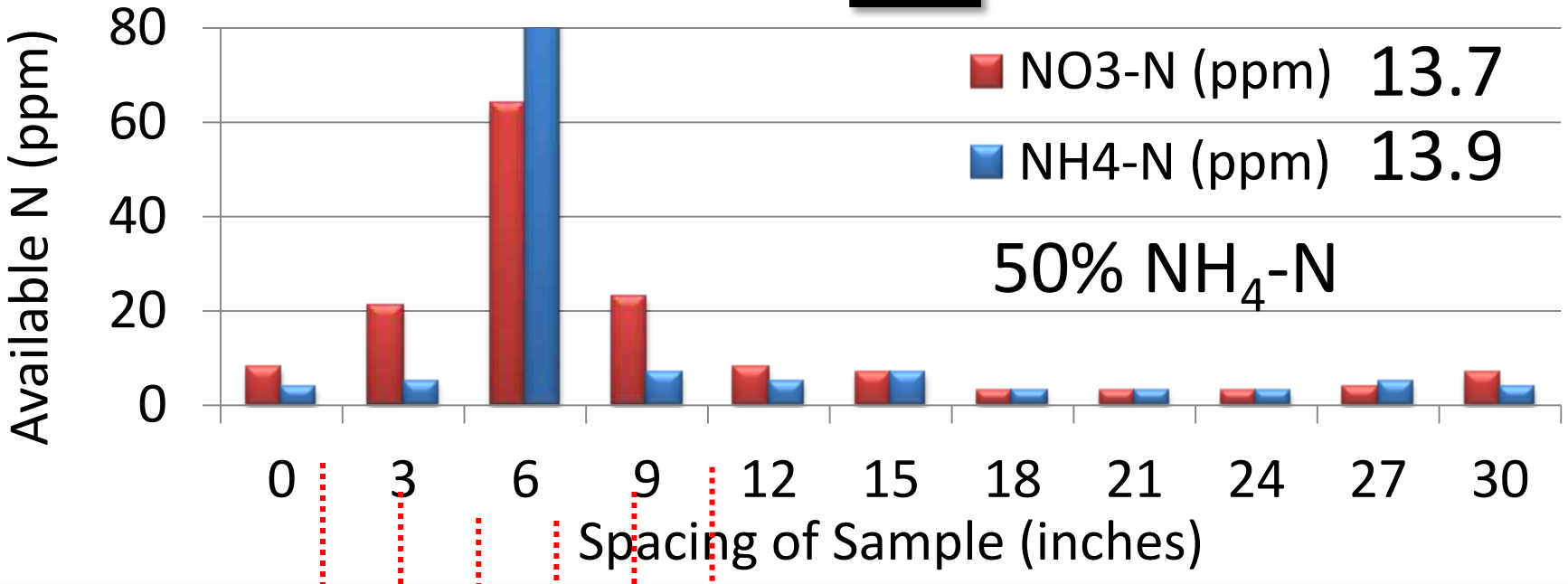
Keep It for the Crop by 2025

Applied: 100 lbs N – 11/10/12 N-Serve **Tested:** 4/2/13

1’



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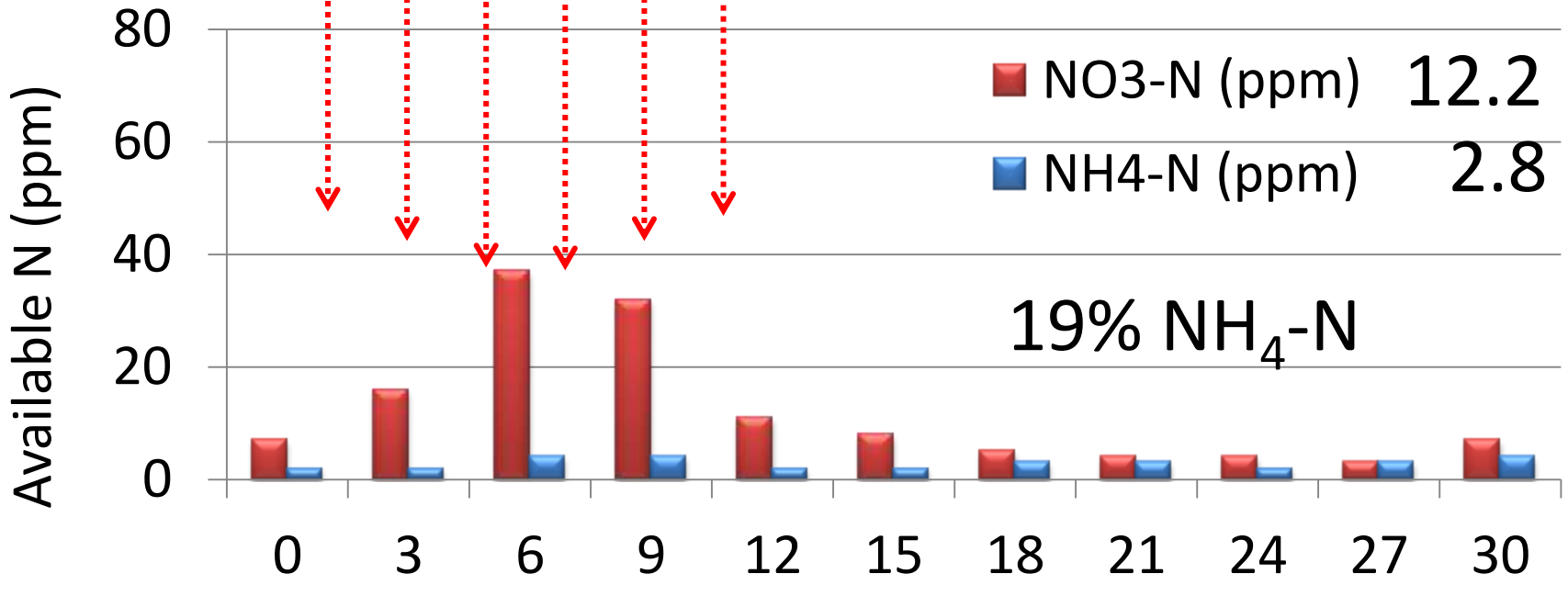
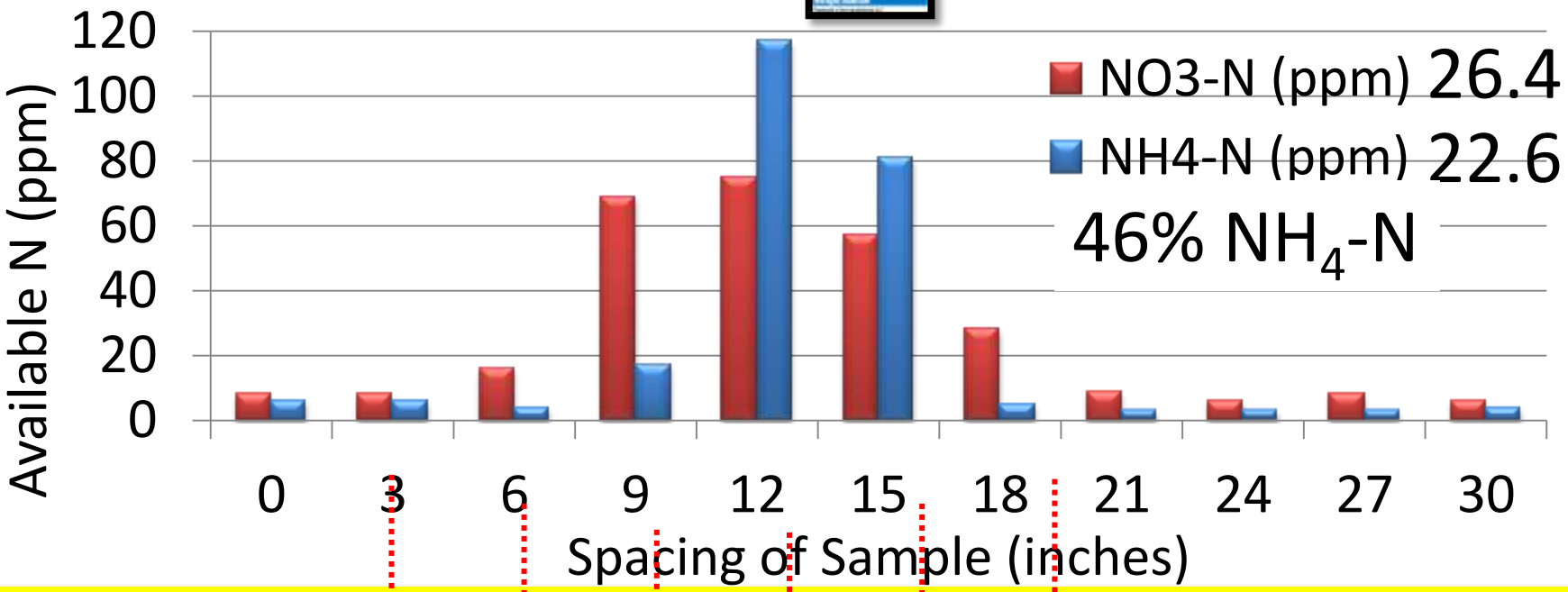


Applied: 150 lbs N – 11/6/12 N-Serve **Tested:** 5/2/14

1’



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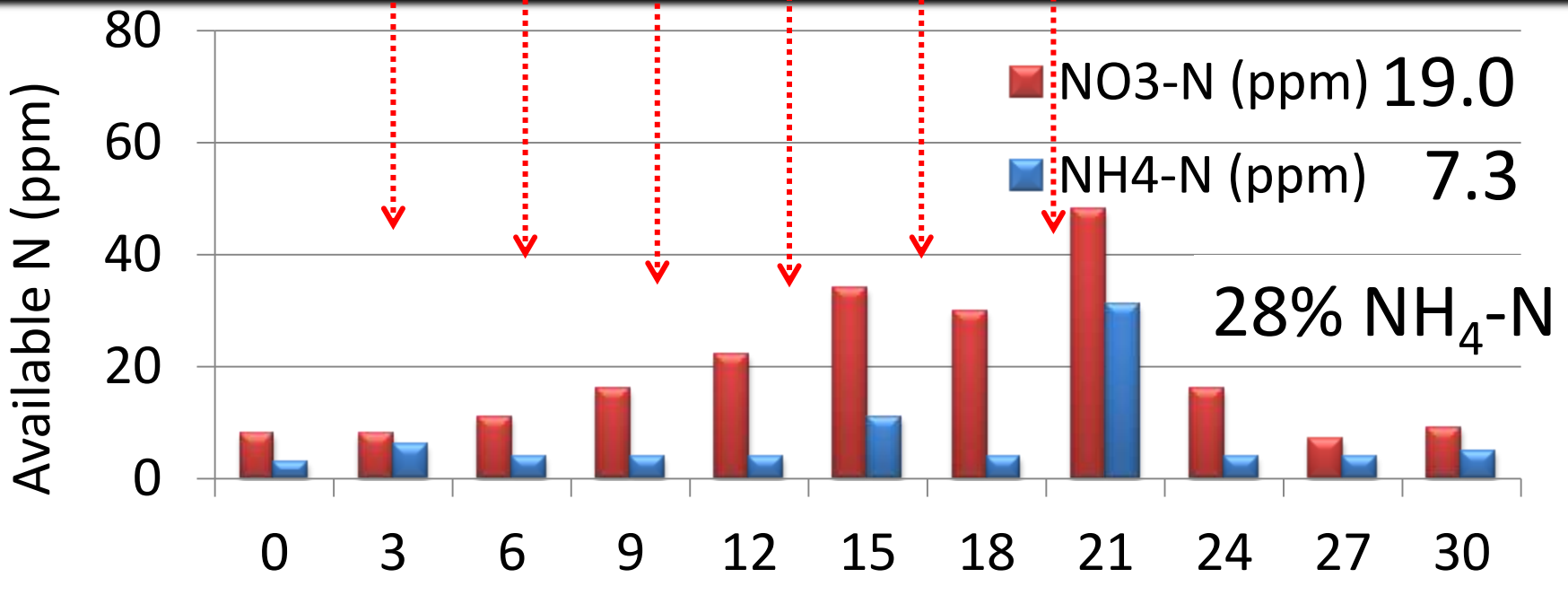
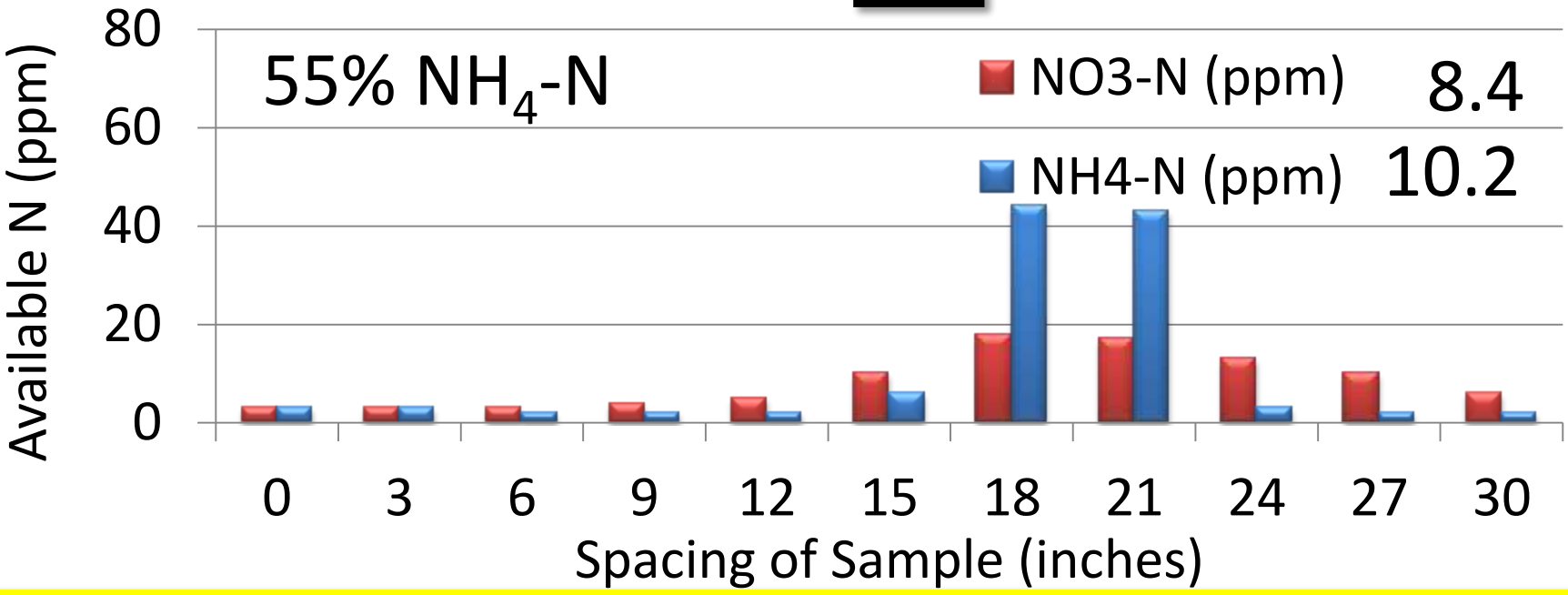


Applied: 165 lbs N – 11/12/12 **Tested:** 5/1/13

1’



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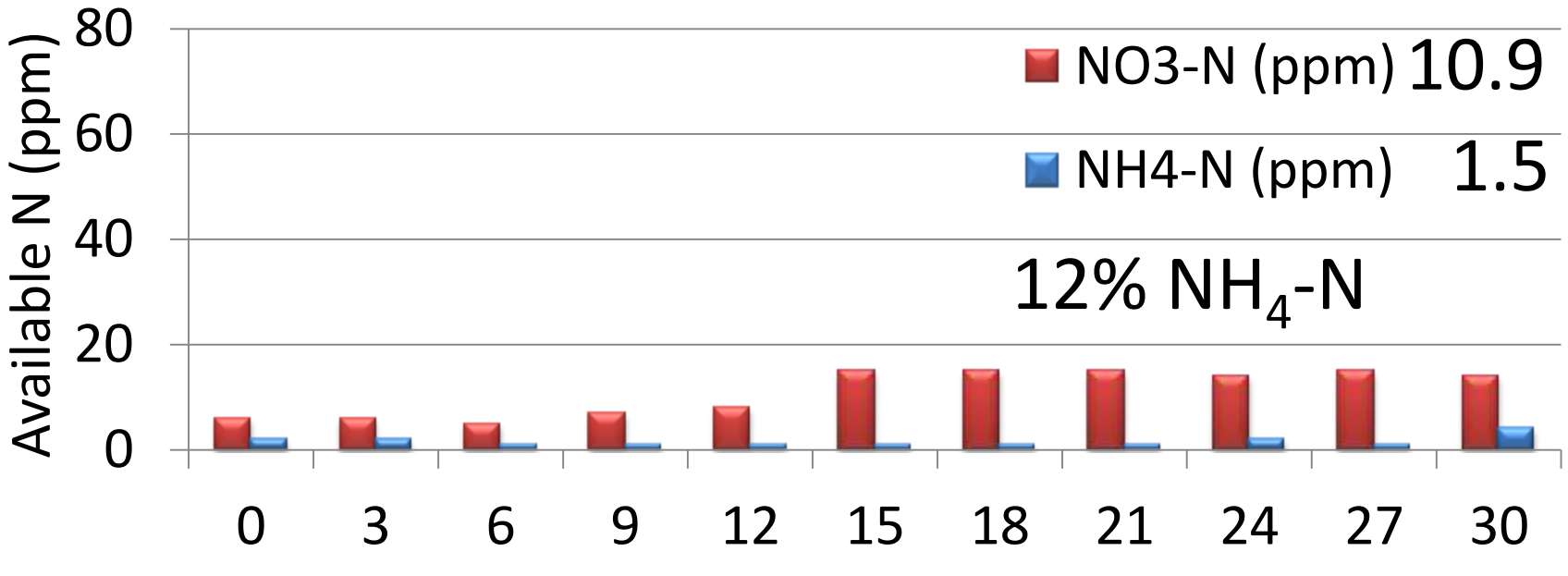
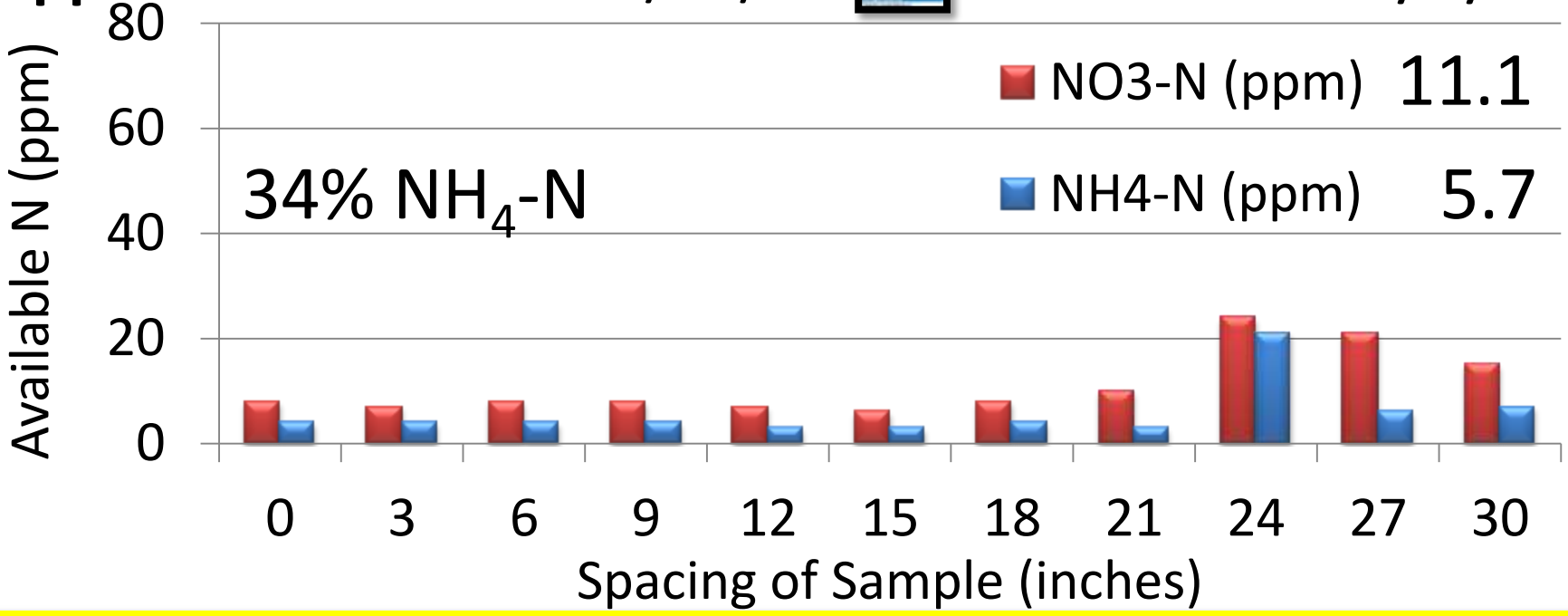
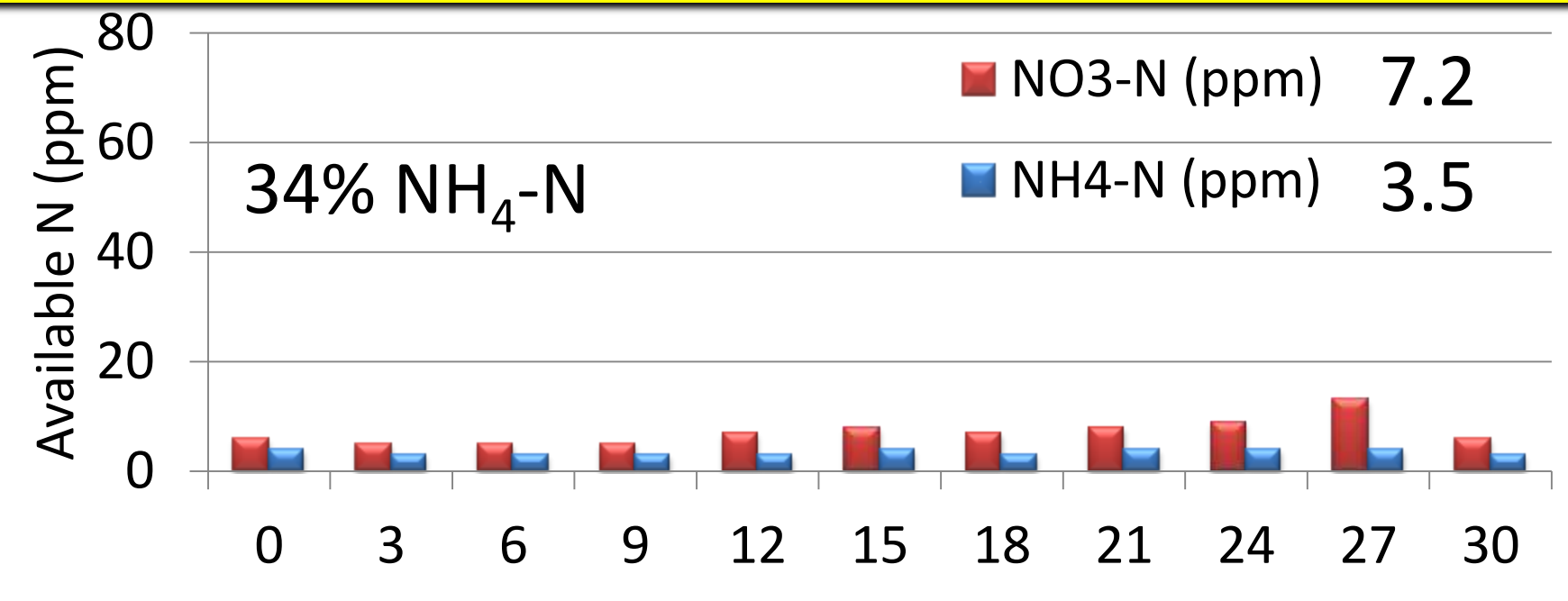


Applied: 164 lbs N – 11/10/12 

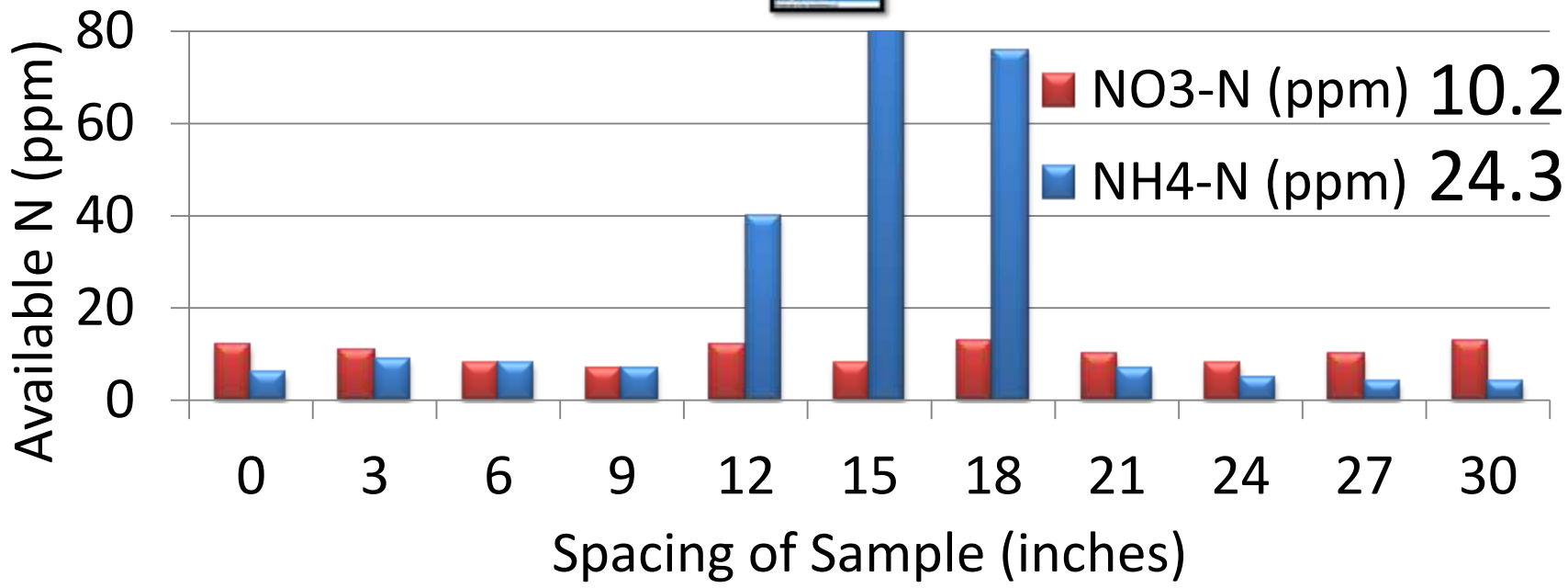
Tested: 4/5/14





Applied: 200 lbs N – 4/8/13 N-Serve **Tested:** 4/9/13

1’



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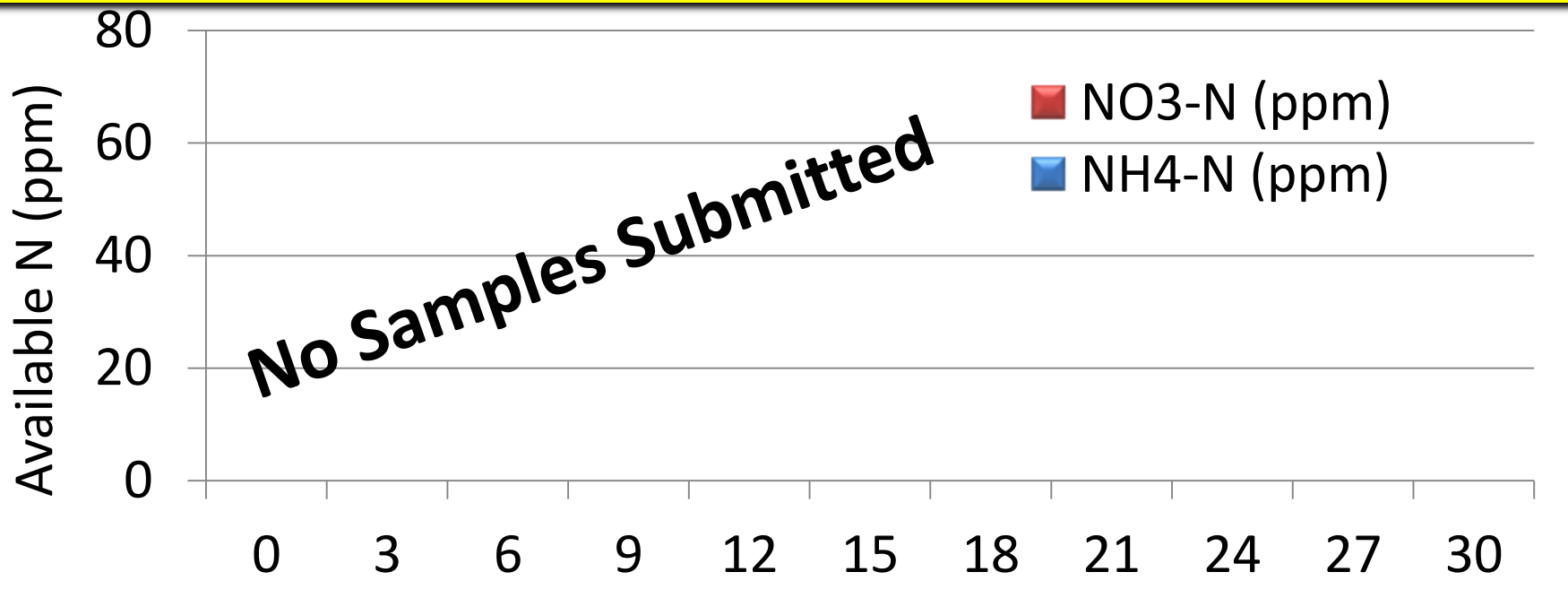
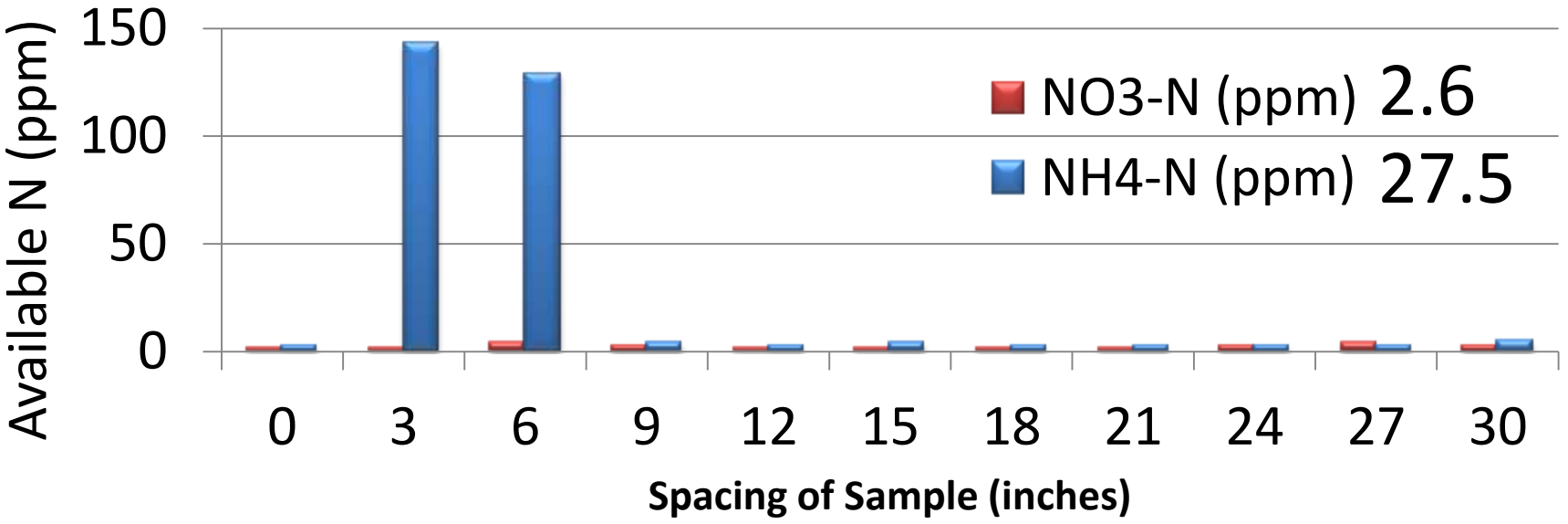


Applied: 200 lbs N – 4/7/13 **Tested:** 4/9/13

1’



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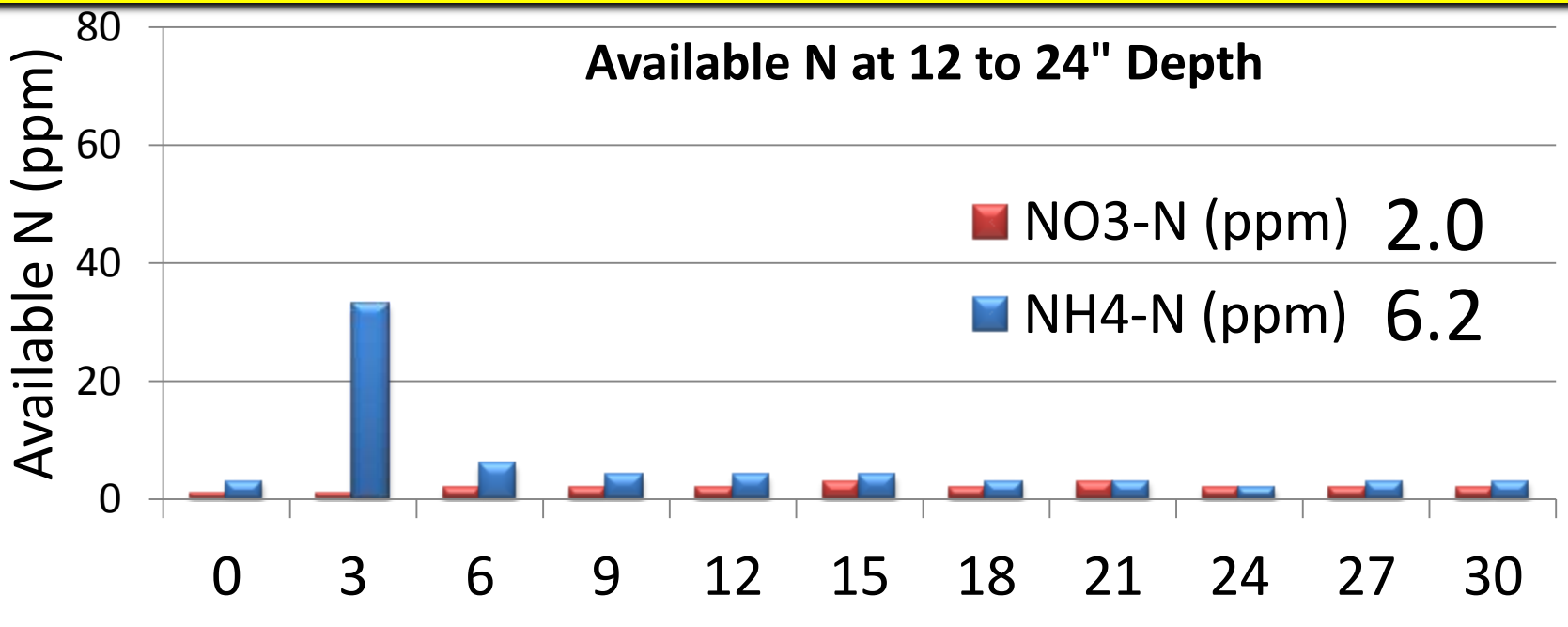
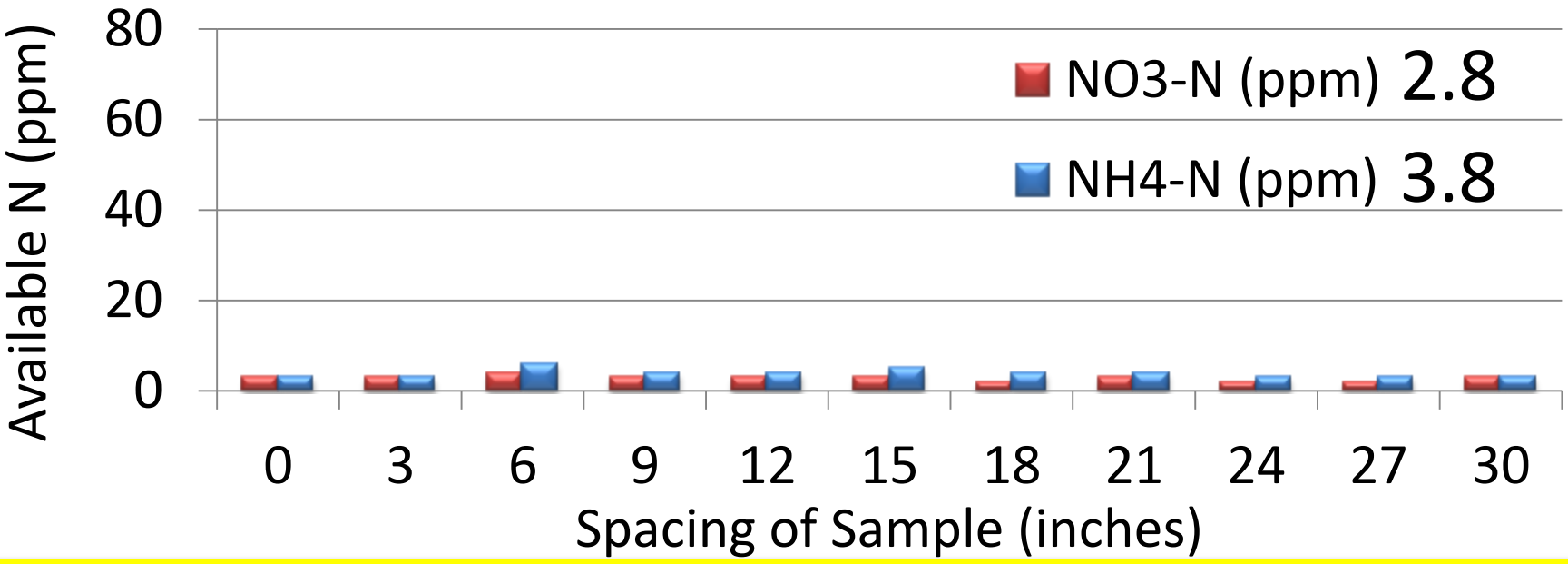


Applied: None (was Soybean) **Tested:** 10/29/12

1’



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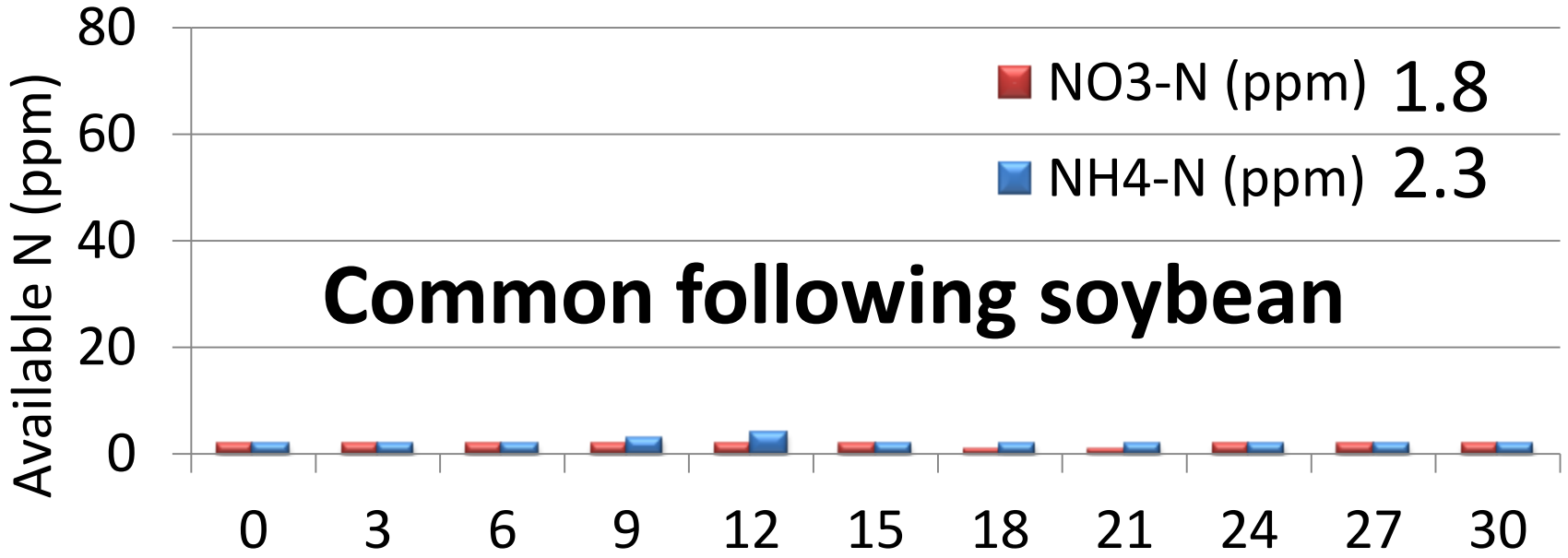
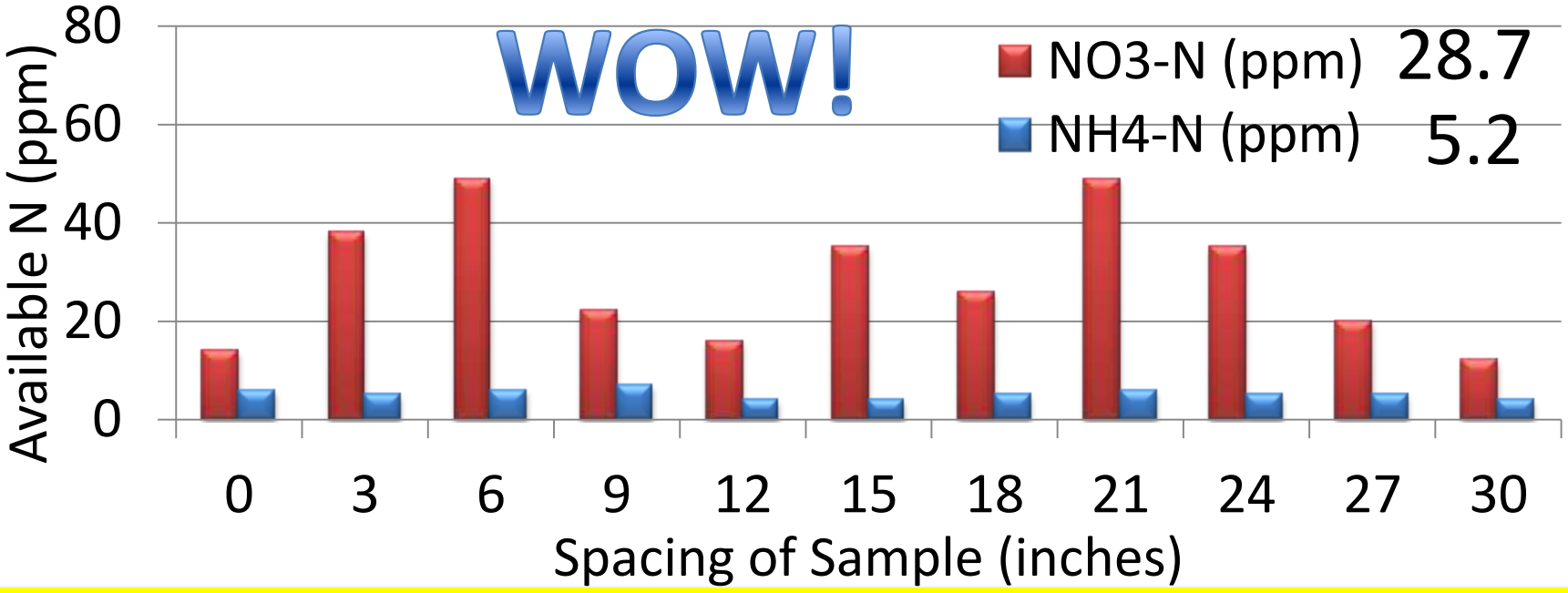


Applied: 180 lbs N: 11/4/12 N-Serve **Tested:** 4/5/13

1’



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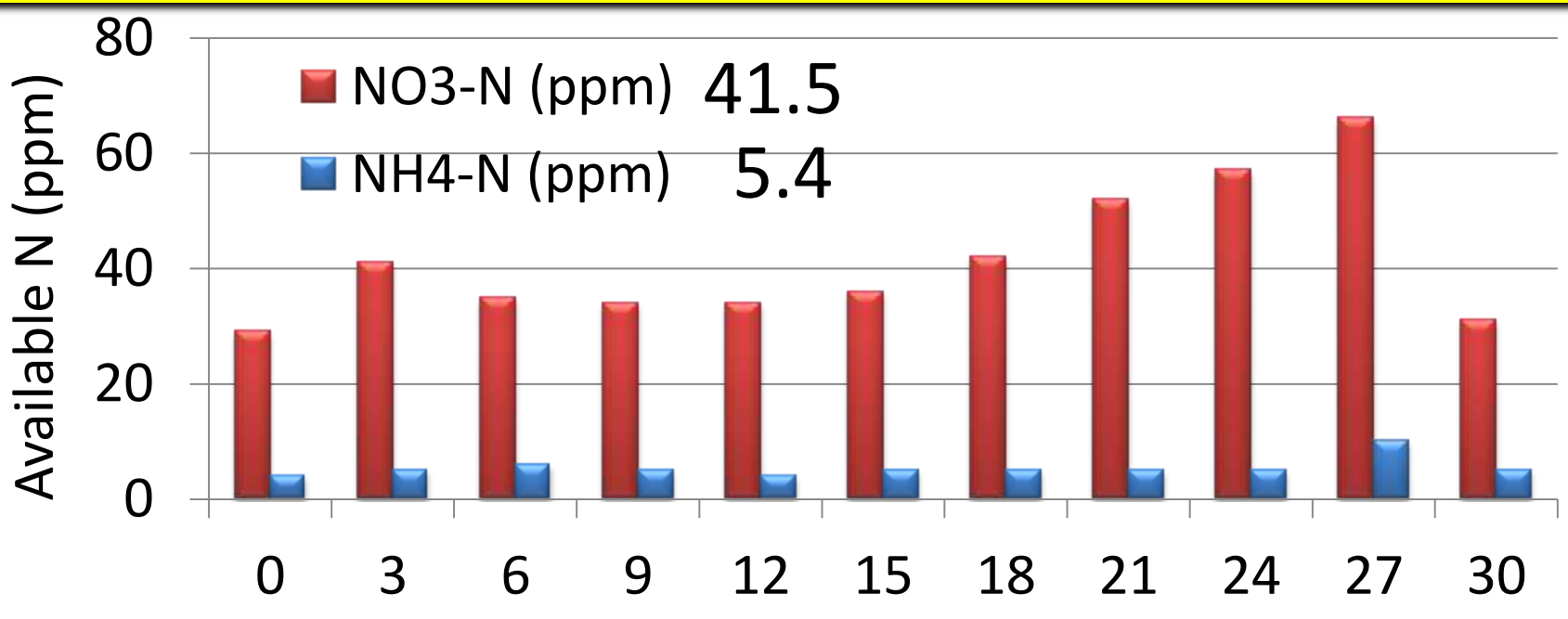

TRACKING

- What is left from Fall N applications?
- What form is it in?
- What influence is weather on available N?
- Is there enough N for optimum yield?

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April 28, 2013

Residual Nitrogen Inventory

NWATCH™

SAMPLE ID	LAB NUMBER	NITRATE NO_3-N ppm	AMMONIUM NH_4-N ppm
1SUR	47925	7	3
1SUB	47926	13	10

May 23, 2013

Residual Nitrogen Inventory

NWATCH™

SAMPLE ID	LAB NUMBER	NITRATE NO_3-N ppm	AMMONIUM NH_4-N ppm
SURF1	21285	16	7
SUB1	21286	11	4

June 3, 2013

Residual Nitrogen Inventory

NWATCH™

SAMPLE ID	LAB NUMBER	NITRATE NO_3-N ppm	AMMONIUM NH_4-N ppm
1-SURF	34615	12	2
1-SUB	34616	10	2

June 14, 2013

Residual Nitrogen Inventory

NWATCH™

SAMPLE ID	LAB NUMBER	NITRATE NO_3-N ppm	AMMONIUM NH_4-N ppm
1SURF	56814	18	5
1AUB	56815	9	2

July 1, 2013

Residual Nitrogen Inventory

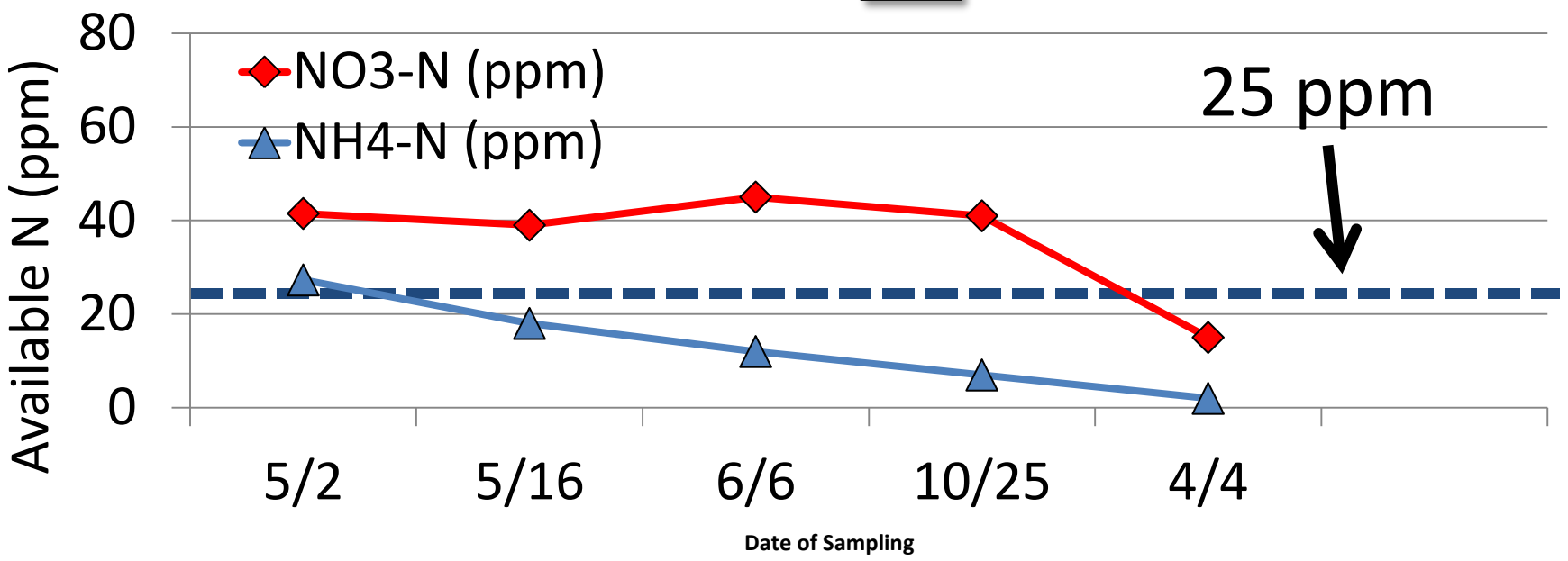
SAMPLE ID	LAB NUMBER	NITRATE NO_3-N ppm	AMMONIUM NH_4-N ppm
1-SURF	2755	15	5
1-SUB	2756	11	6

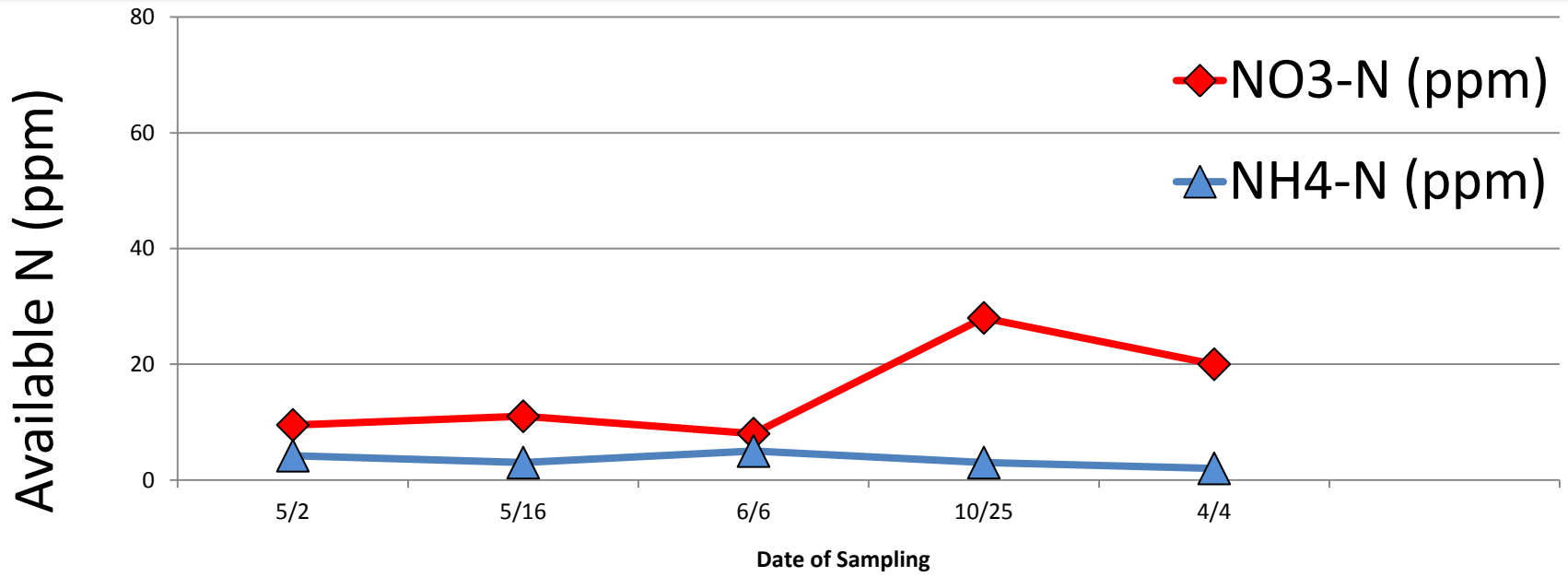
July 21, 2013

Residual Nitrogen Inventory

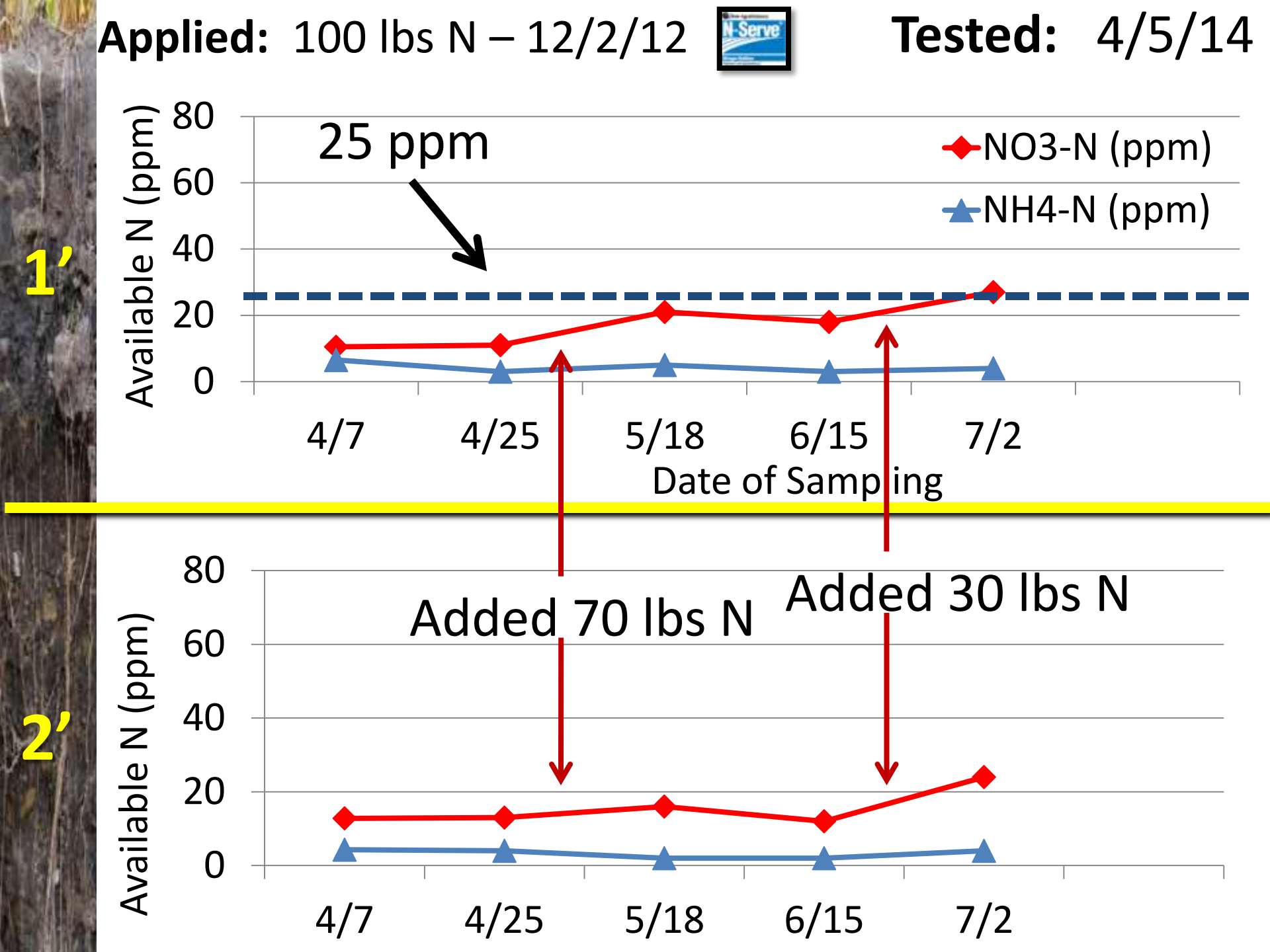
SAMPLE ID	LAB NUMBER	NITRATE NO_3-N ppm	AMMONIUM NH_4-N ppm
1-SURF	28274	24	6
1-SUB	28275	10	5

Applied: 150 lbs N – 11/16/12



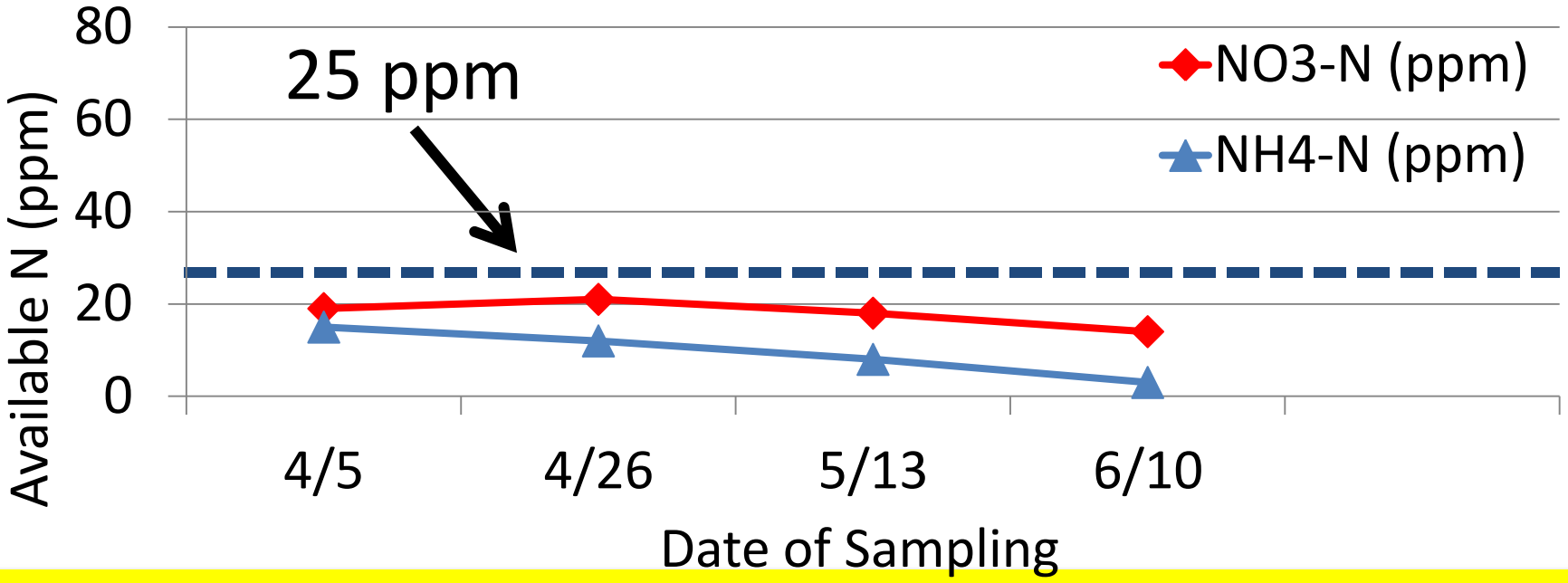


Applied: 100 lbs N – 12/2/12 **Tested:** 4/5/14



Applied: 180 lbs N – 11/4/12 N-Serve **Tested:** 4/5/13

1’



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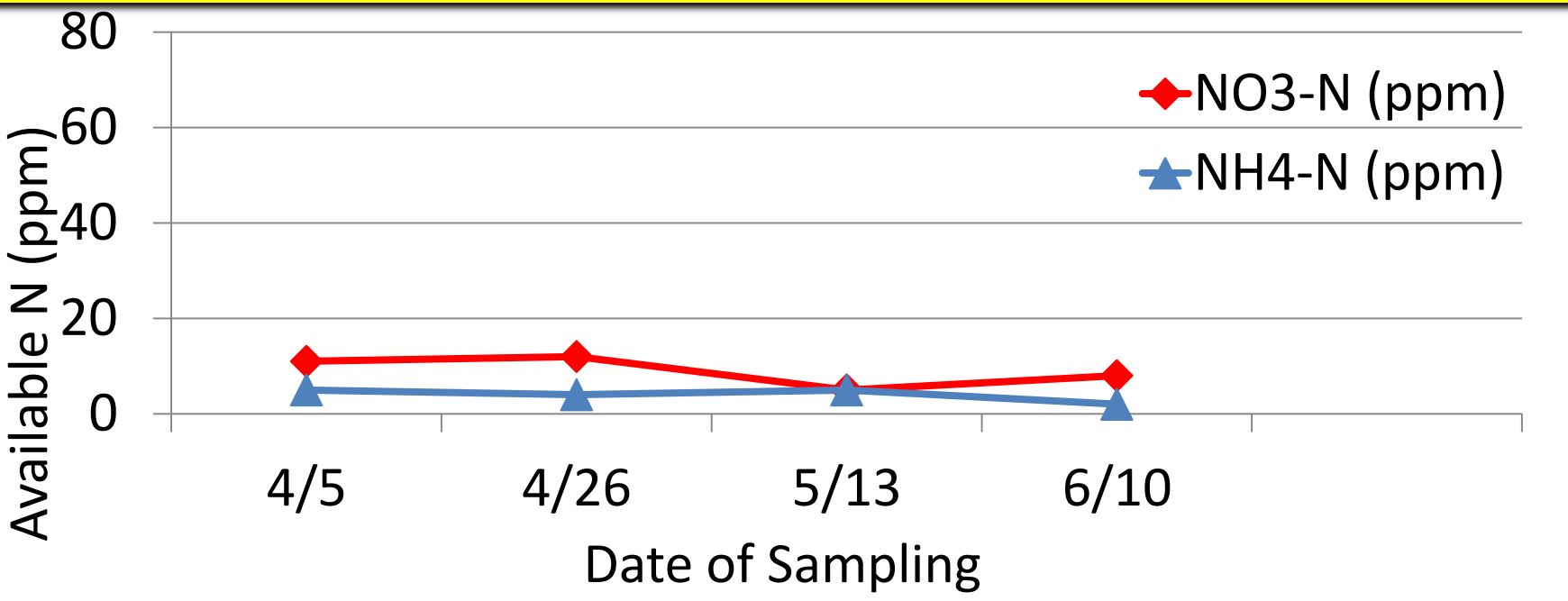
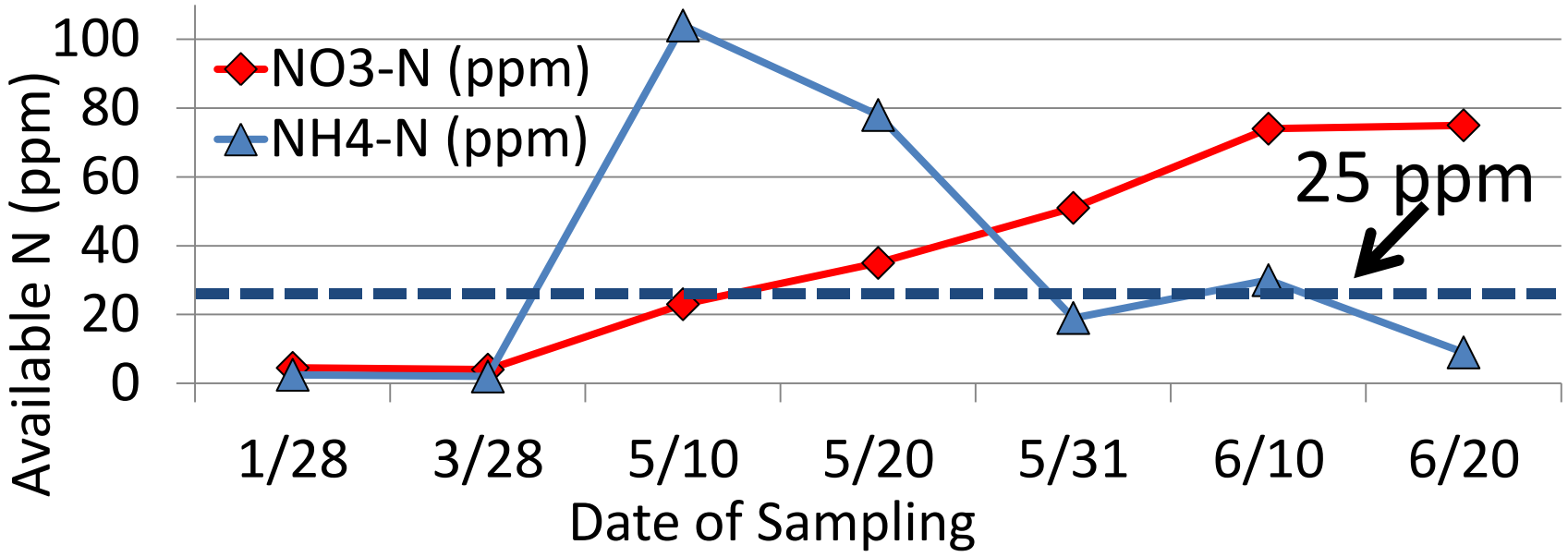
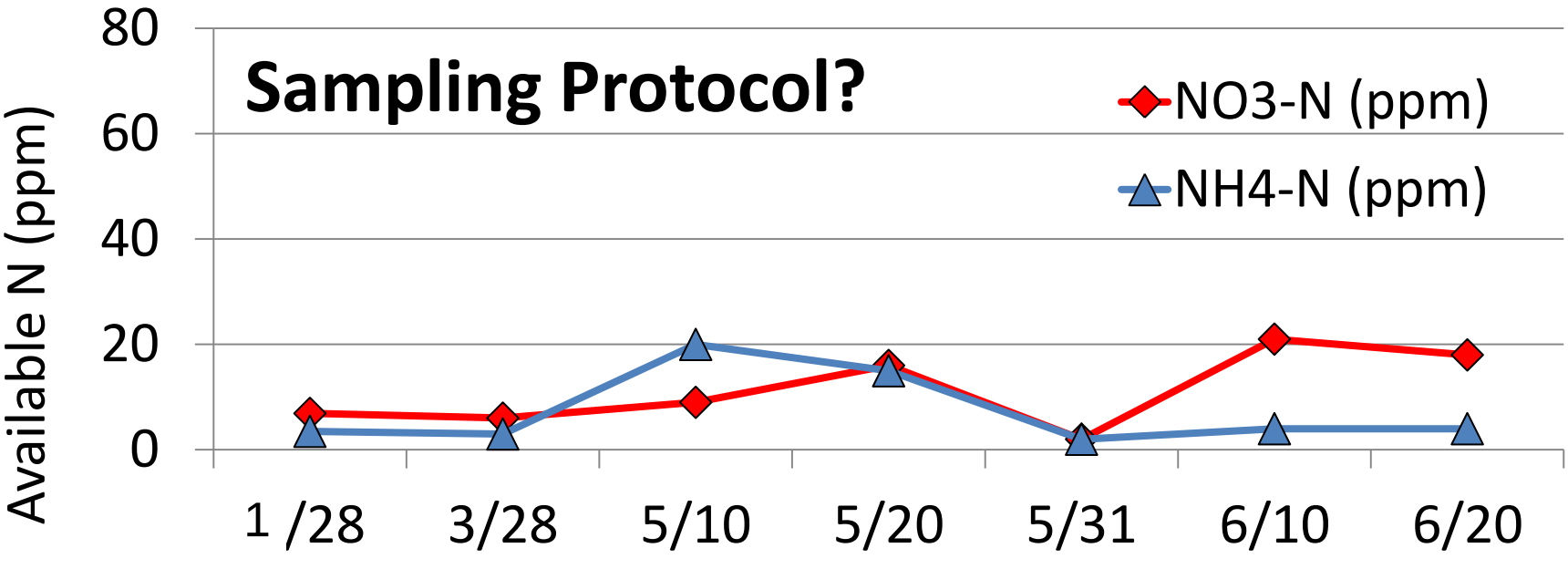
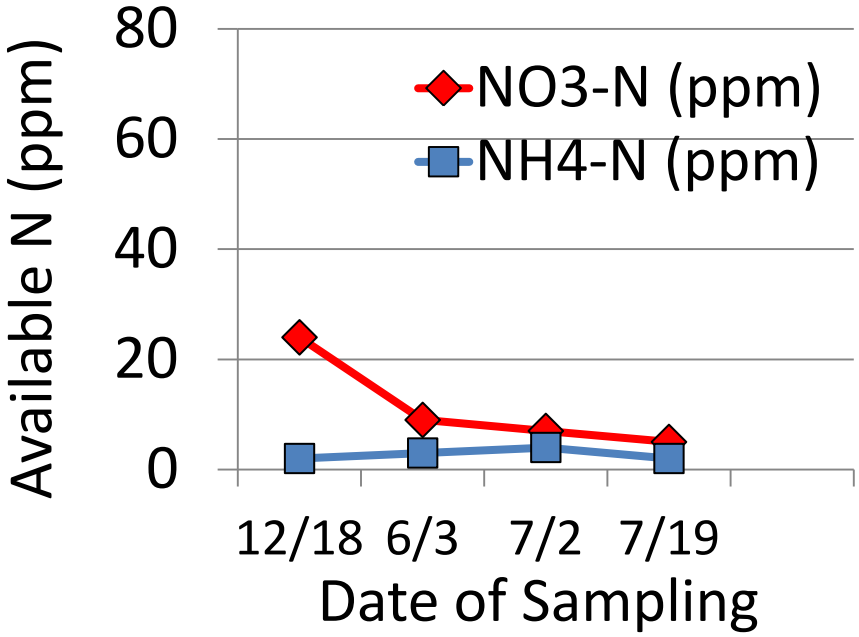


Applied: 175 lbs N – 4/6/13

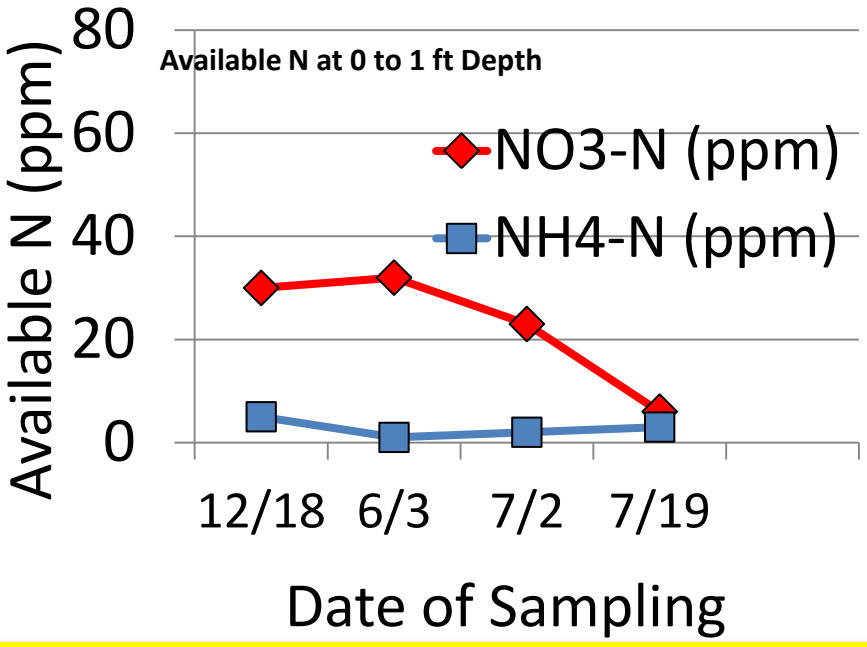


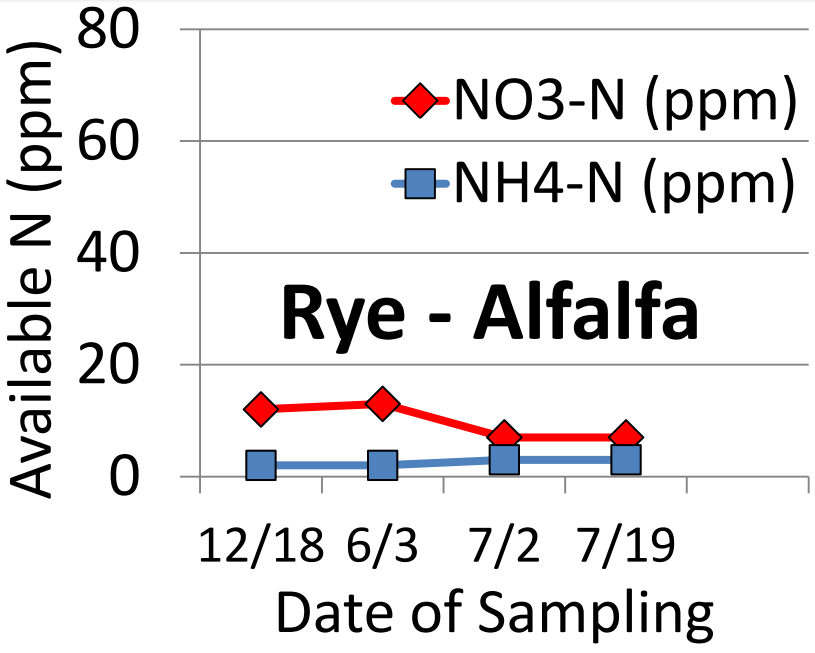


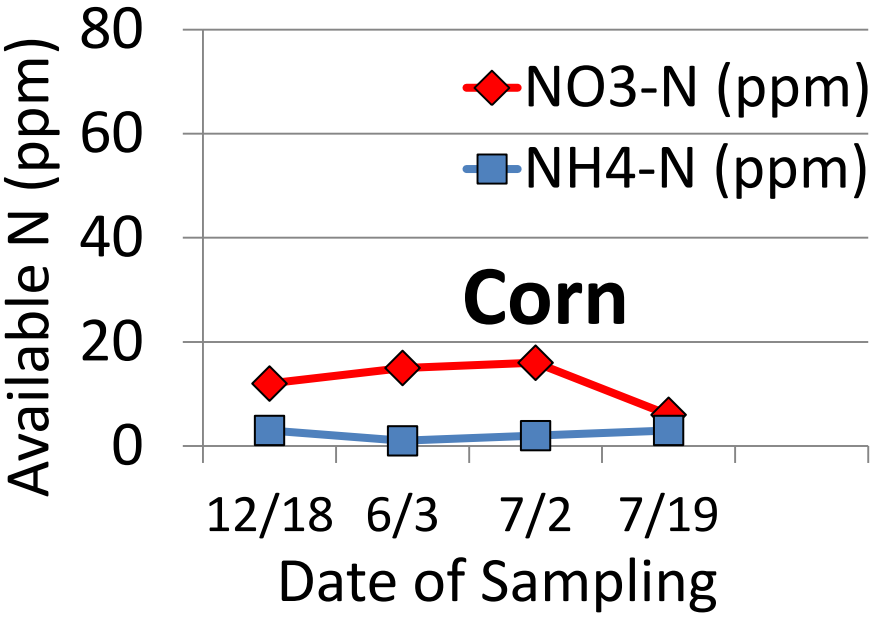
Applied: 5000 gal Dairy



Applied: 10,000 gal Dairy

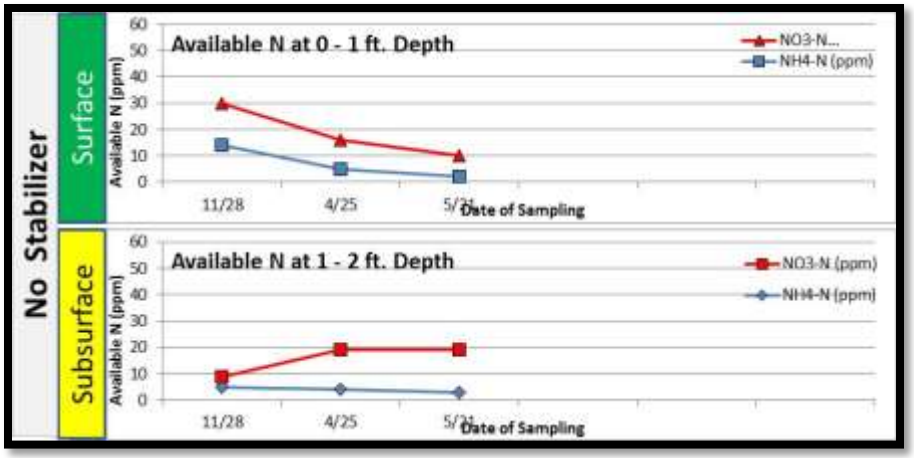


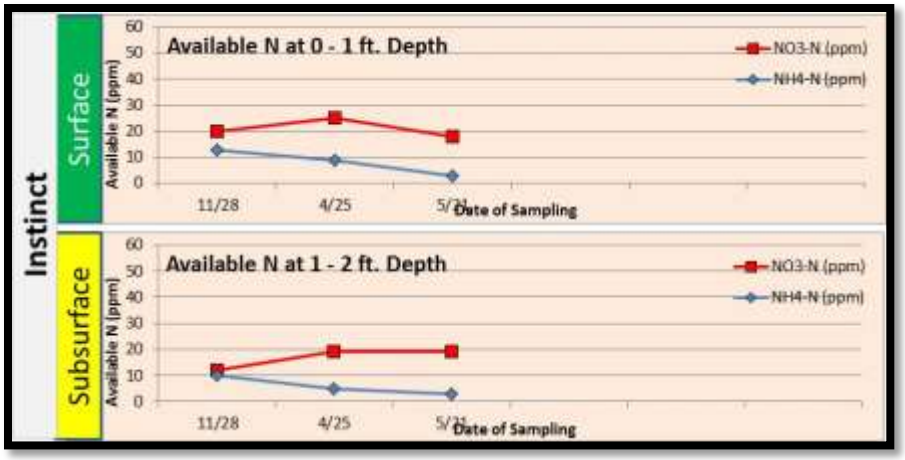




OTHER N-WATCH COMPARISONS

- With and Without N-Serve
- With and Without Cover Crop
- Fall N vs. Spring N
- Fall N vs. Fall + Spring + Sidedress N





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SIMPLE TO PARTICIPATE

- Call CBMP or GROWMARK
  - UPS Address
  - Number of testing sites
  - Type of probe needed (Cost)
- Will receive boxes, return labels, bags, and submittal forms
- Box-up samples and submit

A&L Great Lakes Laboratories

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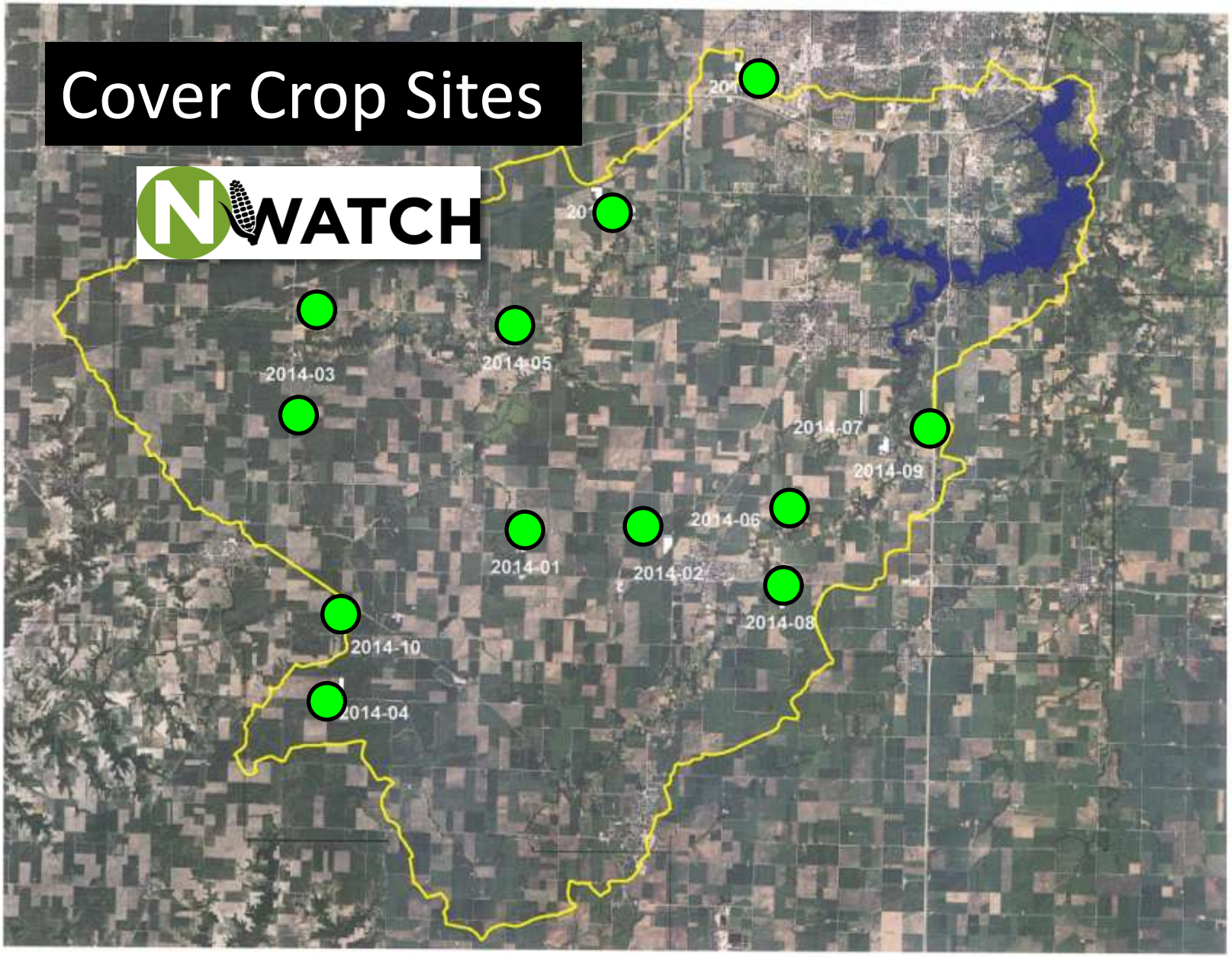
Cover Crop Sites



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Keep It for the Crop by 2025

NITROGEN NINJAS

- Explain the N Cycle
- Aware of local environ. concerns
- Explain point-source issues
- Promote N Mgt. Systems
- Utilize Enhancements and 4Rs
- All there is to know about N

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Keep It for the Crop by 2025

MOM

Minimize Environmental Impact
Optimize Harvest Yield
Maximize Input Utilization

NITROGEN MANAGEMENT SYSTEM

Own Our Message

N WATCH

N Management System

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WHAT THE FUTURE BRINGS

- Improvement in harvest yields
- Improved N use efficiency
- Improvement in water quality

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KIC 2025
Keep It for the Crop by 2025

"Crop production, environmental protection both achievable."