

Pushing the Limits: Sprigging Bermudagrass North of Chicago

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Pushing the Limits: Sprigging Bermudagrass North of Chicago

ZACH SIMONS

DIRECTOR OF GROUNDS AND
SPORTS TURF

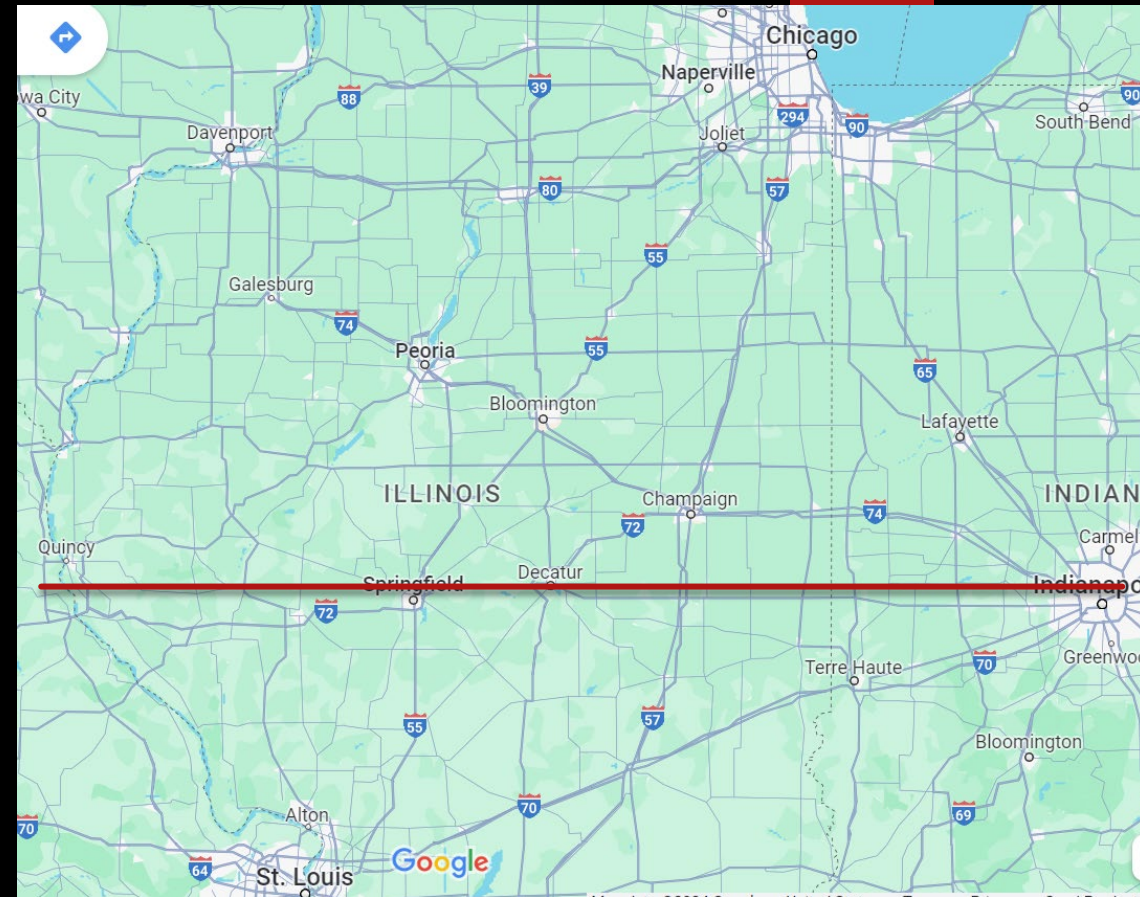
Objectives

- ▶ What issues did we have with our cool season grass field?
- ▶ What could we do to solve the problem?
- ▶ Determining if bermudagrass is possible?
- ▶ Sprigging with IronCutter bermudagrass
- ▶ Performance over 2 seasons



My Background

- ▶ Iowa State University (Ames, IA)
 - 2009-2011 Bachelors degree
 - 2011-2013 Masters degree
- ▶ Benedictine University (Lisle, IL)
 - 2013-2015 Head Sports Turf Manager
- ▶ J & D Turf (Indianapolis, IN)
 - 2015-2017 Manager of Maintenance Division
- ▶ Northwestern University (Evanston, IL)
 - July 2017 – Present Director of Grounds and Sports Turf



▶ Ryan Field switched to grass in 1997

▶ Last Resod was in 2003



Chunking divots
became an issue





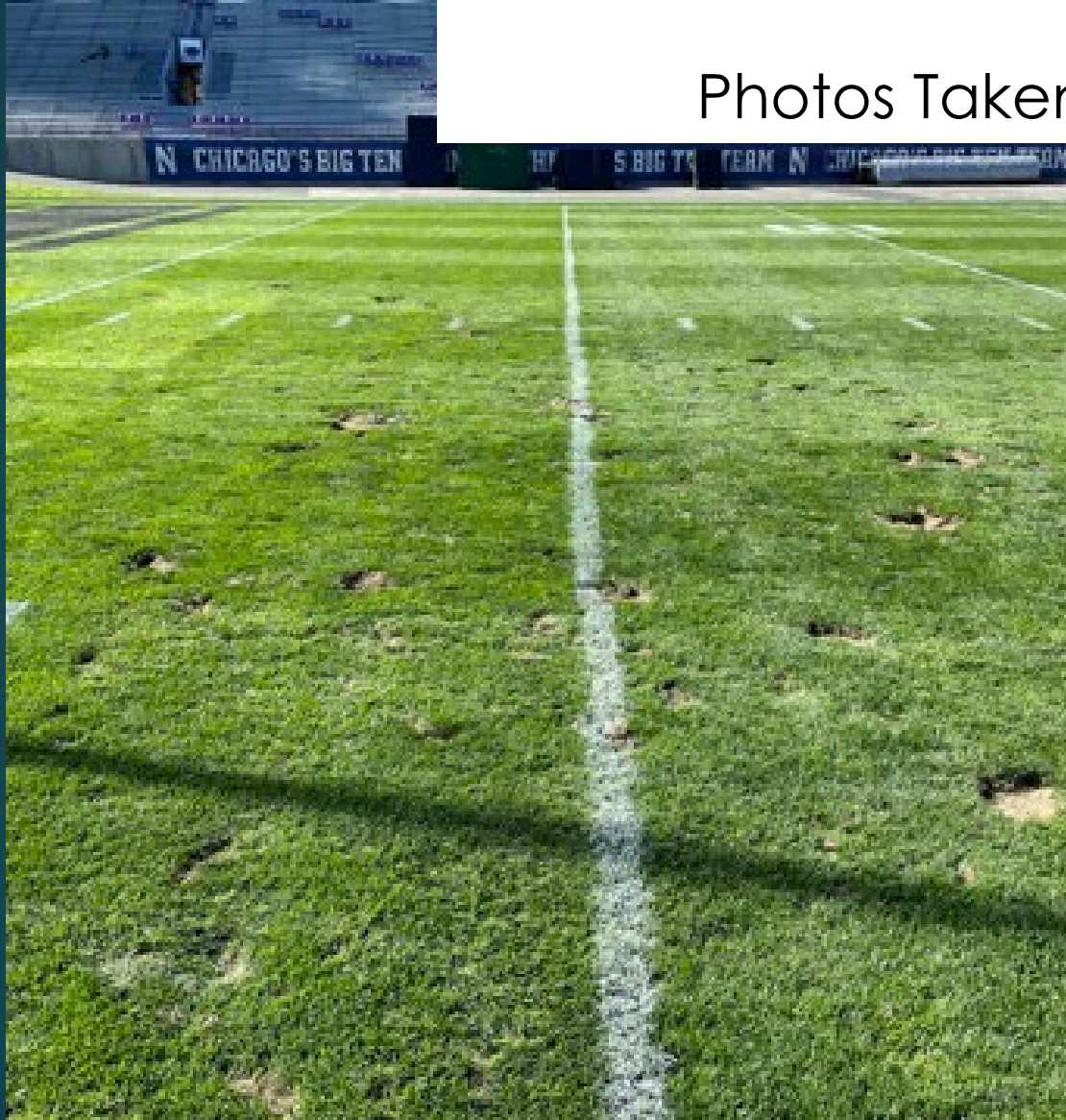


Dryject 2019-2021 to try and improve stability



Especially bad during 2021 season

Photos Taken October 2021



Solutions?

- ▶ Sept. 2021 its announced stadium will be replaced after 2023 season
- ▶ Need an affordable solution.
- ▶ Sod not an option
 - ▶ Could fraze mow in April or May and seed with Kentucky bluegrass
 - ▶ Could fraze mow after graduation and sprig with bermudagrass



High School Sprigging Success



2017 Lafayette Central Catholic
(Northbridge)

50 Games and Practices August
8th- Nov. 1st

Field Source Ohio Sprigging
success around Columbus, OH.

Bermudagrass Sprigging

- ▶ Why?
 - ▶ Best traffic tolerance grass for football
 - ▶ Chicago summers are as warm as other locations with bermudagrass
 - ▶ Only have to survive 2022-2023 winter. (1 winter)
- ▶ How long to establish?
 - ▶ 12 week grow in June 17 to September 10th
 - ▶ Summer of 2022

Average Temperatures 2000-2022

O'Hare	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Av
Avg T (F)	24.7	26.9	38.9	49.3	60.1	70.2	74.8	73.6	66.4	53.6	41.2	29.6	50.8
Blacksburg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Av
Avg T (F)	31.3	34.7	42.5	52.0	60.9	68.5	71.8	71.0	64.9	54.0	43.2	35.5	52.5
Indy	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Av
Avg T (F)	28.6	31.7	43.3	54.1	64.0	72.9	76.0	75.3	68.7	56.0	43.7	33.5	54.0
Lafayette	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Av
Avg T (F)	26.9	29.5	41.7	52.6	62.8	71.9	74.3	73.3	67.0	54.8	42.6	32.0	52.4

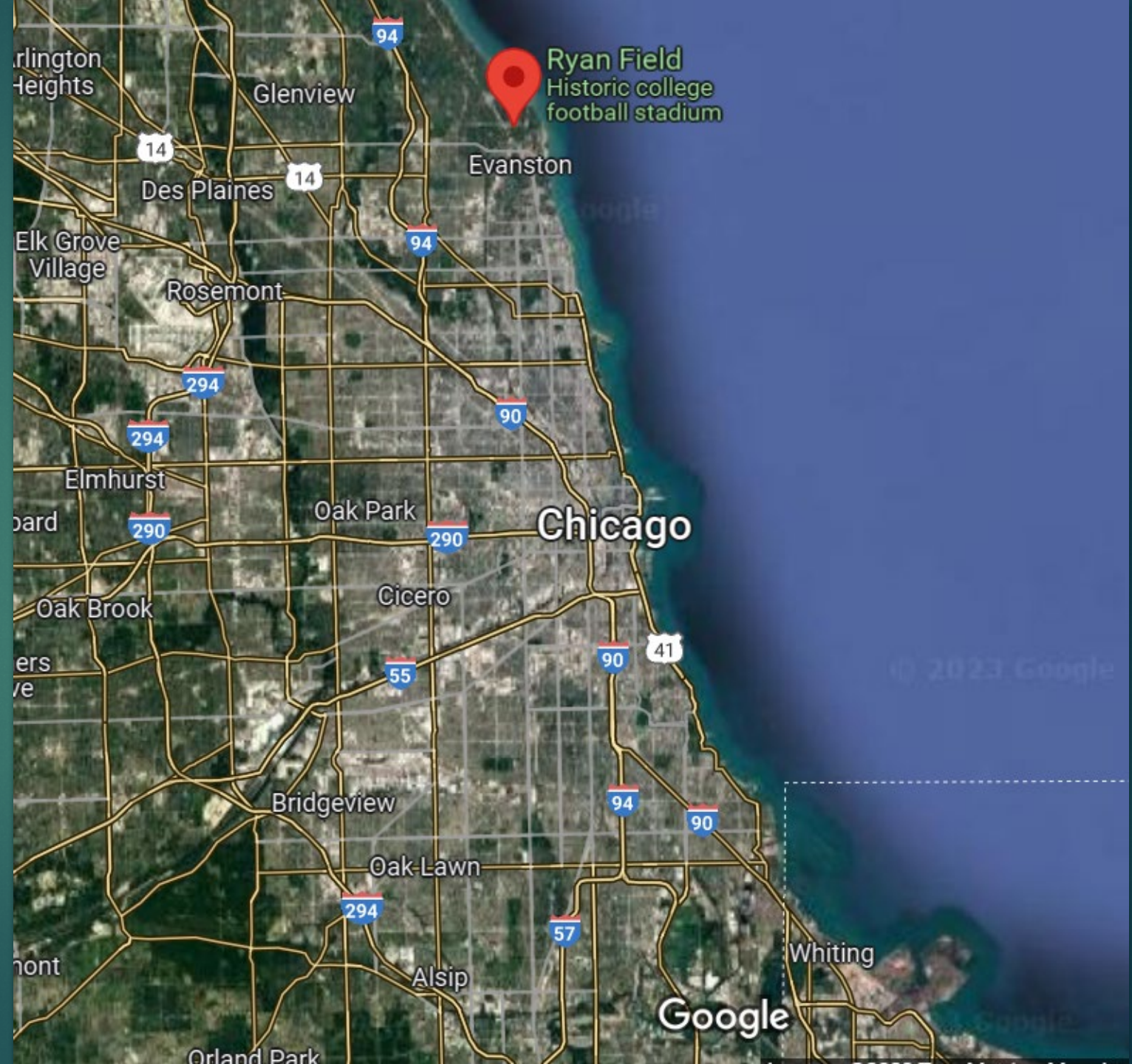
Temps from weather.gov past weather

▶ Urban Heat Island

▶ Can create warmer days and nights in the summer

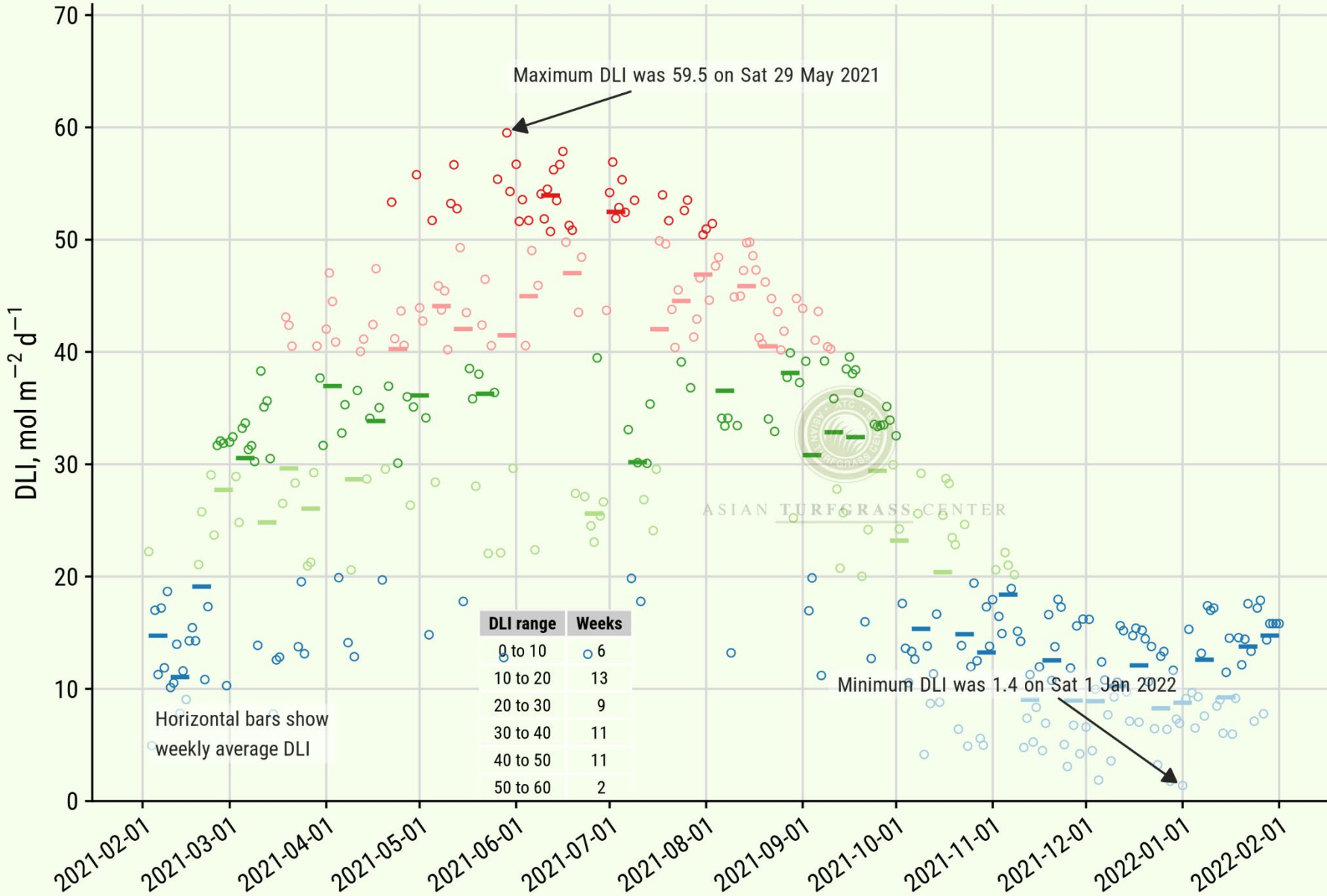
▶ Lake Michigan is Warmer in the Fall

▶ Keeps nighttime temps warmer in Sept – Early November



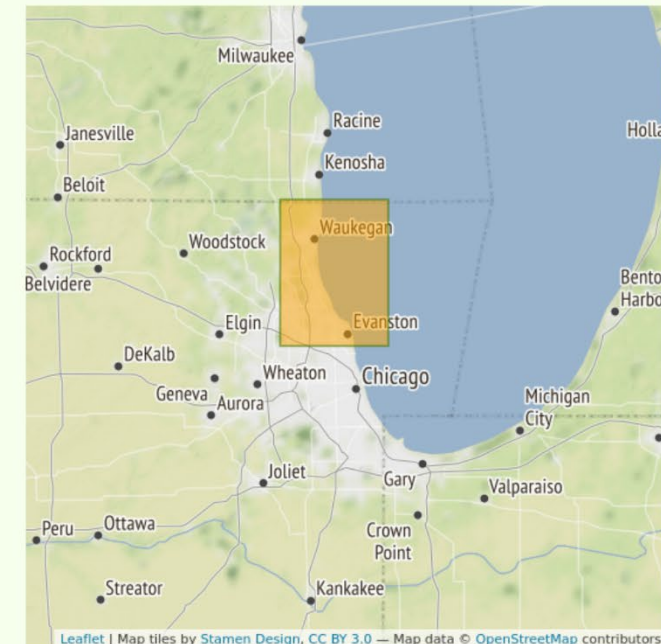
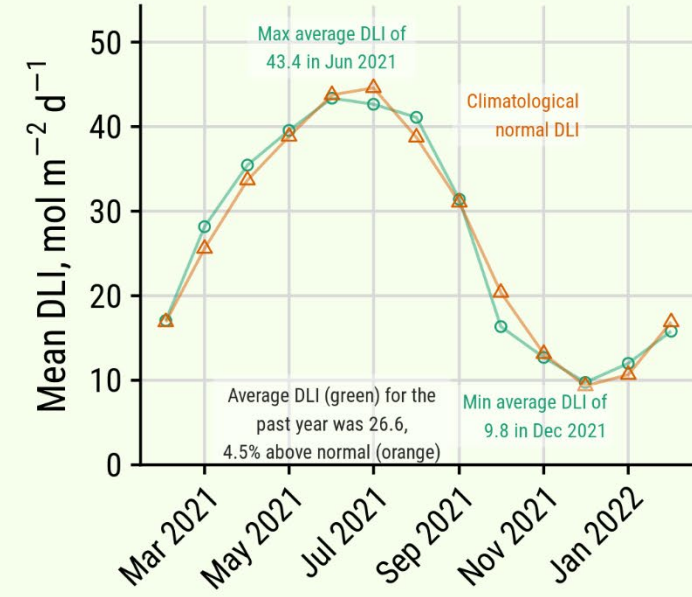
Daily light integral (DLI)

for the past 52 weeks at 42.1° N & 87.7° W



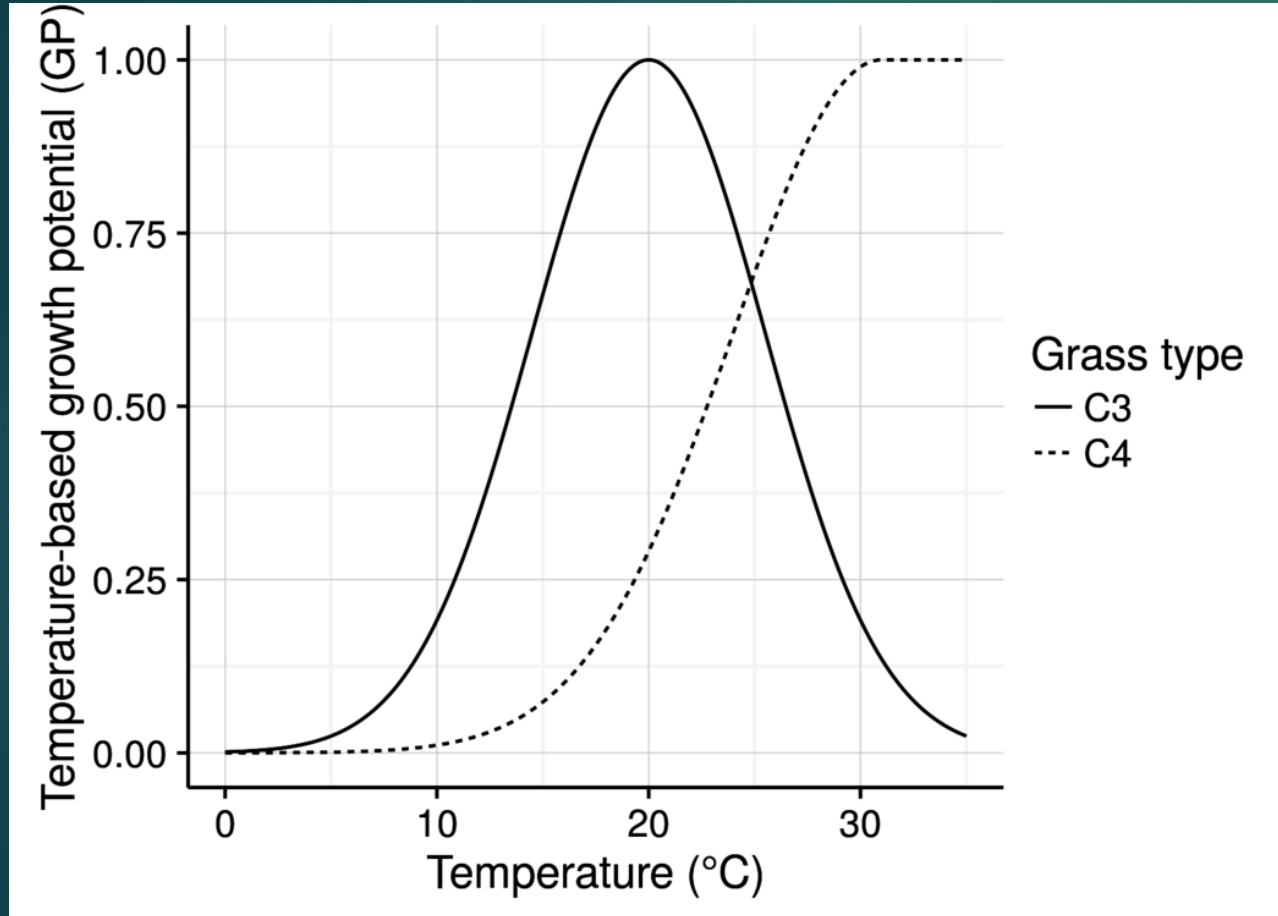
Average DLI by month

at 42.1° N & 87.7° W



These data were obtained from the NASA Langley Research Center POWER Project funded through the NASA Earth Science Directorate Applied Science Program: power.larc.nasa.gov using the 'nasapower' R package by Adam Sparks. This chart generated at asianurfgrass.shinyapps.io/global_dli/

What is Growth Potential?



Woods, 2016

The potential for grass to grow based on how close the temperature is to the optimal temperature for photosynthesis. (air temp)

Cool Season 68 F
Warm Season 88F

Avg Temps/day

Northwestern C4 Growth Potential

Location: Chicago O'hare Avg temps from 2000-2023 weather.gov

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg T (F)	25.0	27.1	38.9	49.4	60.2	70.3	74.9	73.6	66.6	53.8	41.2	30.0
Rainfall (in)	1.8	2.1	2.5	3.6	4.6	4.1	4.1	4.2	3.3	3.4	2.2	2.4

Grass Maximum N/month lb/1000 sq ft = 1.00

Optimum Growth Temperature (F) = 88 Set to 68 for cool season and 88 for warm

Variance = 12 Set to 10 for cool season and 12 for warm

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total lb/1000 sq ft	Rem d fro So ppr
% Growth Potential	0	0	0	1	7	34	55	49	20	2	0	0		

Pace Turf climate appraisal form

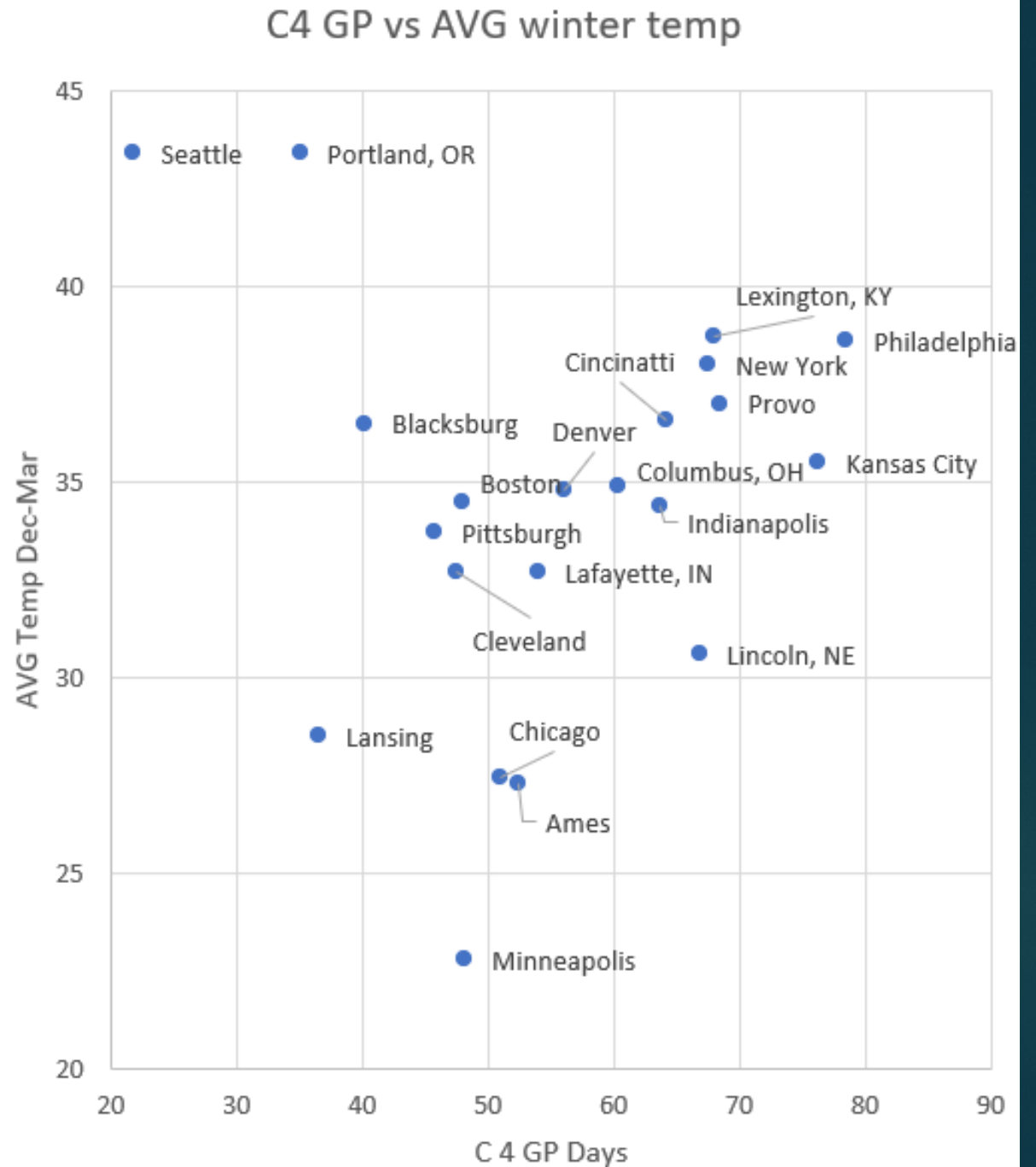
Determine how many days are good for bermudagrass growth

Northwestern		2019		2020		2021	
		GP	Days	GP	Days	GP	Days
April	30	0.01	0.3	0	0	0.01	0.3
May	31	0.05	1.55	0.06	1.86	0.05	1.55
June	30	0.24	7.2	0.46	13.8	0.44	13.2
July	31	0.71	22.01	0.76	23.56	0.48	14.88
August	31	0.48	14.88	0.63	19.53	0.67	20.77
September	30	0.36	10.8	0.17	5.1	0.33	9.9
October	31	0.01	0.31	0.01	0.31	0.06	1.86
Total Days			57.05		64.16		62.46

City	AVG C4 GP days
Blacksburg, VA	40.17
Chicago, IL	50.92
Lafayette, IN	53.92
Columbus, OH	60.38
Indianapolis, IN	63.7
Lexington, KY	68

2000-present avg temps from weather.gov

	C4 GP Days	Avg Temp Dec-Mar
Seattle, WA	21.8	43.4
Portland, OR	35.01	43.4
Lansing, MI	36.5	28.5
Blacksburg, VA	40.17	36.5
Pittsburgh, PA	45.7	33.7
Cleveland, OH	47.53	32.7
Boston, MA	47.9	34.5
Minneapolis, MN	48.1	22.8
Chicago, IL	50.92	27.45
Ames, IA	52.4	27.3
Lafayette, IN	53.92	32.7
Denver, CO	56	34.8
Columbus, OH	60.38	34.9
Indianapolis, IN	63.7	34.4
Cincinnati, OH	64.1	36.6
Lincoln, NE	66.8	30.6
New York, NY	67.5	38
Provo, UT	68.5	37
Lexington, KY	68	38.7
Kansas City, MO	76.3	35.5
Philadelphia, PA	78.5	38.6



Why IronCutter?

- ▶ Spoke with peers who had IronCutter and Tahoma 31
- ▶ Sod Farm Location (Columbia, IL. St Louis Area)
- ▶ NTEP data showed IronCutter exceeded previous generation bermuda's
- ▶ Sprig Rate 1,000 BU/A
= 13,223 sq ft of sod. 9 sq ft = 1 BU



Graduation in Stadium June
8th – 13th 2022



June 16th field being stripped. 8-hour process

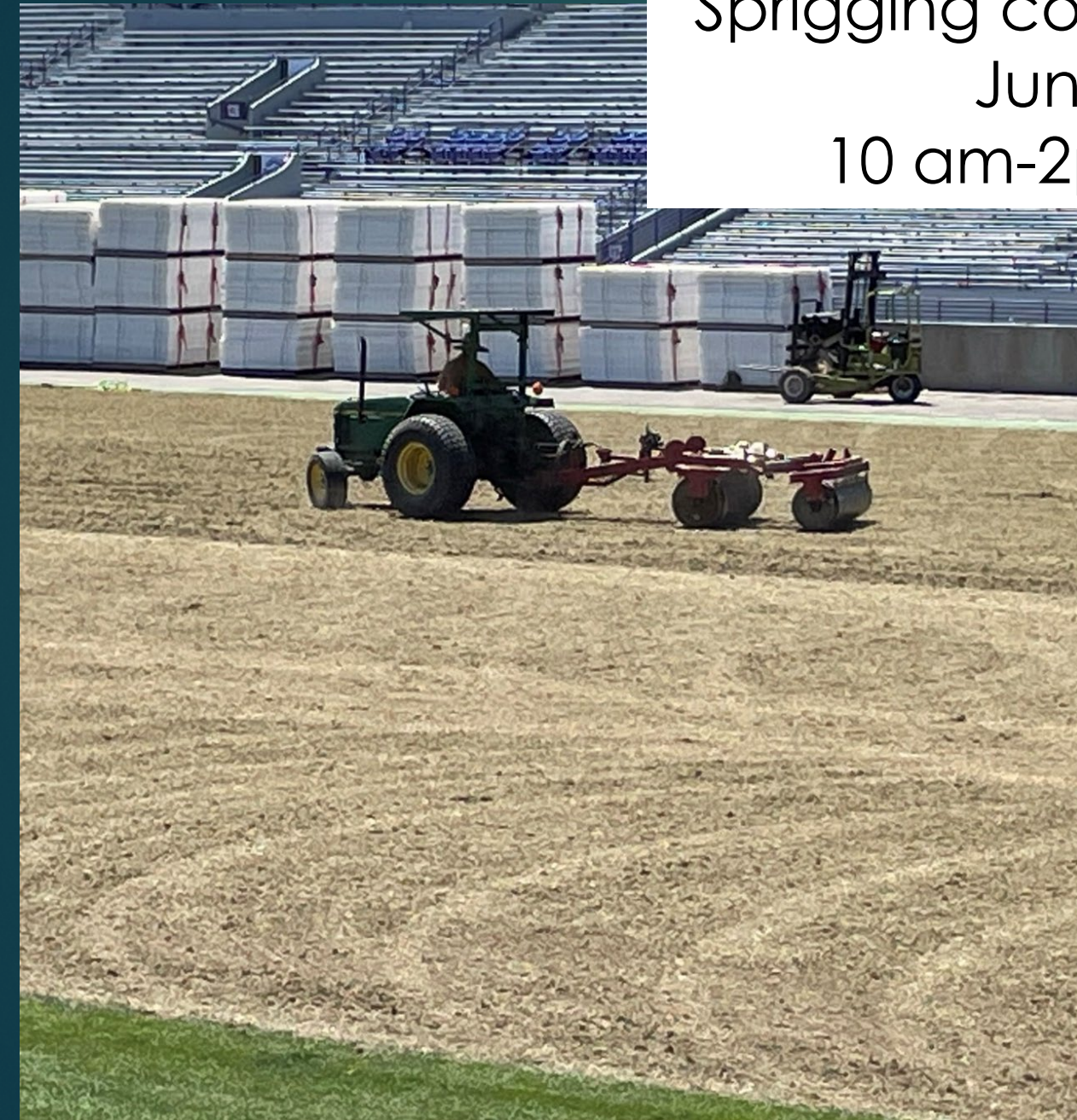
June 16th, grass removal complete



Friday June 17th
Sprigs arrive 9:30am



Sprigging completed Friday
June 17th.
10 am-2pm Approx



Afternoon June 17th. Sprigging
complete



June 25, 8 days after sprigging and seeing some green plants



July 2nd, 15
days in and
more green
plants



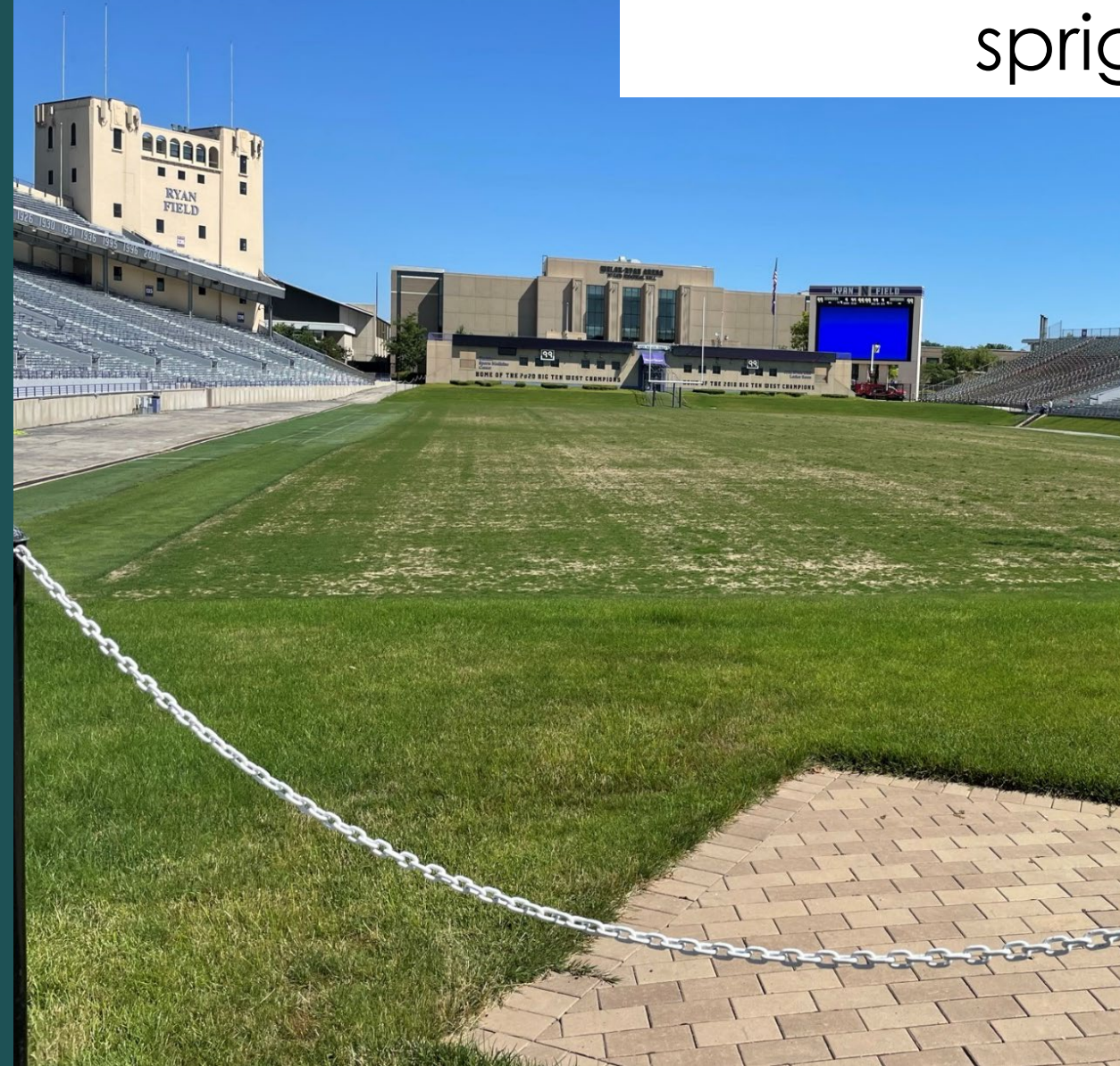


July 5th,
18 days
after
planting

July 13th 26 days after Sprigging



July 18th, 31 days after
sprigging



July 22nd 35 days after sprigging



July 28th, 41 days in. 44 days until
game



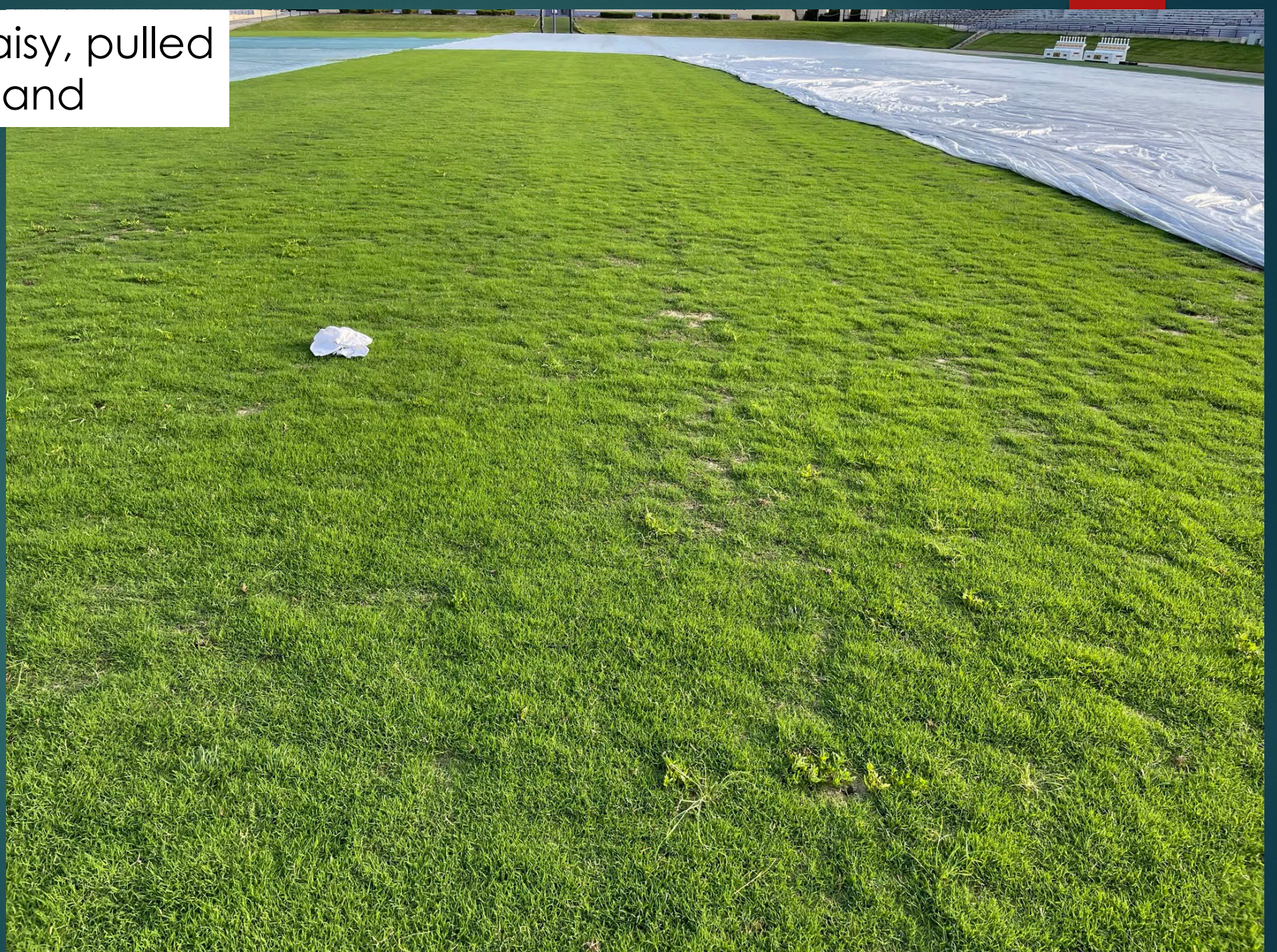
Movie Night, 8/4
48 days after Sprigging
37 days until Game 1





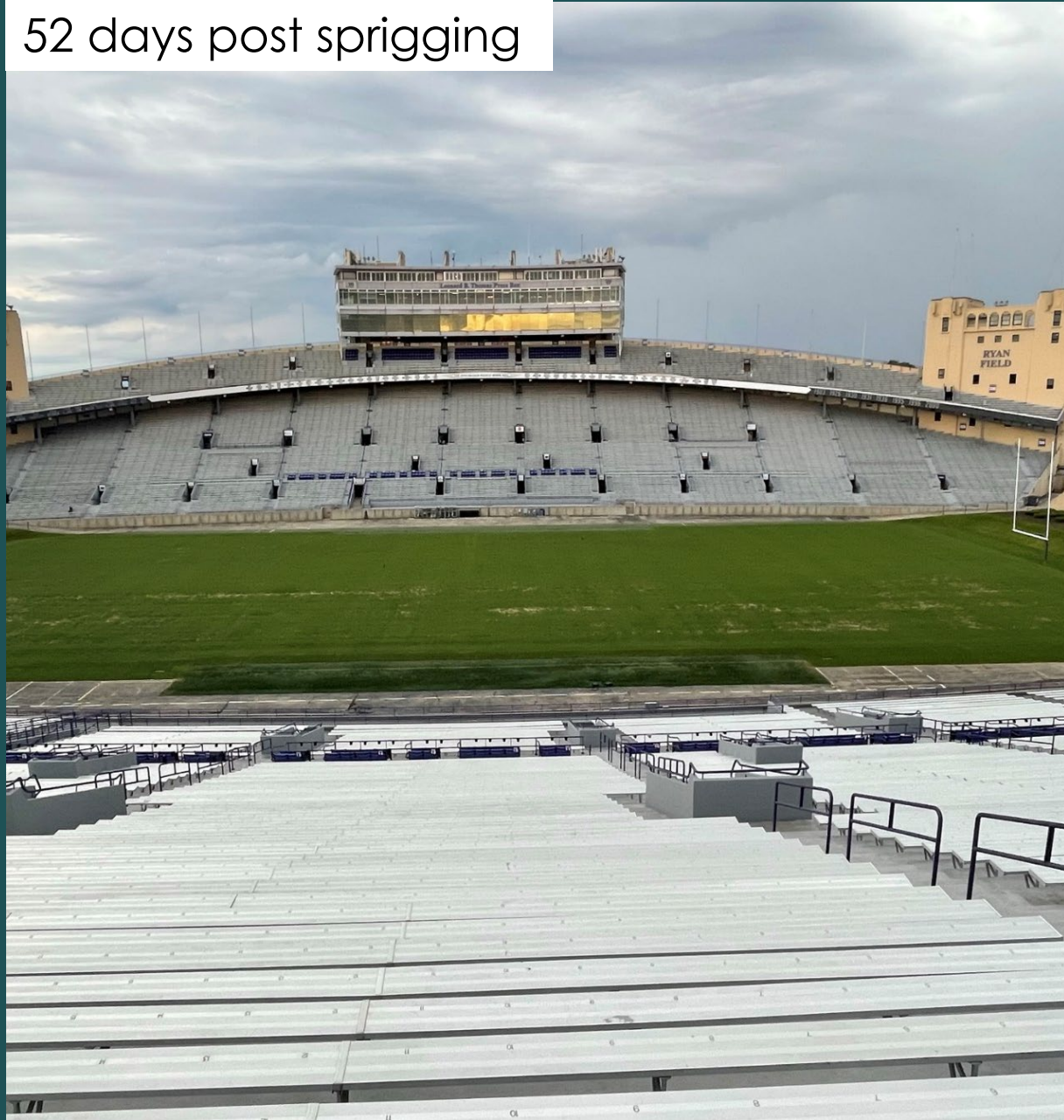
- ▶ Used grow tarps 10 out of 14 days from August 8th to August 22nd
- ▶ Weeks 8 and 9 since planting

Issue with False Daisy, pulled
weeds by hand

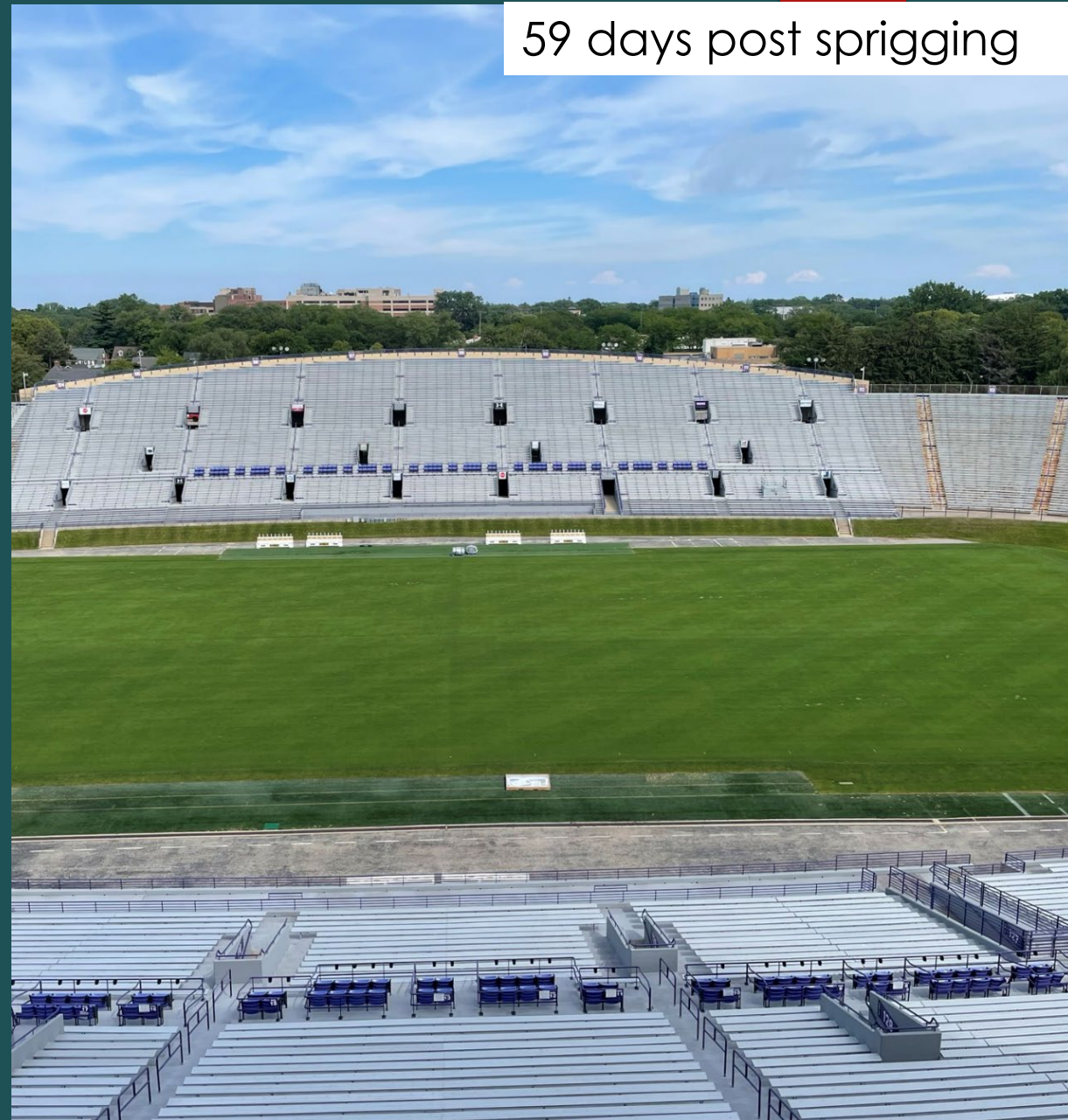


8/8 left vs 8/15 right 7 days apart

52 days post sprigging



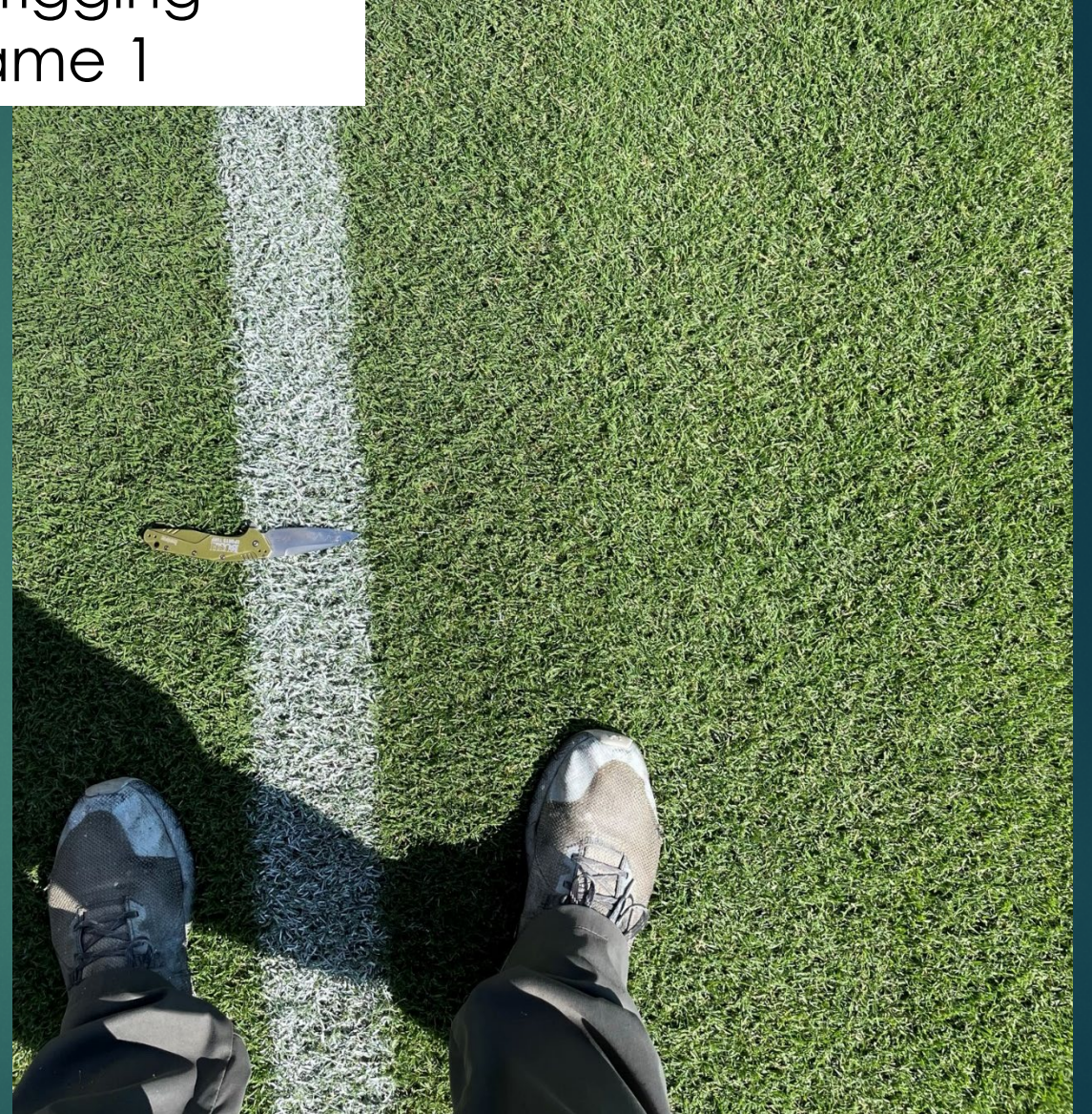
59 days post sprigging



8/18, Field painted for Mock game
62 days post sprigging



62 days post sprigging
22 days until game 1



9-week-old Bermuda with 8"
roots



▶ 1st ryegrass seeding
August 24th at 13lbs/1000
by weight.

▶ 68 days post sprigging

▶ 17 days before game 1



▶ Ryegrass germinates in 7 days. August 31st

▶ 75 days post sprigging

▶ 11 days before game 1



Grow In Inputs

- ▶ 5.22 lbs N
- ▶ .89lb P₂O₅
- ▶ 3.5 lbs K₂O
- ▶ 2 Trinexepac-Ethyl Apps Week 9 (8/17) 3oz/A, Week 10 (8/26) 5oz/A
- ▶ 3 Topdressing's 7/13, 8/5, 8/24
- ▶ Solid Tine 8/5 (to break the crust)
- ▶ Initial seeding rate 13lbs/1000 coated perennial ryegrass seed
- ▶ Mowing Height
 - ▶ 3/4" weeks 5 through 8
 - ▶ 7/8" weeks 8-12
 - ▶ 1" day before game 1

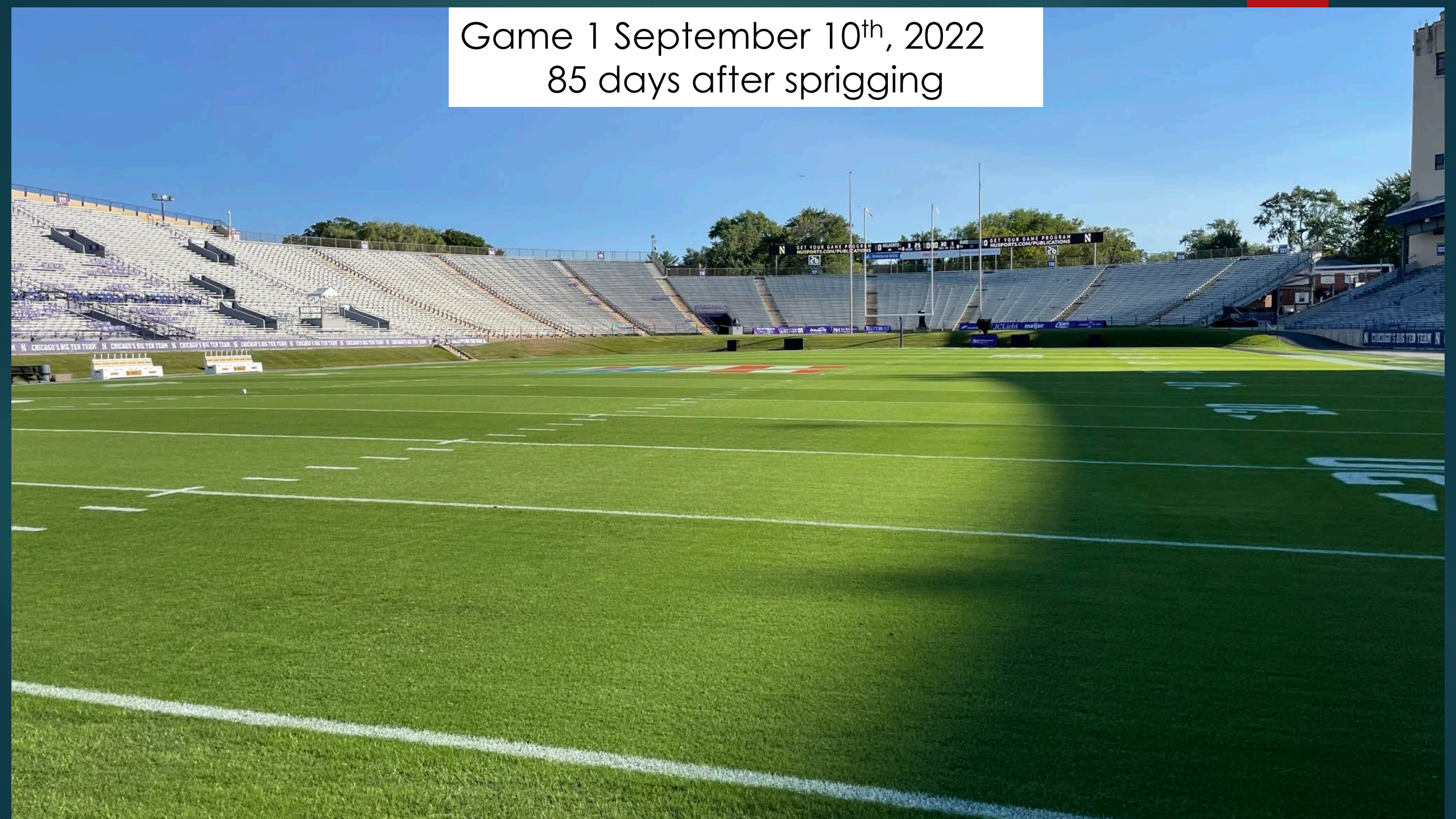
Water Use year 1

- ▶ 1st 6 weeks after sprigging 8-9 minute run times, every 1.5 hours
- ▶ 1-3x per week 15-20 min run times weeks 6 – 8
- ▶ Once perennial ryegrass installed
 - ▶ initially daily, 10-15 min run times
 - ▶ Once growing 1-3x/ week 10-15 min run times
 - ▶ Ran water sparingly Wednesday- Saturday.
 - ▶ Goal was 17-18% VWC for games

September 7th.
Week of game 1



Game 1 September 10th, 2022
85 days after sprigging



performance during
warmups 9-10-22



Wear following game 1



Game 2 September 17th, 2022
2nd in a row. 13-week-old grass



Sweeping debris after Game 2



Game 3, September 24th
3rd in a row. 14-week-old
grass

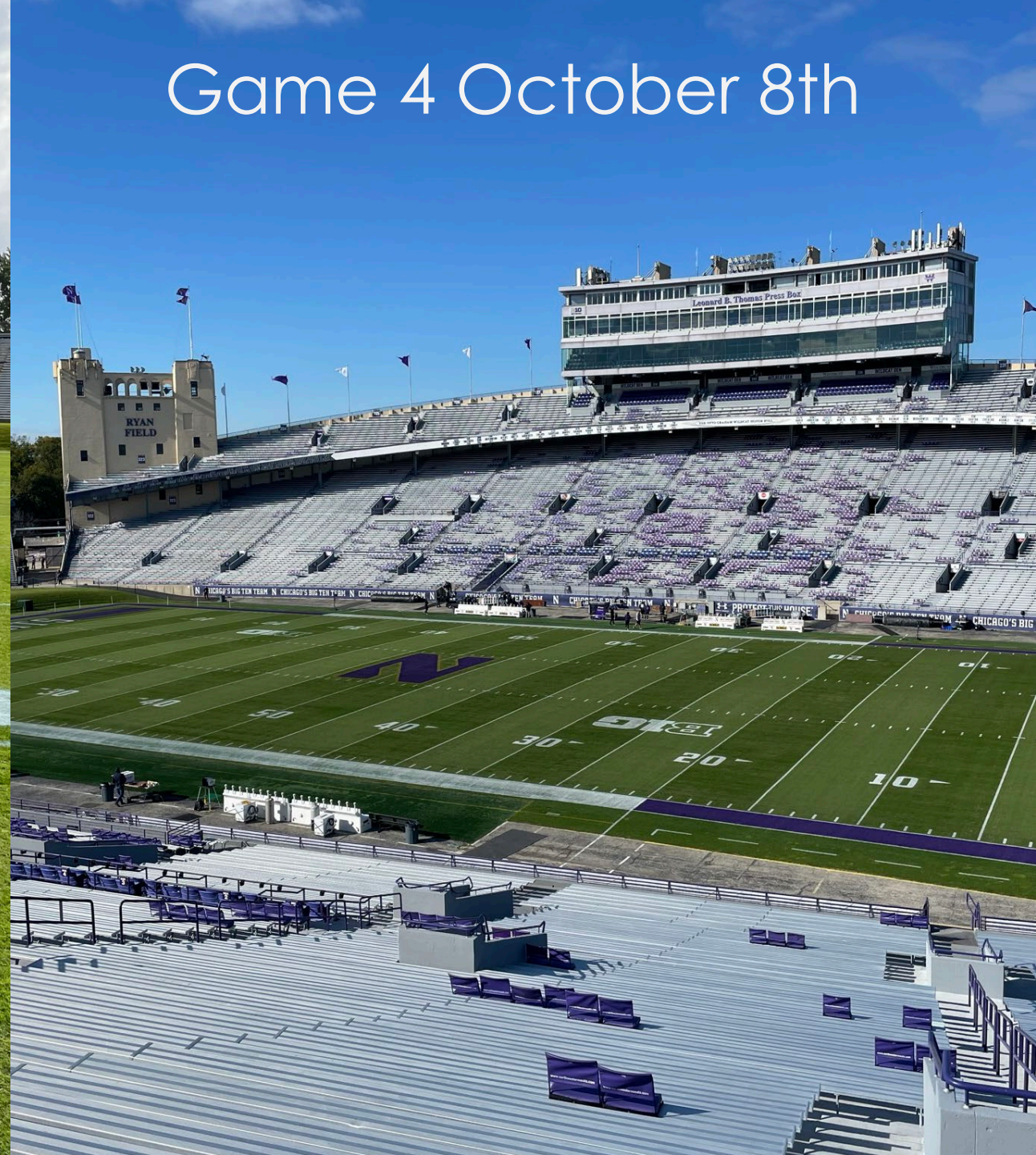


2-week break

- ▶ 9/27 Overseed with 9 bags of seed. 7.5lbs/1,000
 - ▶ 3.33 lbs of seed after game 1
- ▶ 9/27 Topdress with 25 tons of sand
- ▶ Covers on for 5 days
- ▶ Foliar app with pigment
- ▶ Granular after game 1 at .25lb N



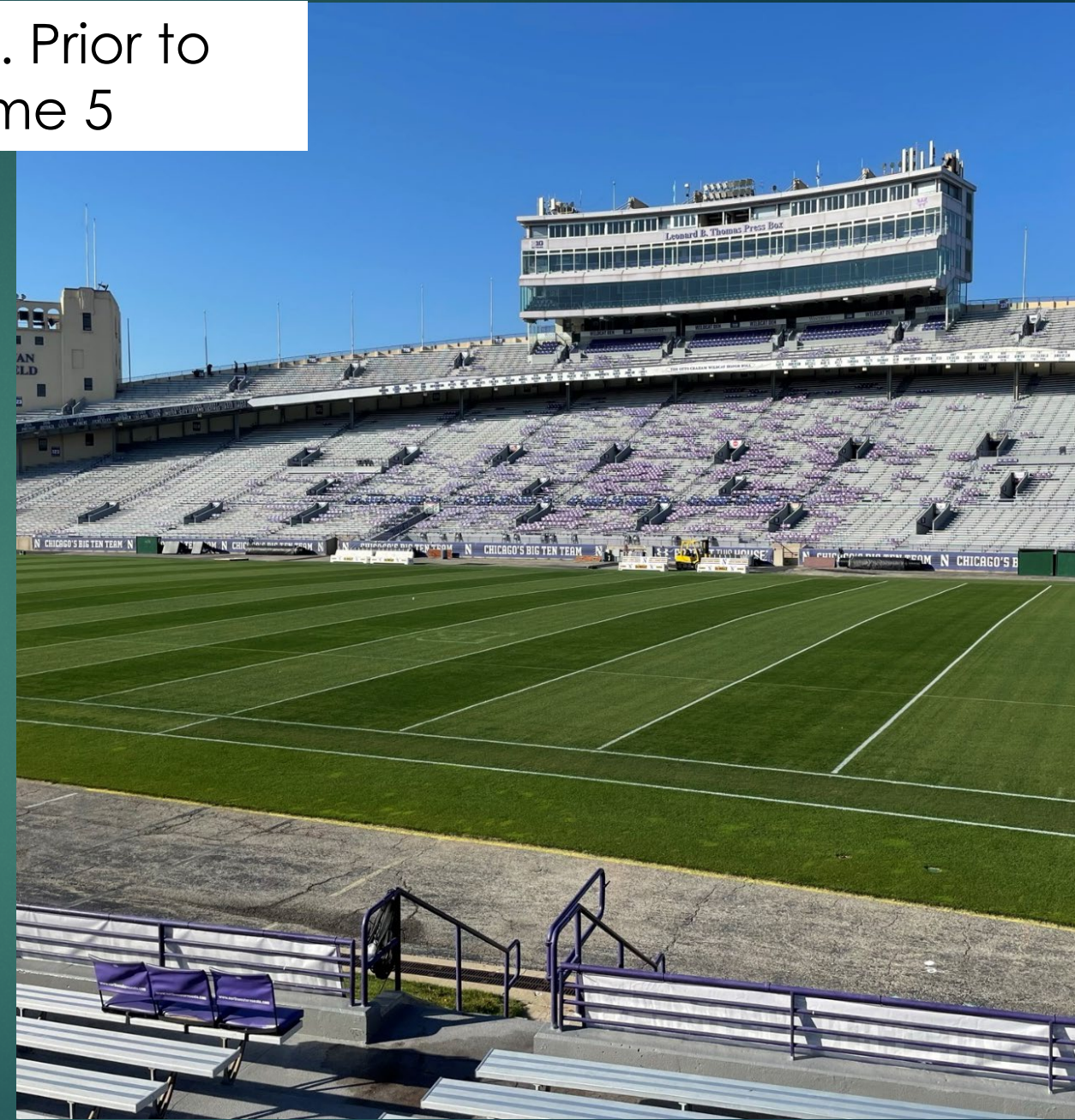
Game 4 October 8th



4 week break

- ▶ Seed 10/11 with 5 bags of seed. 4.1 lbs of seed
- ▶ granular app with .16lb of N
- ▶ Foliar Fert app with green dye
- ▶ Topdress on 10/20 with 25 tons of sand
- ▶ Covers on 10/13 to 10/20 and 10/27 to 10/31

Nov 2nd. Prior to
Game 5



Game 5 November 5th



Field performance
during 2nd Half



Postgame Field
performance



3 week break

- ▶ 1 bag of seed down the middle
- ▶ Foliar app with green dye
- ▶ Covers on 11/10 until 11/21

Game 6 November 26, 2022



Football Season Input Use

- ▶ .71 lb N (5.93lbs/1,000 for the year)
- ▶ .11lb P₂O₅ (1lb/1,000 for the year)
- ▶ .57 lb K₂O (4.1lbs/1,000 for the year)

- ▶ Topdress 1 semi load each 9/27 and 10/20
- ▶ Overseed with coated seed, 9/13, 9/20, 9/27, 10/10, around 33lbs/1,000 by weight total over season 16lbs/1,000 of actual seed.
- ▶ 4 Green dye or pigment applications

Washed Plug
November 29, 2022



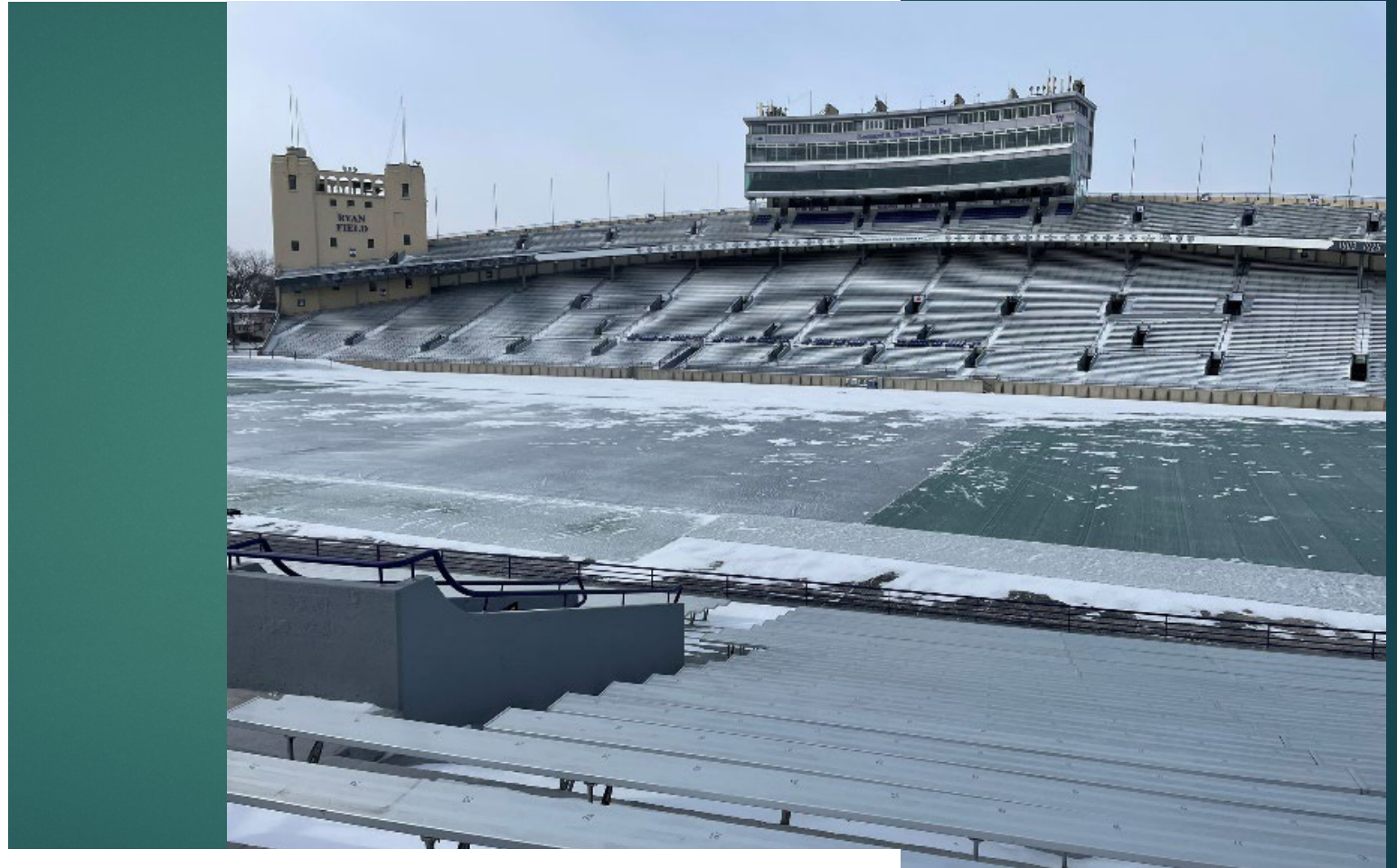
Postseason

- ▶ December 1
 - ▶ Snow Mold application made for the winter
 - ▶ Roundup applied to begin removing ryegrass 48oz/A
- ▶ December 15
 - ▶ Covers installed on field for the winter
 - ▶ Waited for soil temps to drop into 30s before installing covers

December 22nd, 2022 Cold Snap

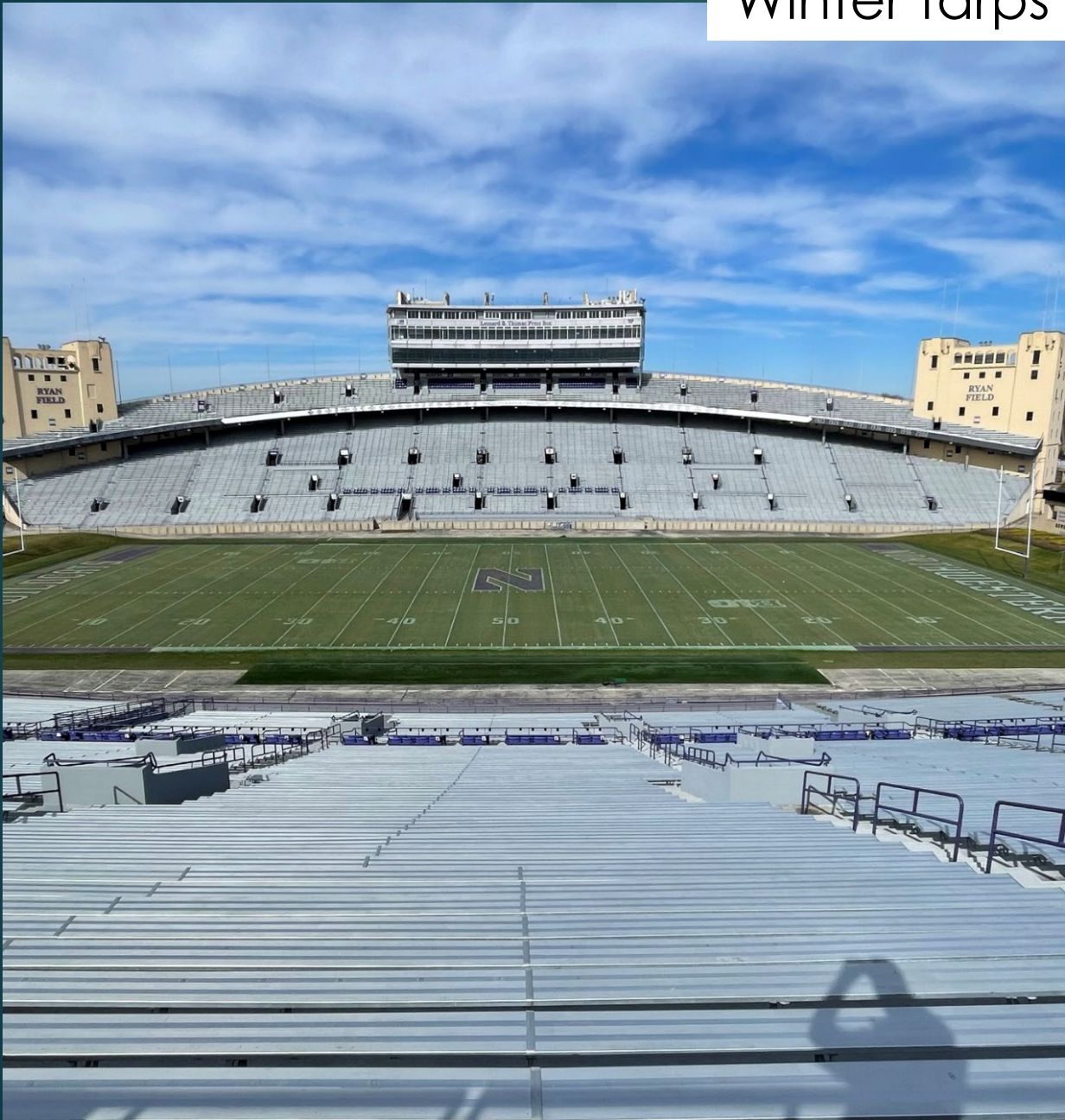
Wilmette 88.0 %
US 12 mph
-8.5 °F Sat 9 °F Sun 9 °F Mon 23 °F

16.4 °F Air Temperature	84% Relative Humidity
34.4 °F Soil temperature	19% Soil moisture
0 uMol PPFD	0.33 Soil EC



2" Soil temp never dropped below 32 during the Winter

Winter tarps removed 4-8-23



First Mow 5/5/23
Katana Spray 5/10/23
1.5oz / A



5/31 Solid Tining Field, Ahead of Graduation



6/6 – 6/12 Graduation flooring on the field



6/12 Removing the flooring from the field



Cultural Practices 7/7 through 7/11



Roots and Rhizomes Late July

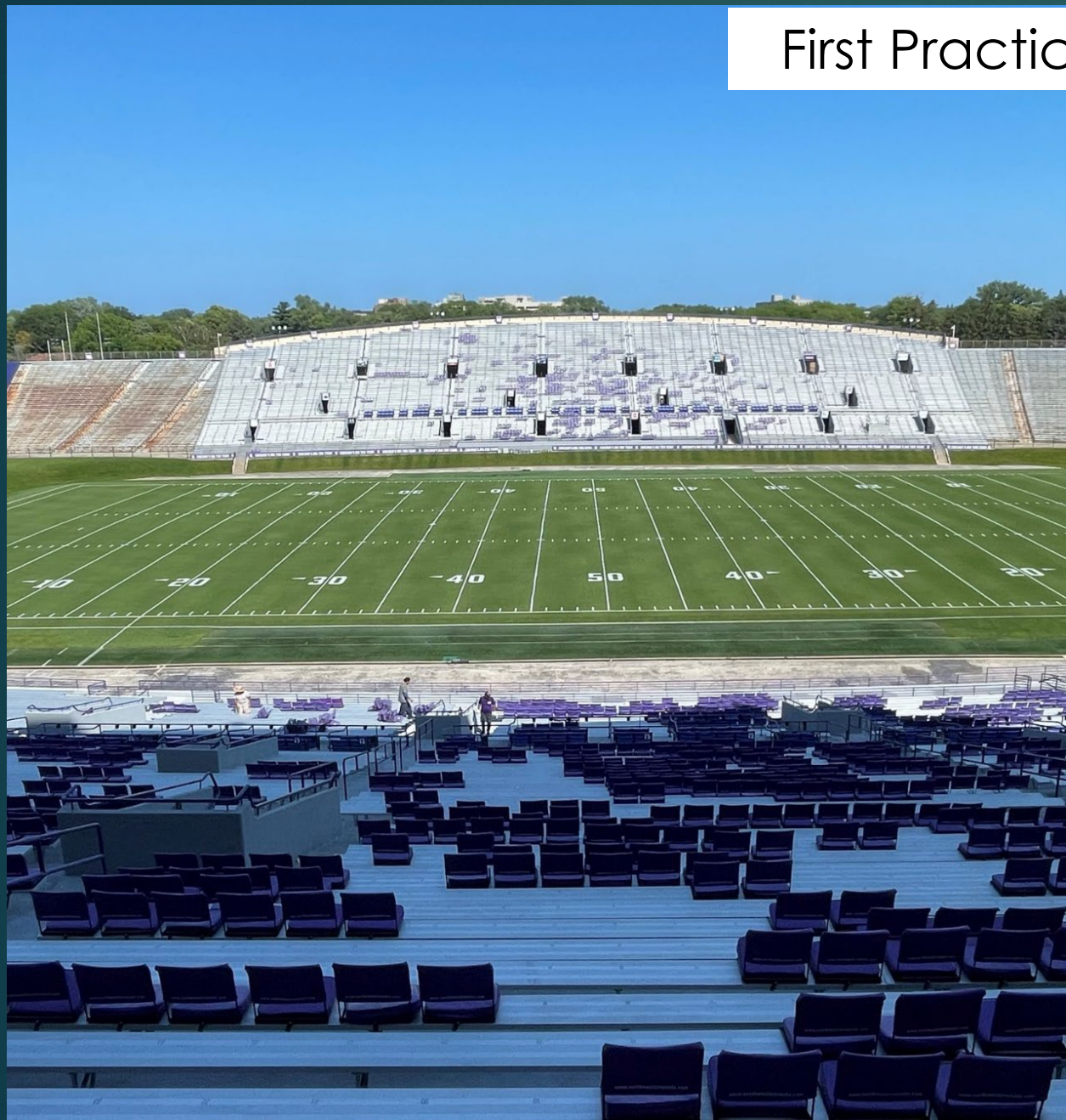


Summer 2023 inputs

- ▶ N use
 - ▶ 2.13lbs inside B1G logos
 - ▶ 1.88lbs B1G logos and out
- ▶ 4 Trinexapac-Ethyl applications
 - ▶ 5oz/A 7/20, 8/1, 8/15
 - ▶ 3oz/A 8/31
- ▶ 3 topdressing applications 7/11, 8/7, 8/20
- ▶ Cultural practices
 - ▶ Solid Tine 5/31
 - ▶ Core aerify 7/10
 - ▶ Verticut 1x middle, 2x corners 7/9

HOC: 5/8" over the summer
3/4" beginning 8/18

First Practice 8/19/2023



Damage on 8/28



Recovery 9/6 (9 days)



Water Use Year 2

- ▶ Water 1x or 2x a week with 15 – 20 min run times
 - ▶ Some weeks 0 with rainfall
 - ▶ With cool season would water 4x a week or more, 20-30 min run times
 - ▶ Able to keep VWC lower with bermudagrass
 - ▶ Wouldn't see wilting with bermudagrass, would water when VWC 10-12%
 - ▶ Would see wilting on the cool season field around 18% VWC
- ▶ With perennial ryegrass did water more frequently
 - ▶ Able to keep the run times 10-15 min
 - ▶ Day lengths/temps decreasing so able to use less irrigation

Game 1

9/9/23



10/4/2022
After 3 games, prior
to game 4



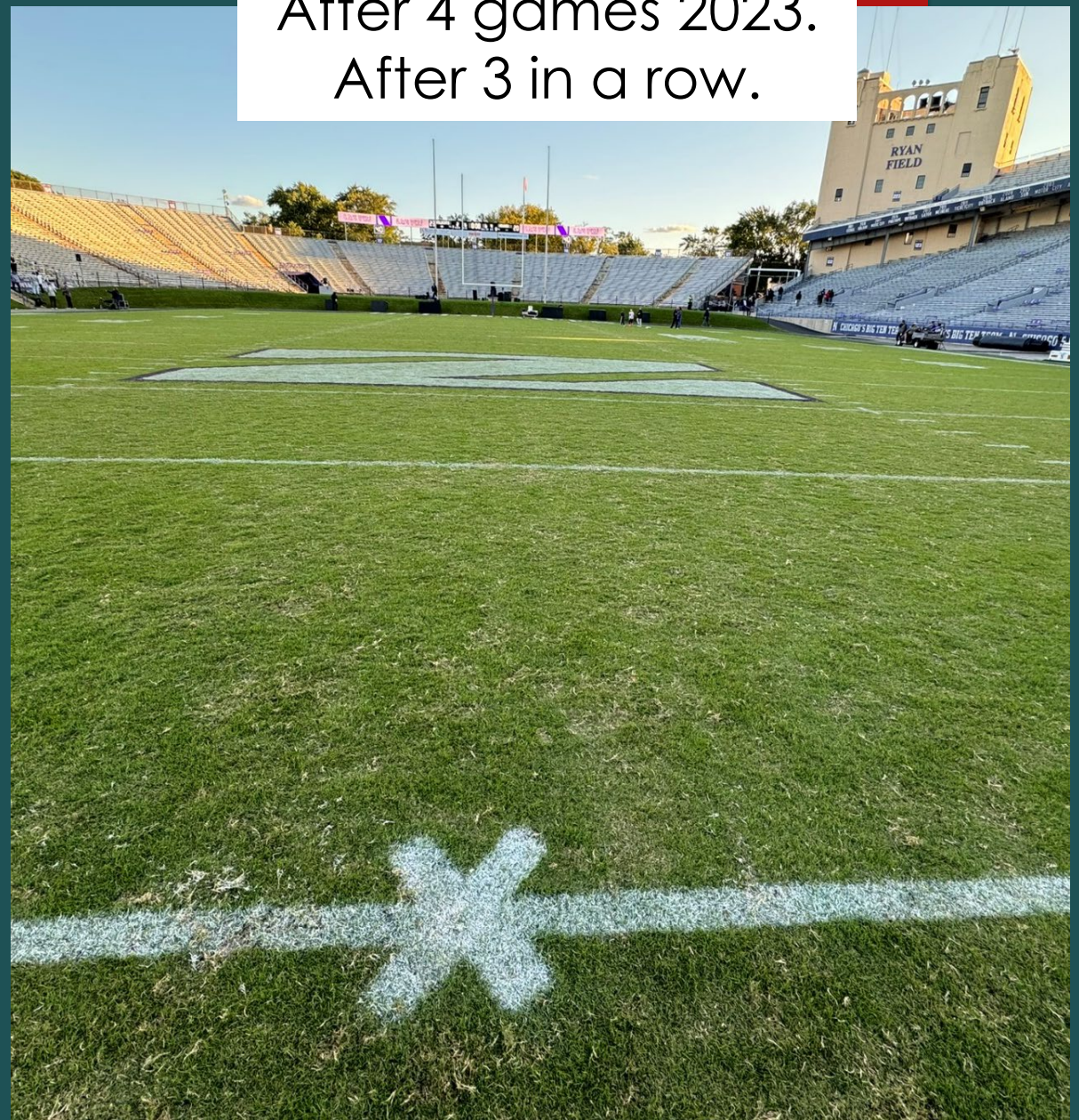
10/4/2023
After 3 games, (2 in a
row)
Prior to game 4



After 3 games 2022



After 4 games 2023.
After 3 in a row.



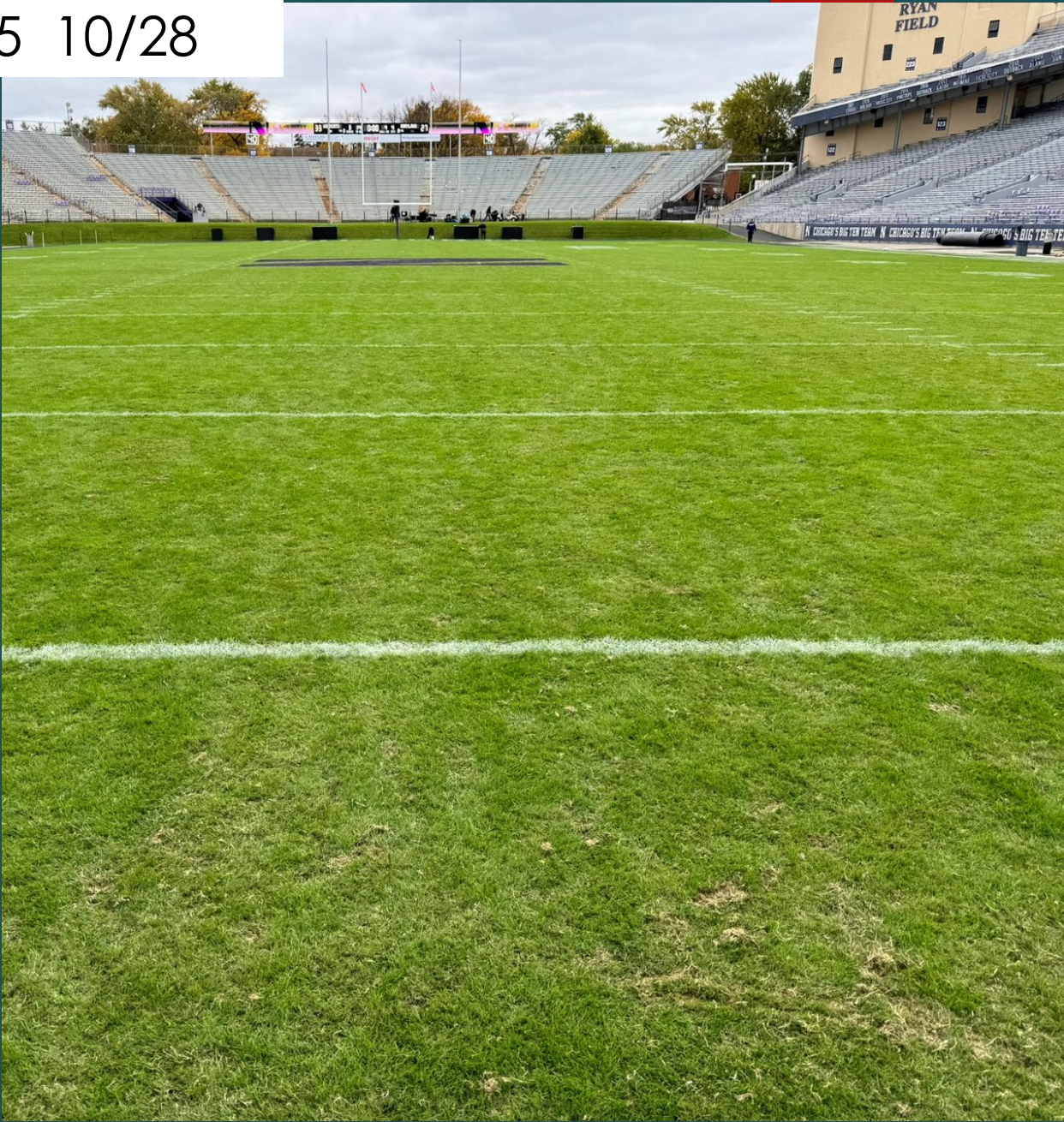
Adding Green dye during a 3 week
break 10/11/23



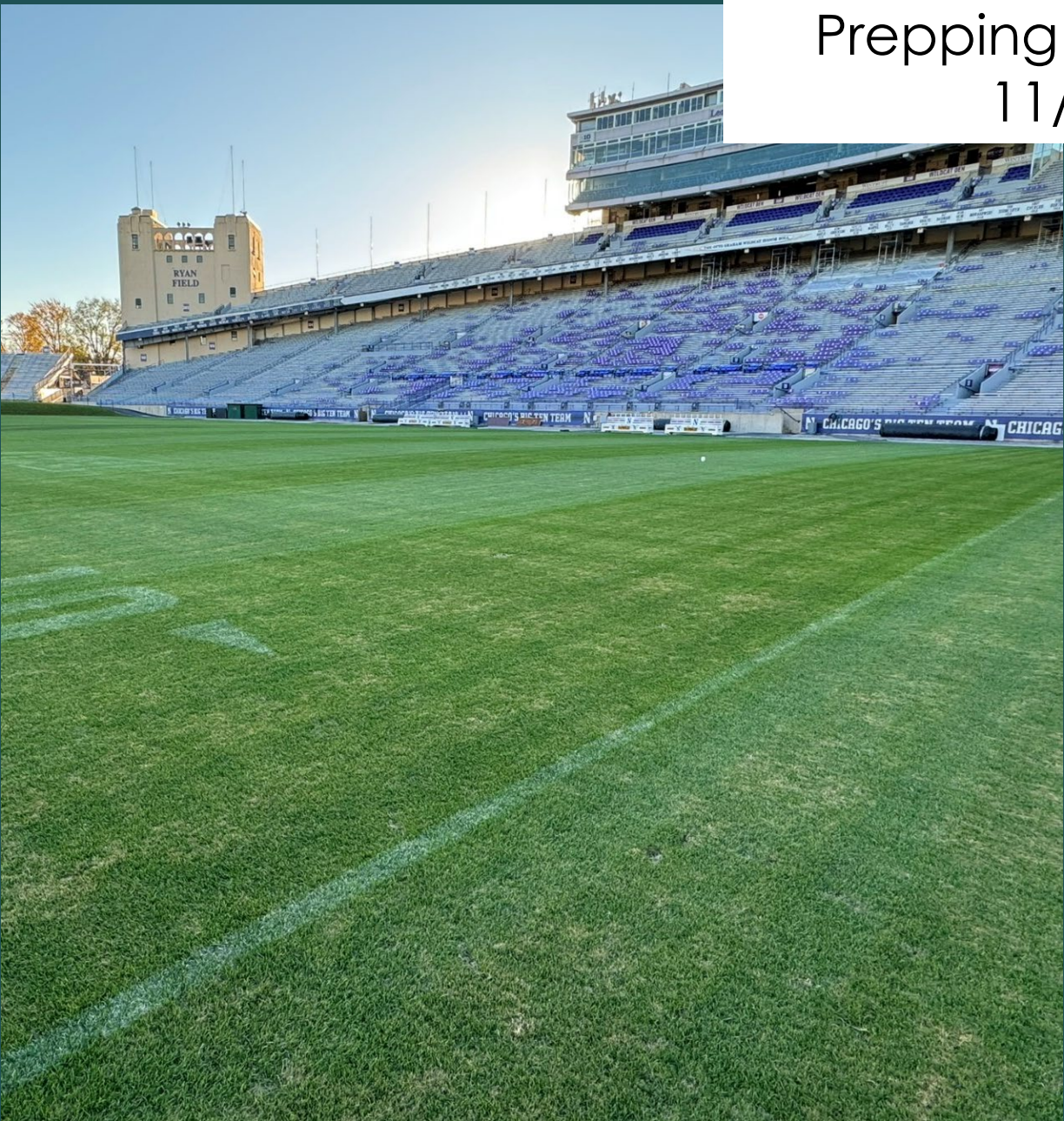
Top photos 10-10-23
Bottom Photos 10-20-23



Game 5 10/28



Prepping for Game 6.
11/14/23



Final game 11/18/23



In season inputs 2023

- ▶ N use
 - ▶ .6lbs N inside B1G logos (2.7lbs N for the year)
 - ▶ .4lbs N outside B1G logos (2.28lbs N for the year)
- ▶ 2 Topdressings. 9/12 and 10/10 (5 total for the year)
- ▶ HOC. Up to 7/8" starting 9/8

Color plan year 1 vs 2

2022 season

- ▶ Coated seed used 33lbs/M by weight, 15lbs/ 1,000 of seed
- ▶ Bulk of seeding 8/24 through 10/10
- ▶ 3 Green paint applications
- ▶ Grow covers used 3x during season

- ▶ Avg Temp year 50 C4 GP days

2023 season

- ▶ 19lbs/1,000 non coated seed used
- ▶ Bulk of seeding 8/21 through 10/9
- ▶ 2 Green paint applications
 - ▶ Tried different products
- ▶ Grow covers used twice during season
 - ▶ 10 days in October
 - ▶ 13 days in November
- ▶ Below Avg Temp Year 45 C4 GP days

Pros vs Con's

Pros

- ▶ Improved stability and wear tolerance
- ▶ Poa annua not an issue
- ▶ Less water usage
- ▶ Less fertilizer usage
- ▶ Less pesticide usage
- ▶ Easier postgame cleanup

Cons

- ▶ No performance cons
- ▶ Using grow covers to stimulate recovery
- ▶ Does turn brown later in the season
- ▶ Having to explain that the grass may die and would need replaced to administrators

Is This possible elsewhere?

- ▶ This would work best in a football or soccer situation in the North (fall season)
- ▶ What about Spring usage?
 - ▶ Important to communicate some areas may die due to spring usage
 - ▶ How much down time in the summer to get areas to recover?
- ▶ If interested, try a test plot
- ▶ How close are you to a Bermuda source
 - ▶ Will have to transport sod or sprigs to site to regrow some areas



Questions?

Zach Simons
zach.simons@northwestern.edu

Thank You!