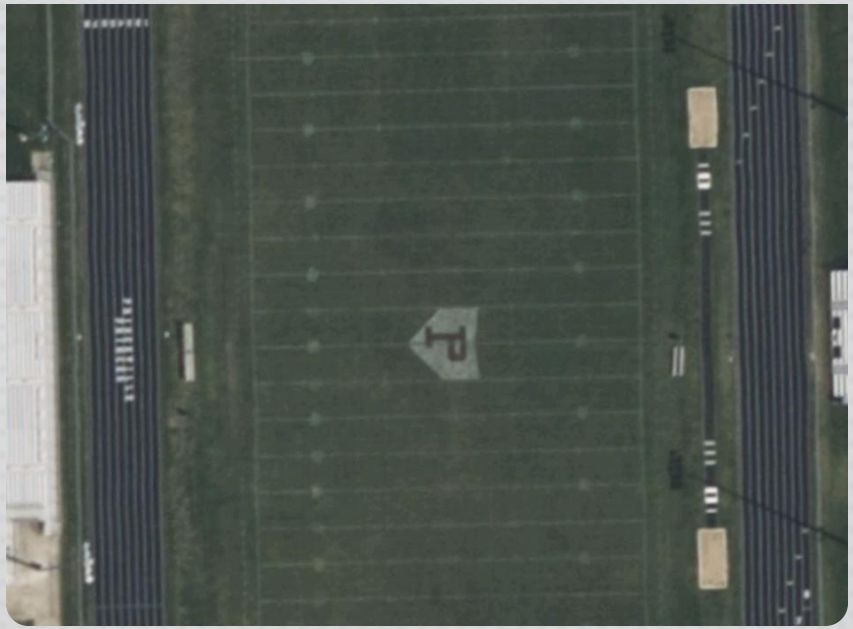
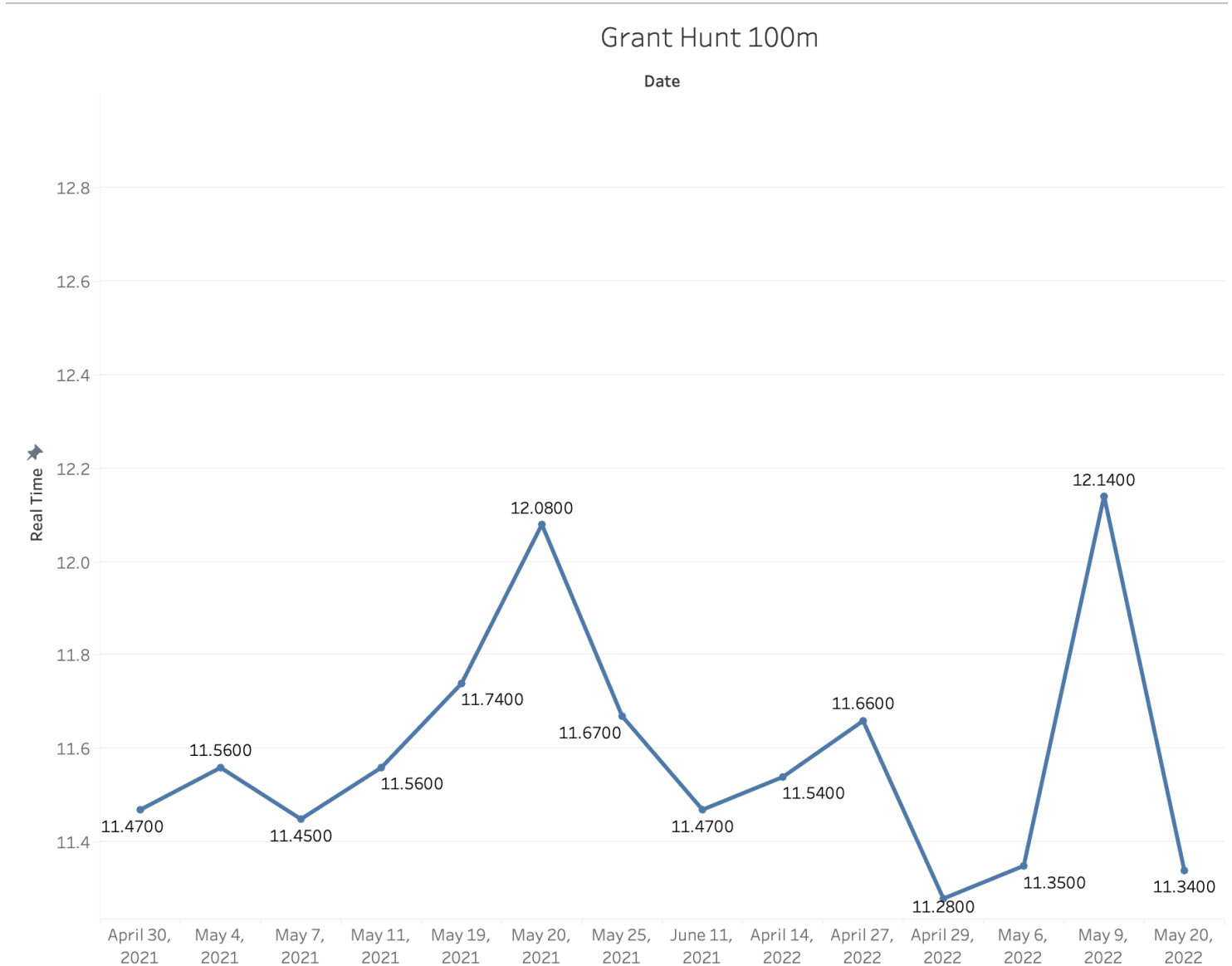
THE IMPACT OF LOCATION ON TRACK TIMES

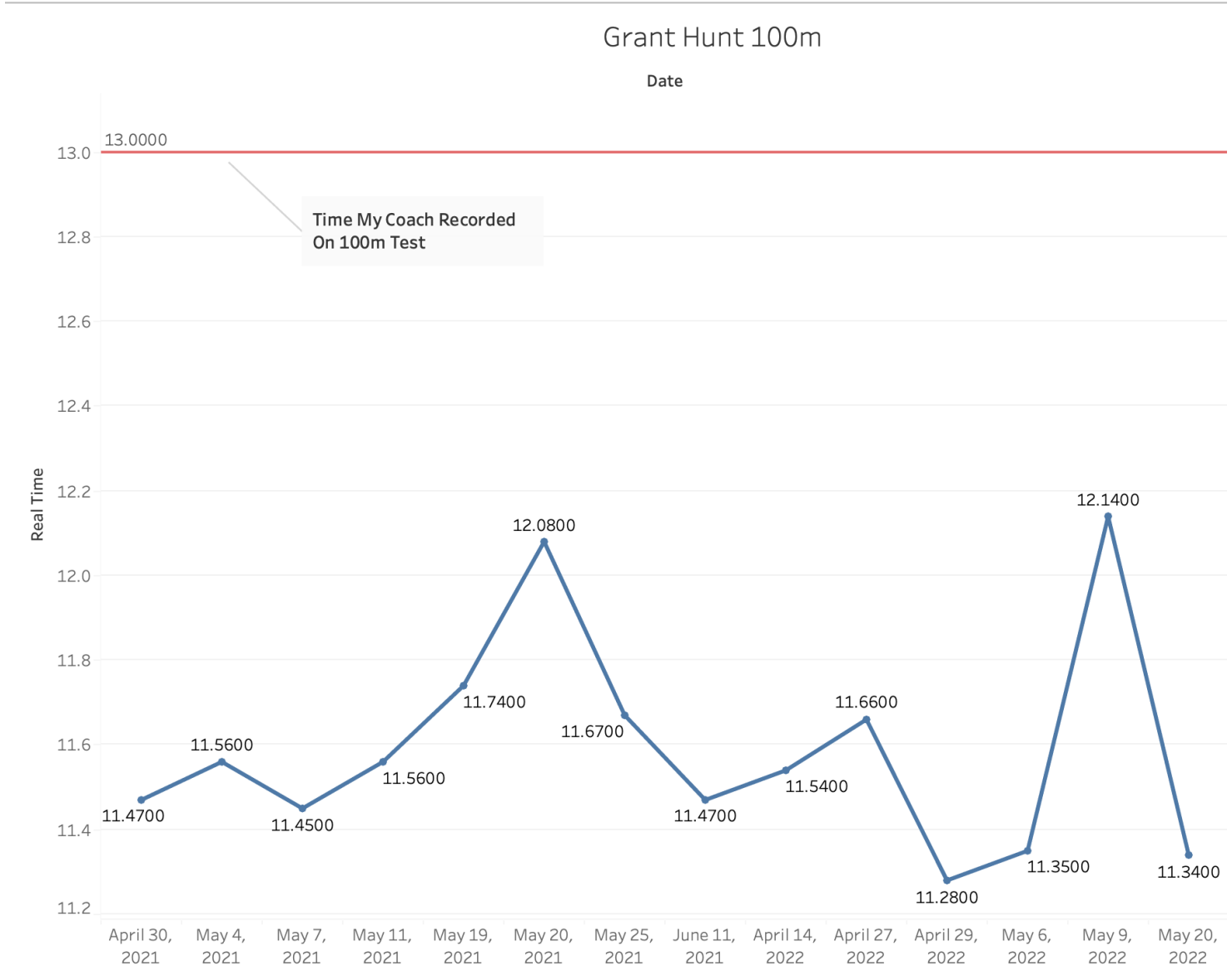
By Grant Hunt



MY QUESTION

- Does the location and construction of my high school track result in slower times for sprinters?


Grant Hunt 100m
Date
Real Time
12.8
12.6
12.4
12.2
12.0
11.8
11.6
11.4
11.4700
11.5600
11.4500
11.5600
11.7400
12.0800
11.6700
11.4700
11.5400
11.6600
11.2800
11.3500
12.1400
11.3400
April 30, 2021
May 4, 2021
May 7, 2021
May 11, 2021
May 19, 2021
May 20, 2021
May 25, 2021
June 11, 2021
April 14, 2022
April 27, 2022
April 29, 2022
May 6, 2022
May 9, 2022
May 20, 2022


Grant Hunt 100m
Date
13.0000
Time My Coach Recorded
On 100m Test
Real Time
13.0
12.8
12.6
12.4
12.2
12.0
11.8
11.6
11.4
11.2
11.4700
11.5600
11.4500
11.5600
11.7400
12.0800
11.6700
11.4700
11.5400
11.6600
11.2800
11.3500
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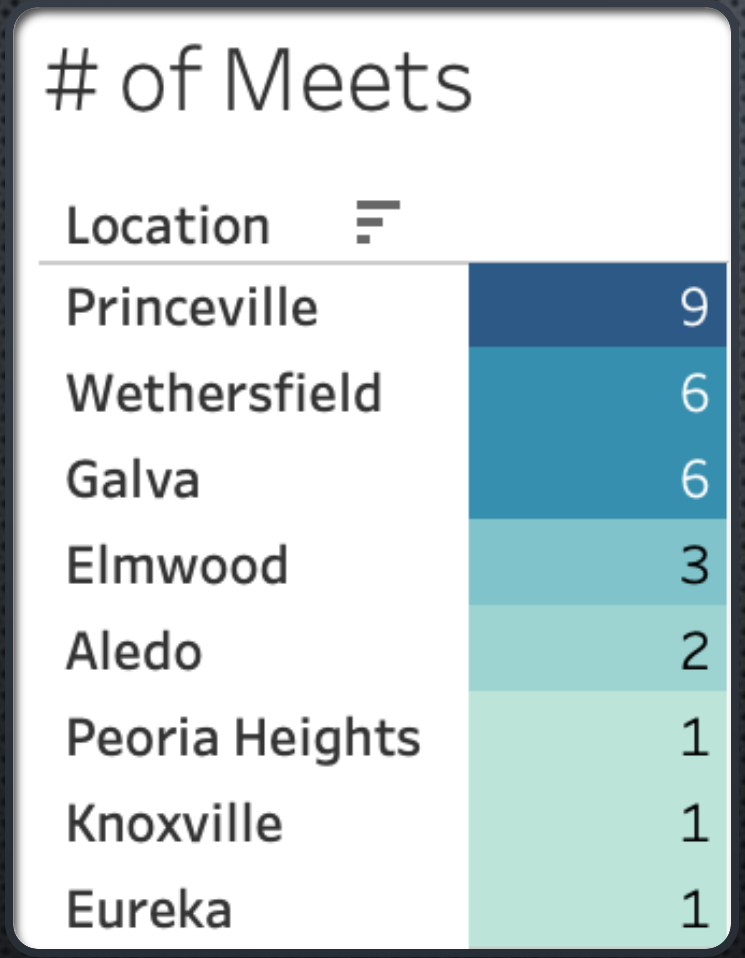


MY DATA SET

THE SET CONSISTS OF EVERY MEET PRINCEVILLE'S MEN'S TRACK AND FIELD TEAM HAS COMPETED IN IN THE PAST 3 YEARS.

- 1,274 ROWS (EACH REPRESENTING A RESULT FROM A RACE)
- RESULTS FROM 100M, 200M, AND 400M RACES
- 29 MEETS ACROSS 8 DISTINCT LOCATION
- 405 DIFFERENT ATHLETES

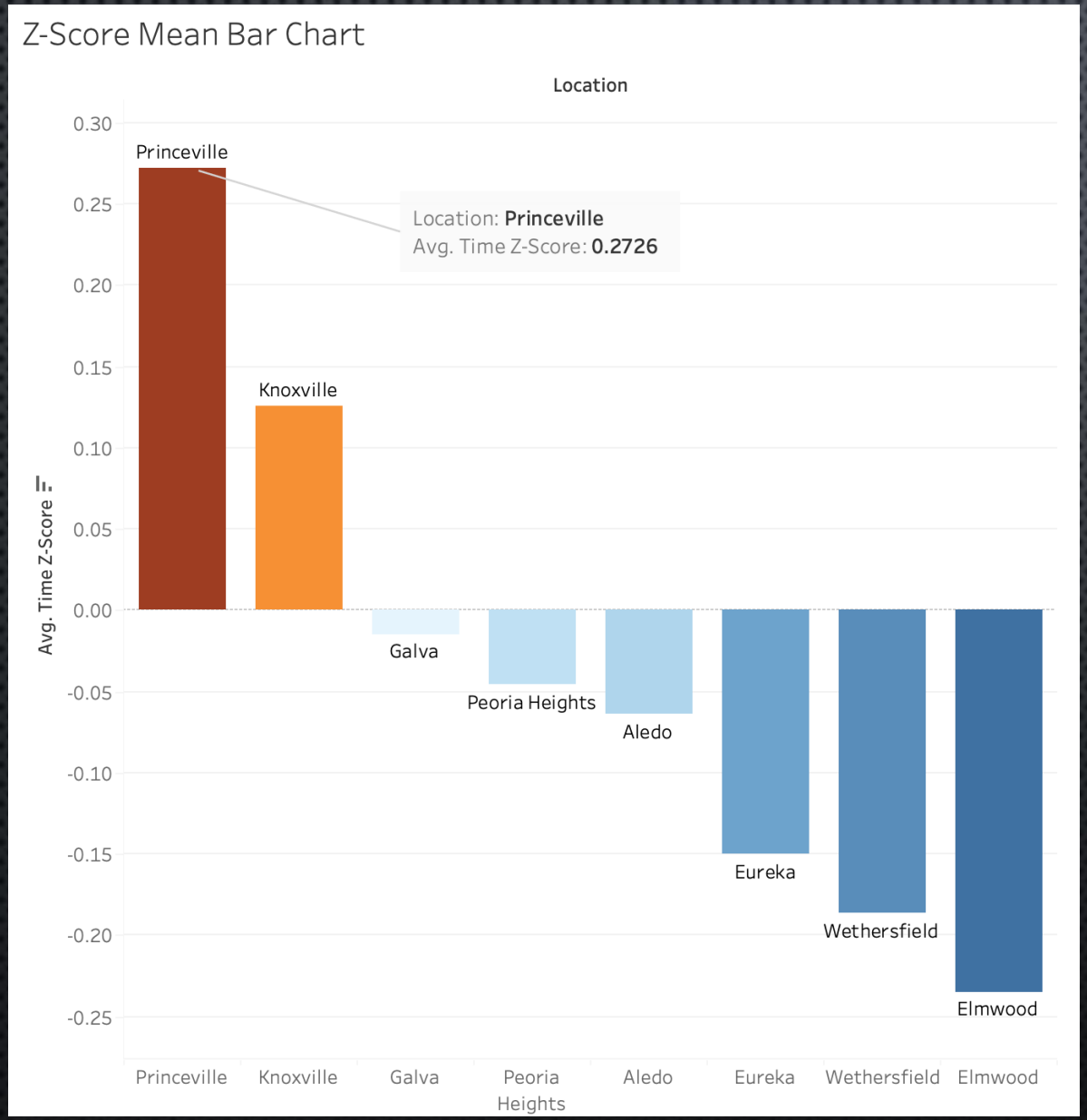
METHOD OF DETERMINING SPEEDS FOR EACH TRACK

Z-SCORE = (AVERAGE TIME – TIME)/STANDARD DEVIATION

FIXED BY **RACE LENGTH** AND **ATHLETE**

Index	Real Time	Time Mean	Time STDEVP	Time Z-Score
99	24.43	24.60	0.17	-1.00
290	24.77	24.60	0.17	1.00

AVERAGE Z SCORE FOR EACH LOCATION



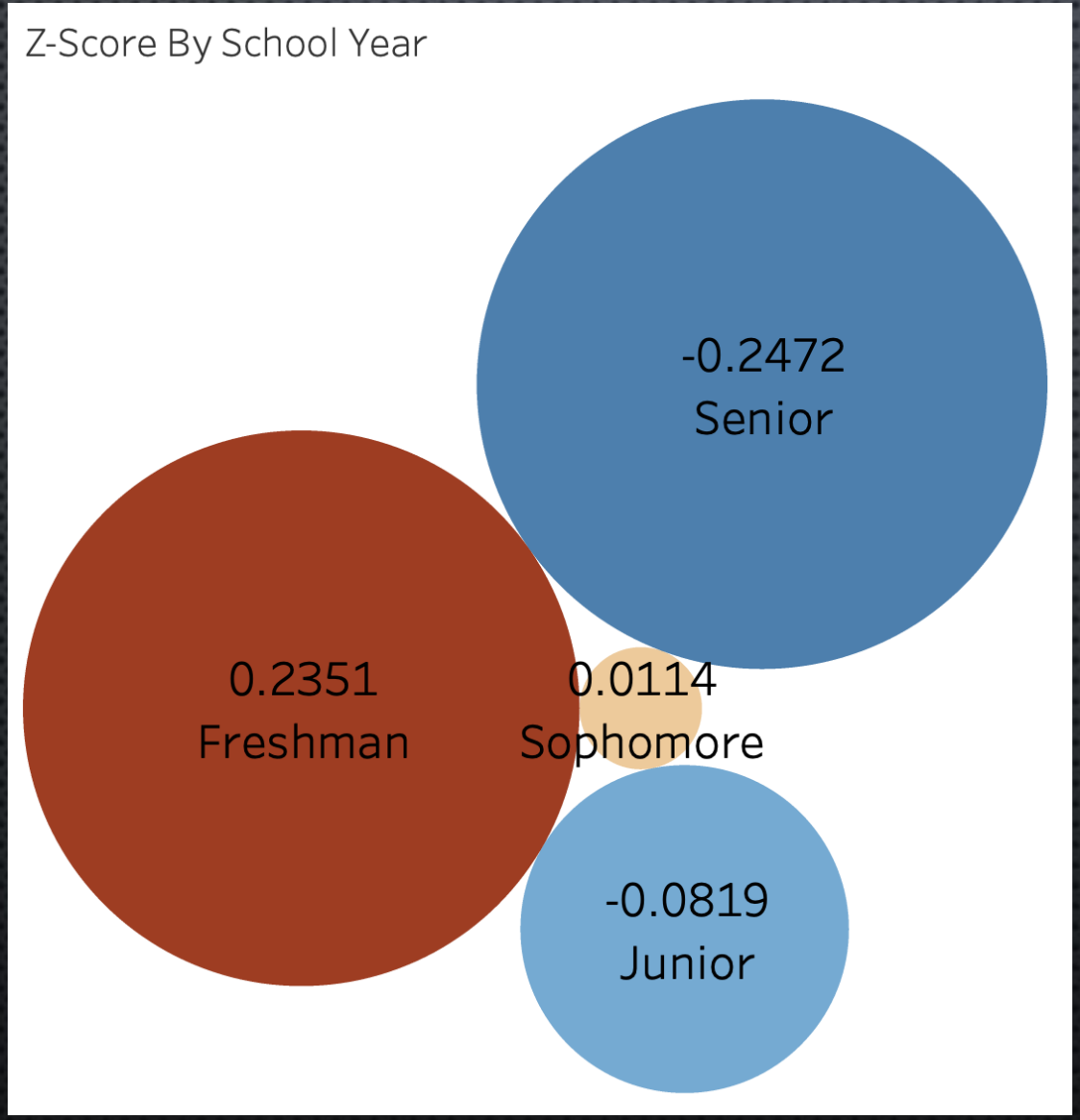
AVERAGE Z SCORE FOR EACH LOCATION

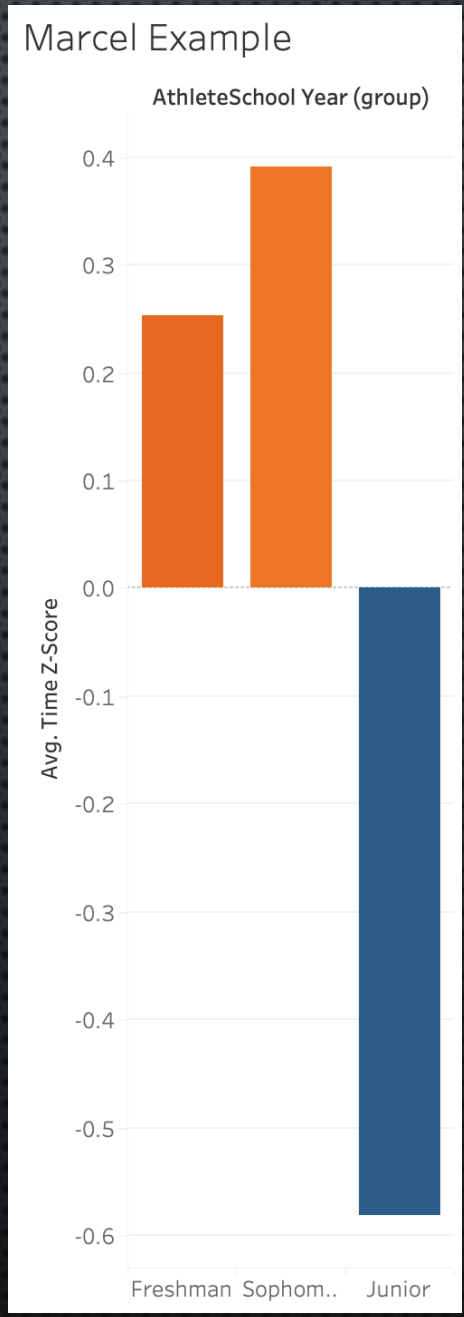
- PRINCEVILLE LOOKS THE SLOWEST OVERALL

HOWEVER, WE DON'T KNOW IF THIS IS DUE TO FACTORS SPECIFIC TO THE LOCATION (SURFACE TYPE, TRACK SHAPE, TIMING SYSTEM RELIABILITY...). THIS DIFFERENCE COULD BE DUE TO:

- SCHOOL YEAR OF ATHLETES
- TYPE OF MEET
- LENGTH OF RACE
- TEMPERATURE
- DAYS SINCE THE START OF THE SEASON
- WIND SPEED

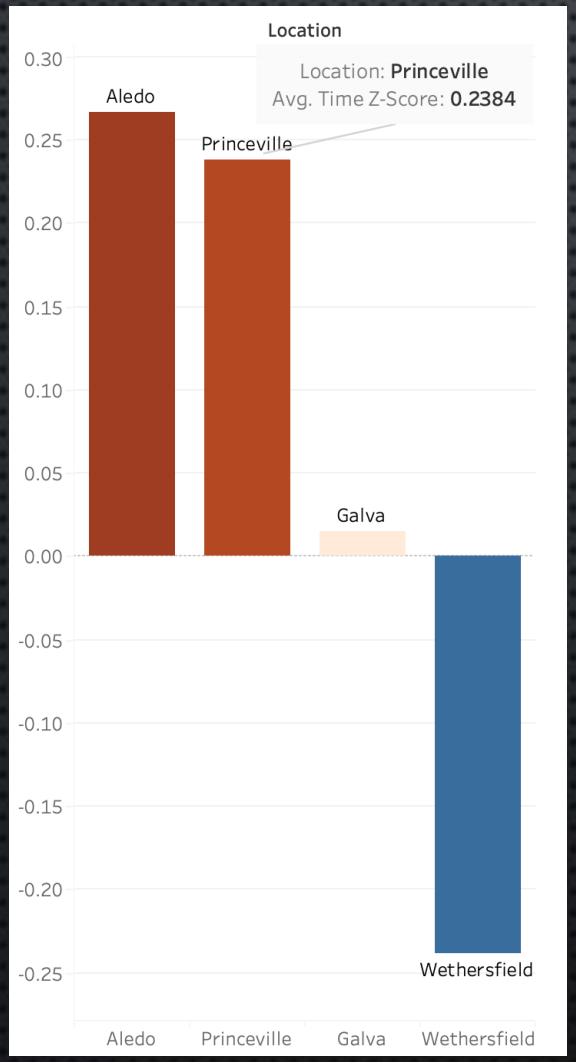
SCHOOL YEAR


Z-Score By School Year
-0.2472
Senior
0.2351
Freshman
0.0114
Sophomore
-0.0819
Junior

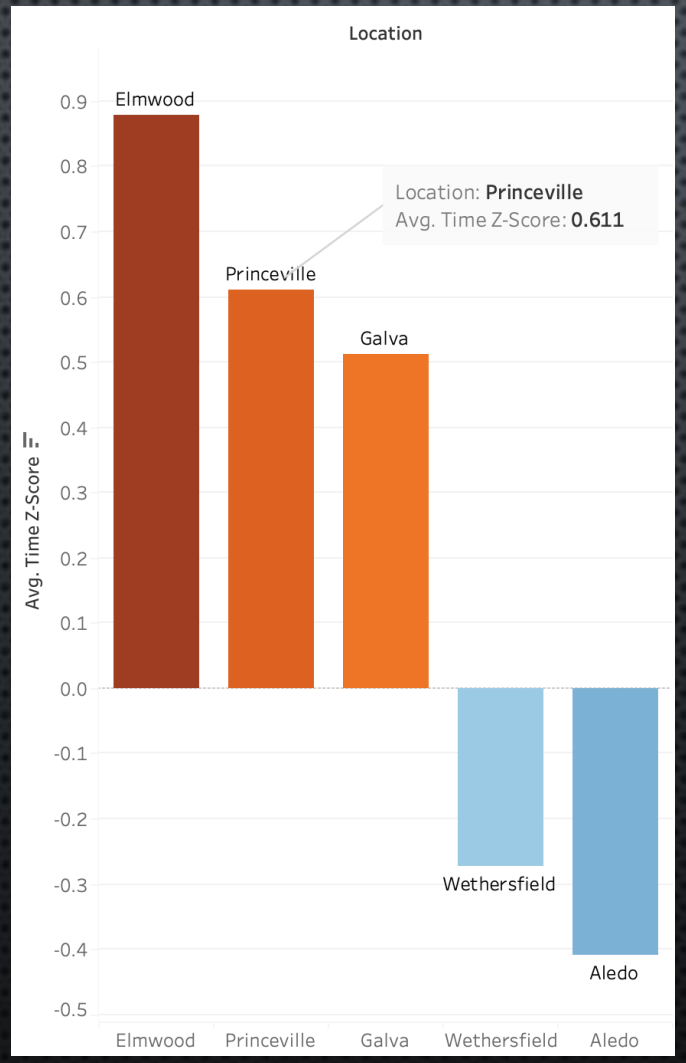

Marcel Example
AthleteSchool Year (group)
Avg. Time Z-Score
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
Freshman
Sophom..
Junior

SCHOOL YEAR

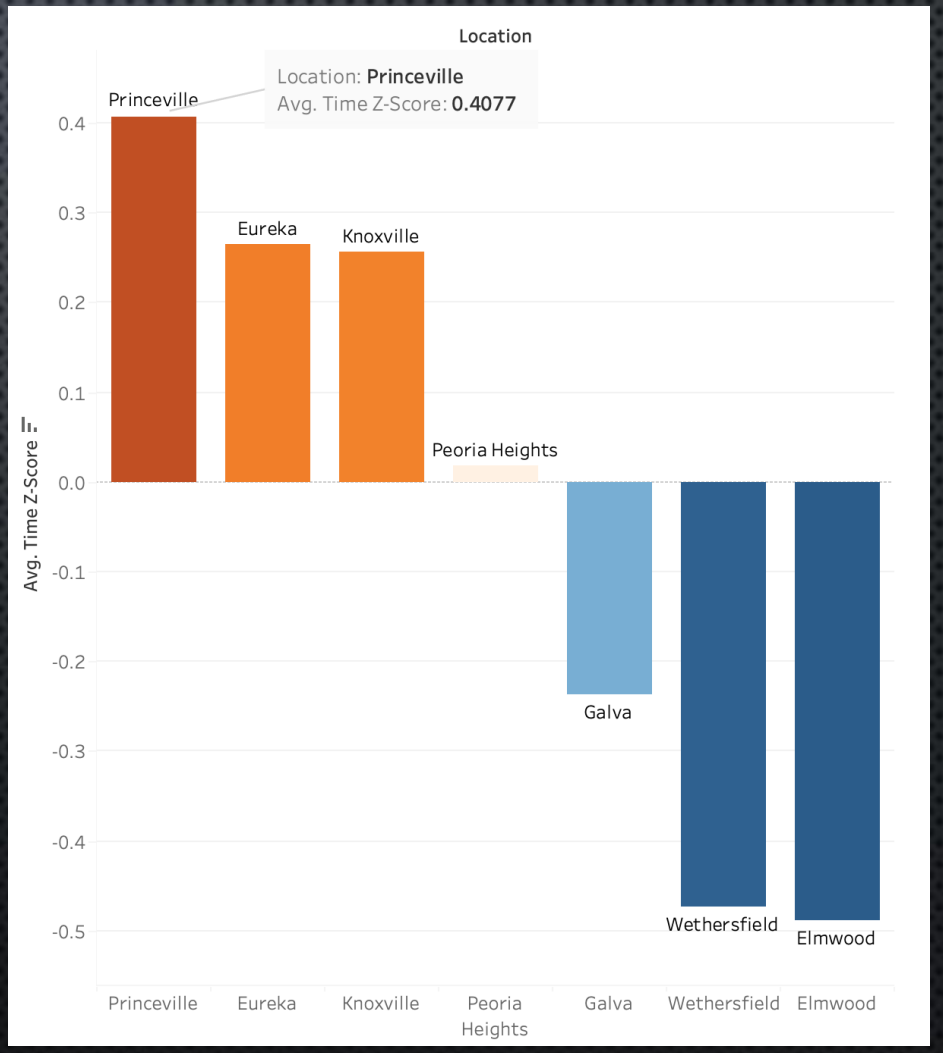
2021



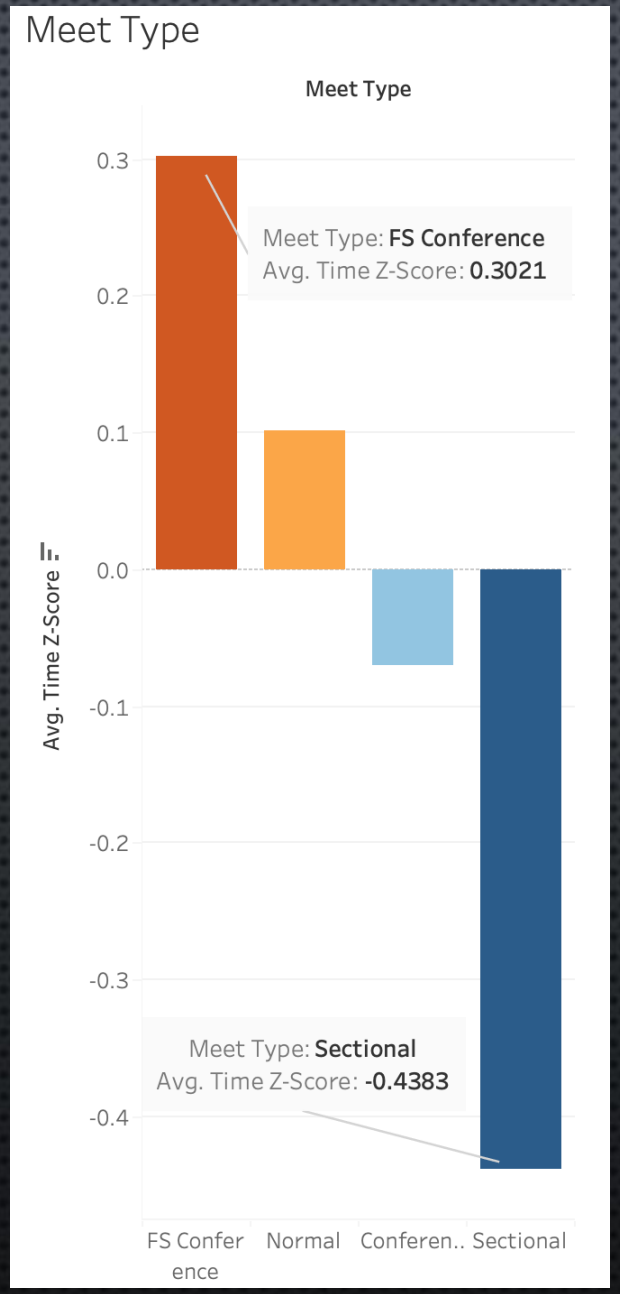
2022

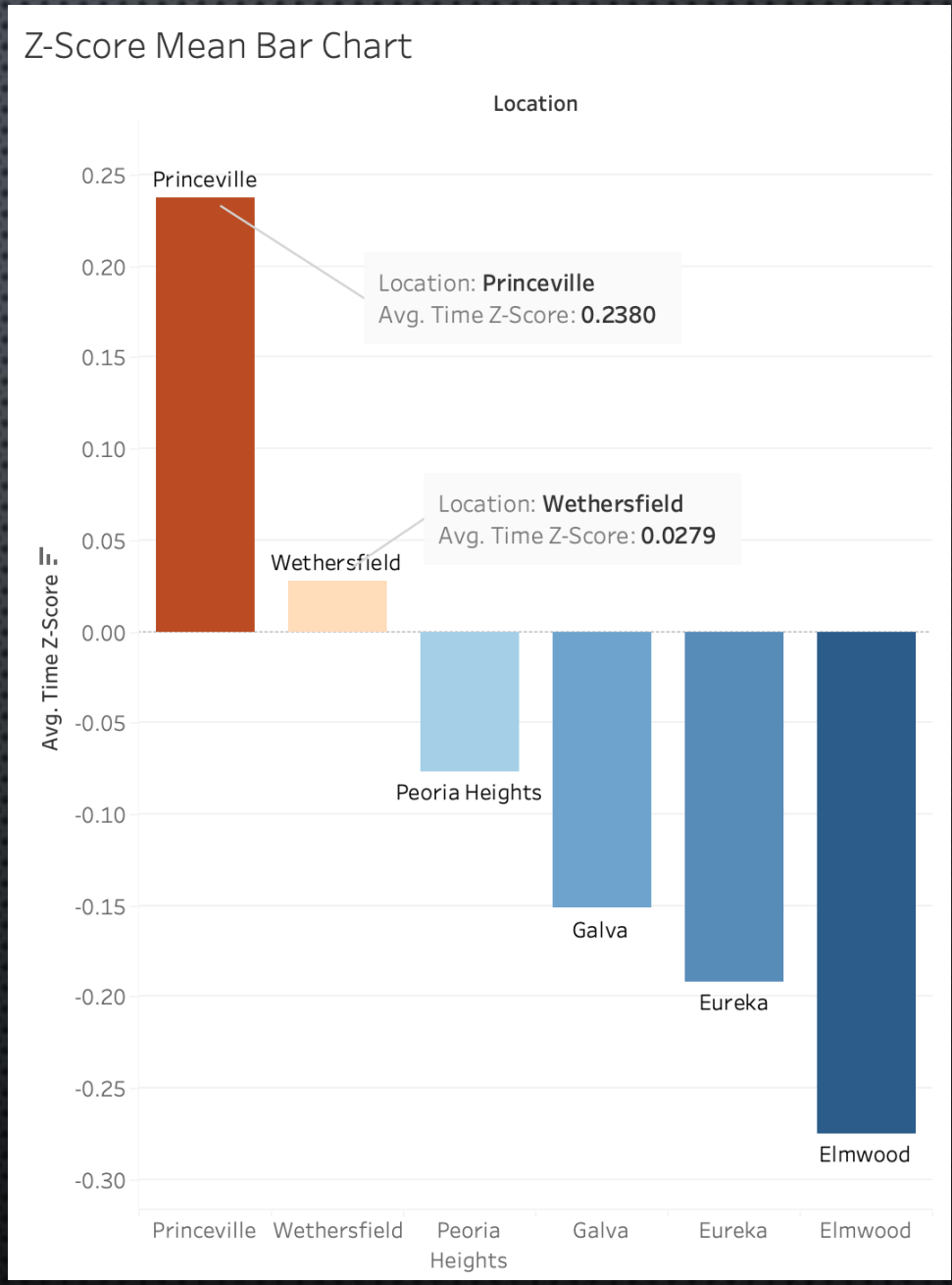


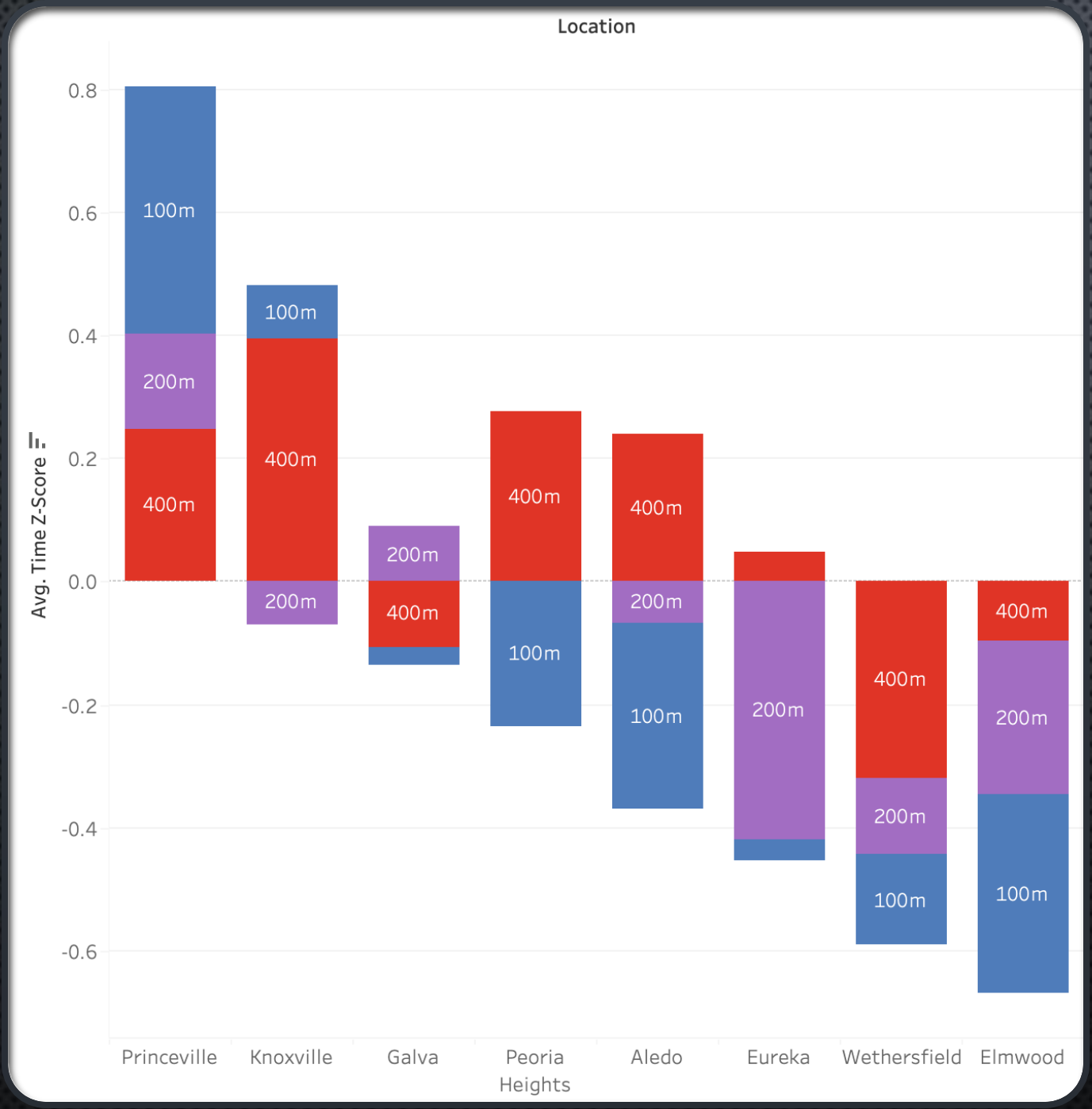
2023



TYPE OF MEET

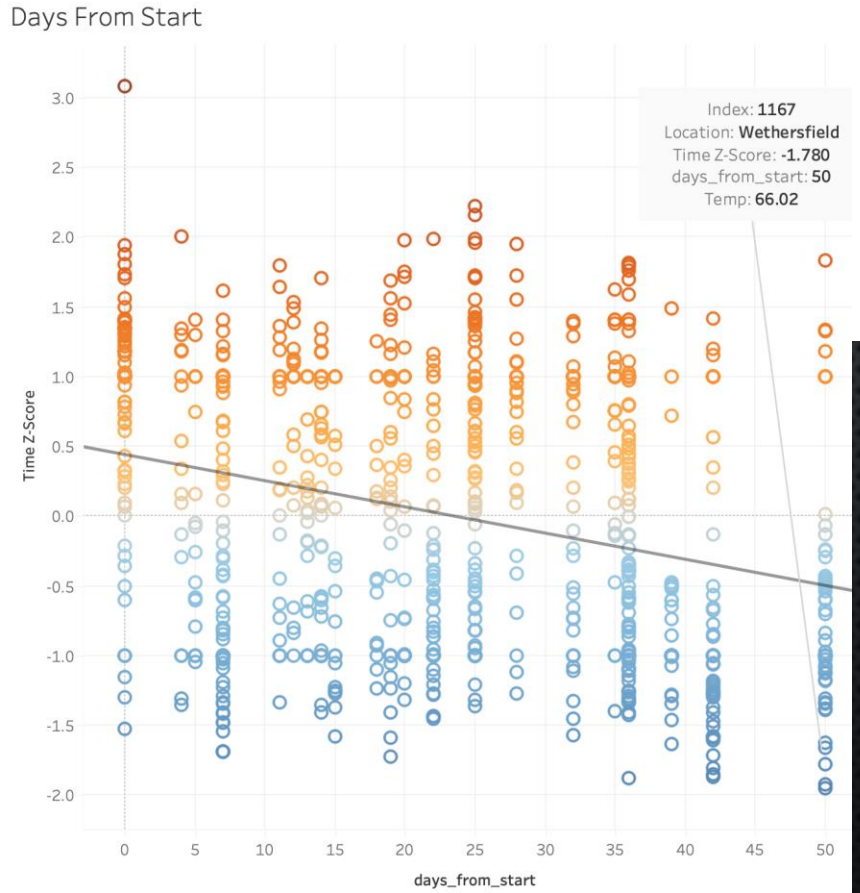

Meet Type
Meet Type
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
Avg. Time Z-Score
Meet Type: FS Conference
Avg. Time Z-Score: 0.3021
Meet Type: Sectional
Avg. Time Z-Score: -0.4383
FS Confer ence
Normal
Conferen..
Sectional

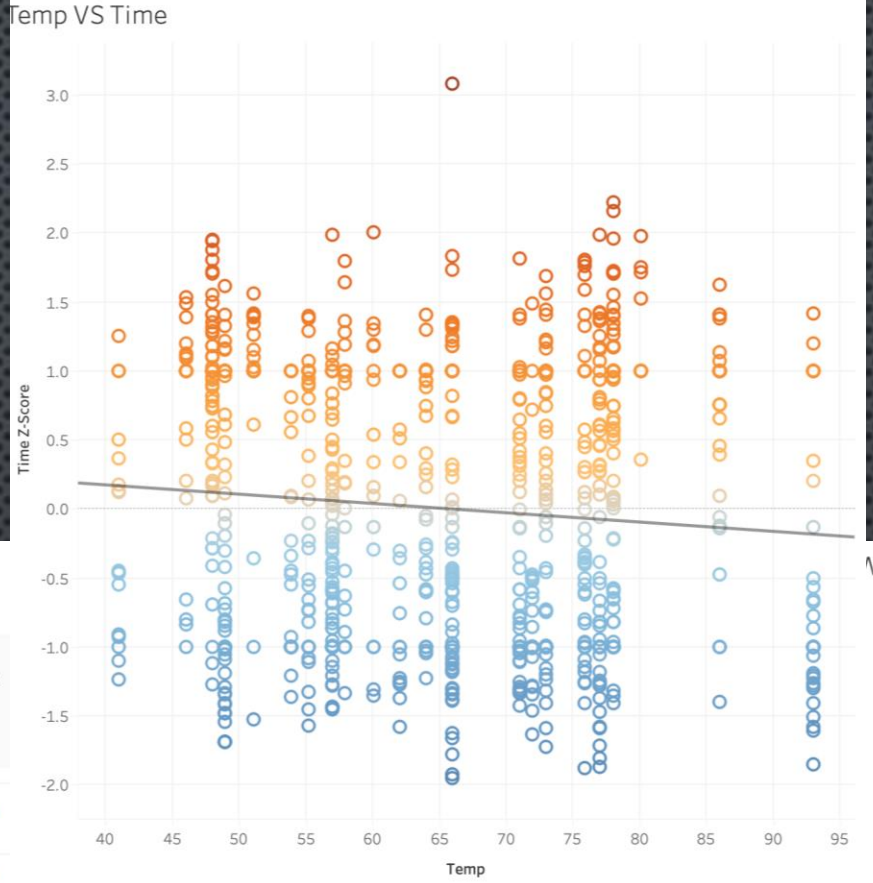

Z-Score Mean Bar Chart
Location
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
-0.20
-0.25
-0.30
Avg. Time Z-Score
Princeville
Location: Princeville
Avg. Time Z-Score: 0.2380
Wethersfield
Location: Wethersfield
Avg. Time Z-Score: 0.0279
Peoria Heights
Galva
Eureka
Elmwood
Princeville
Wethersfield
Peoria Heights
Galva
Eureka
Elmwood



LENGTH OF RACE

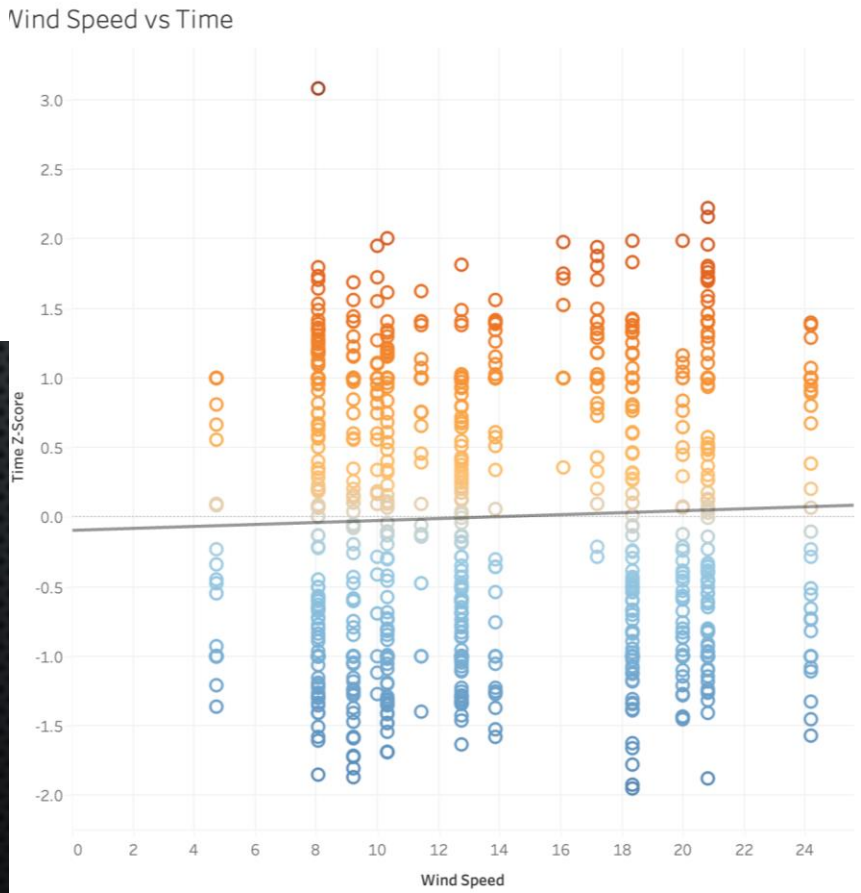
Days Since Start of Season vs Time Z-Score





Temperature vs Time Z-Score

Wind Speed vs Time Z-Score



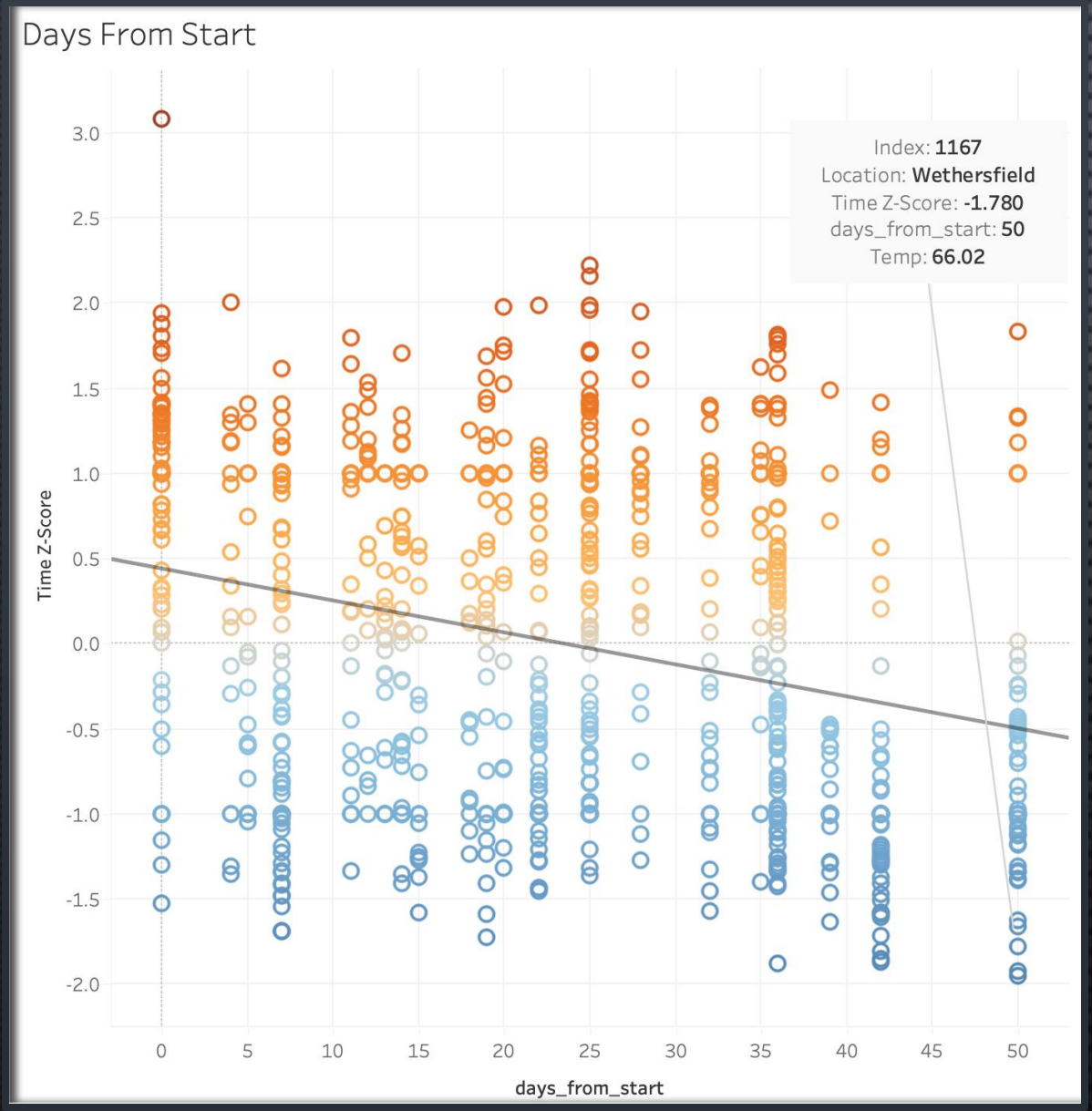
We've Checked For

- School Year
- Type of meet
- Race length
- Days since start of season
- Temperature
- Wind speed

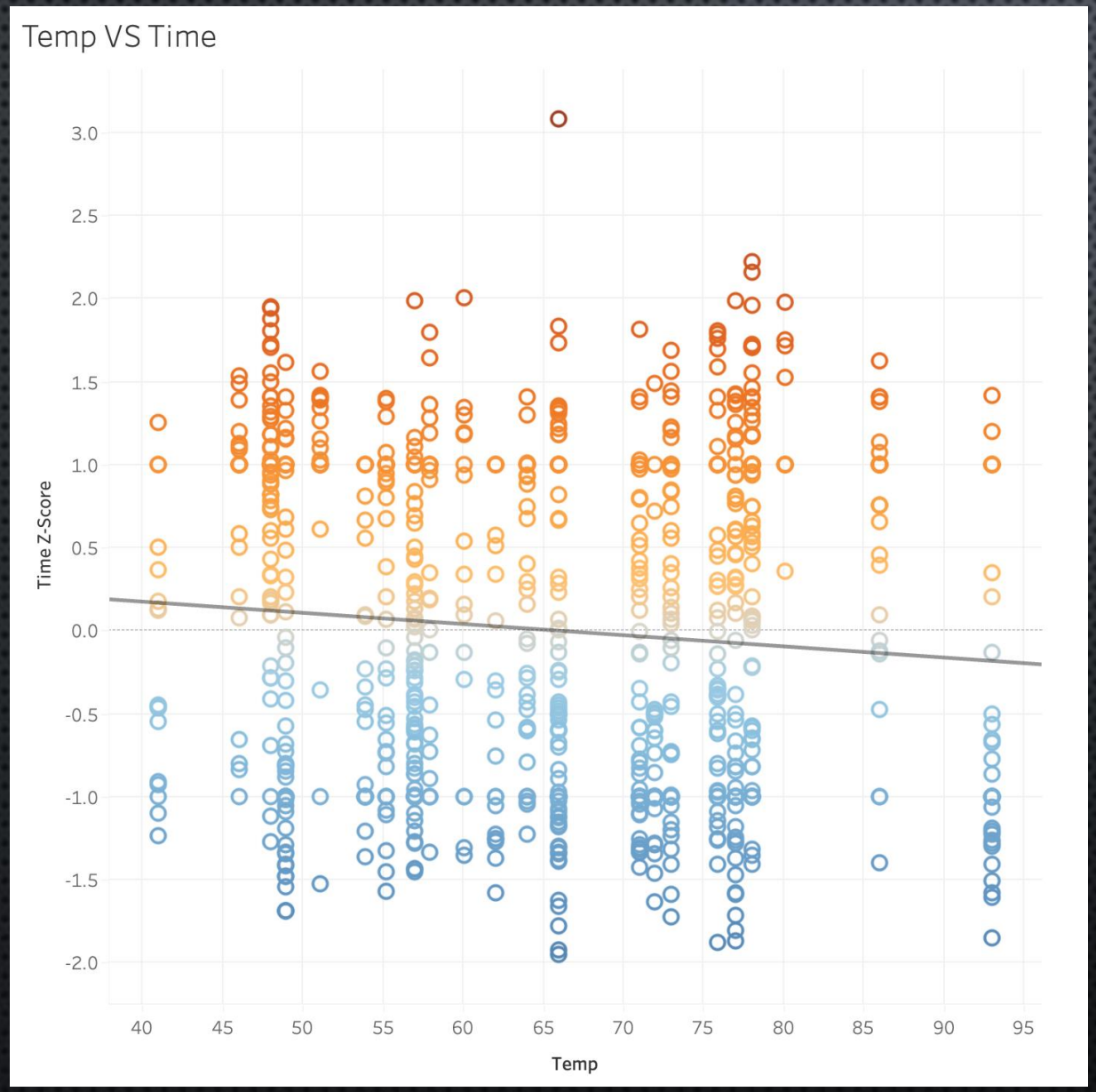
Removing each of these factors still results in Princeville being slower on average.

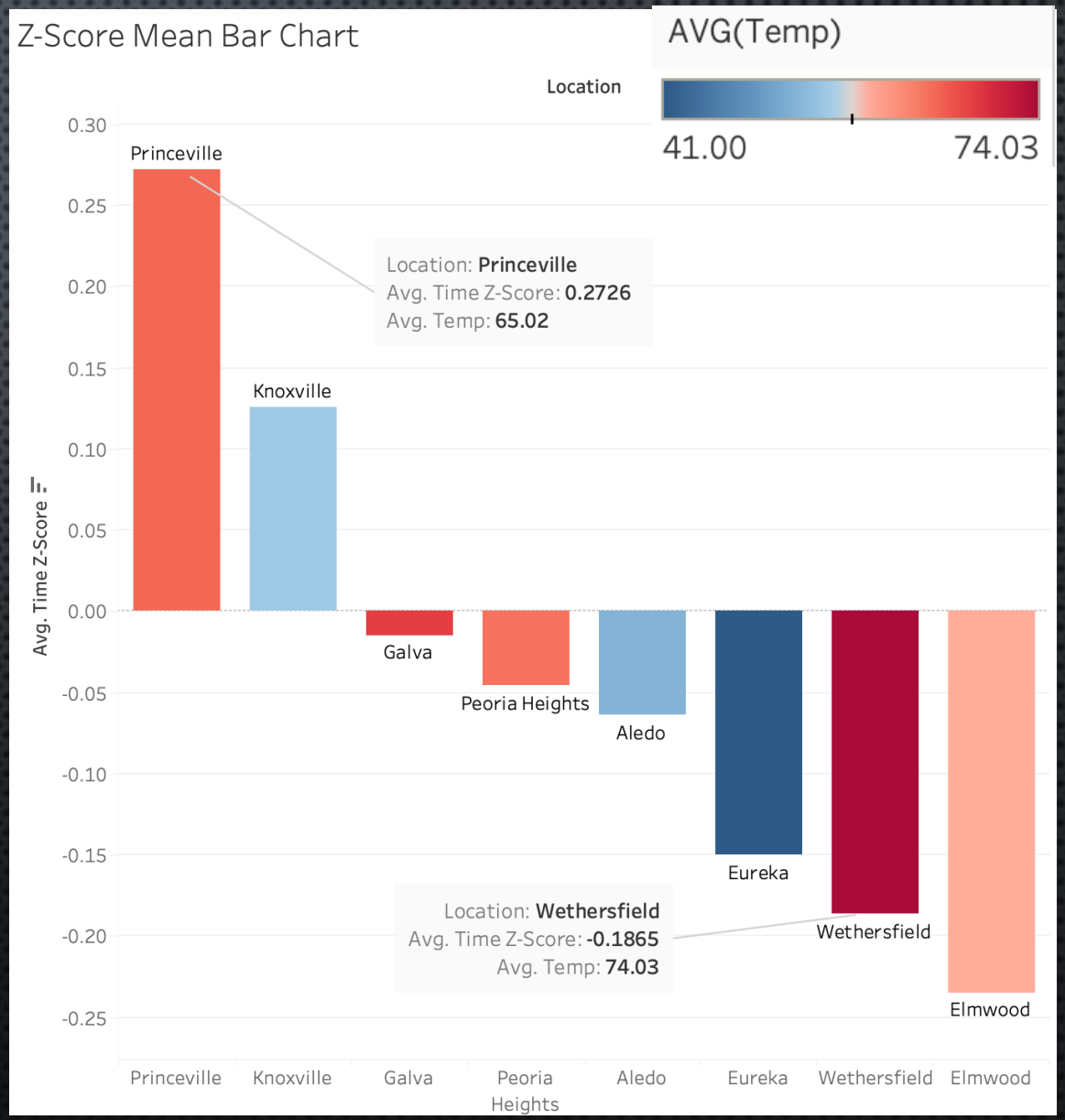
- Therefore, it's not certain, but it's likely that the specific aspects of **location** are what makes the average z-score higher for Princeville.
- Shape of track
- Surface type
- Crowd environment
- Reliability of fat timing system

DAYS SINCE START OF SEASON

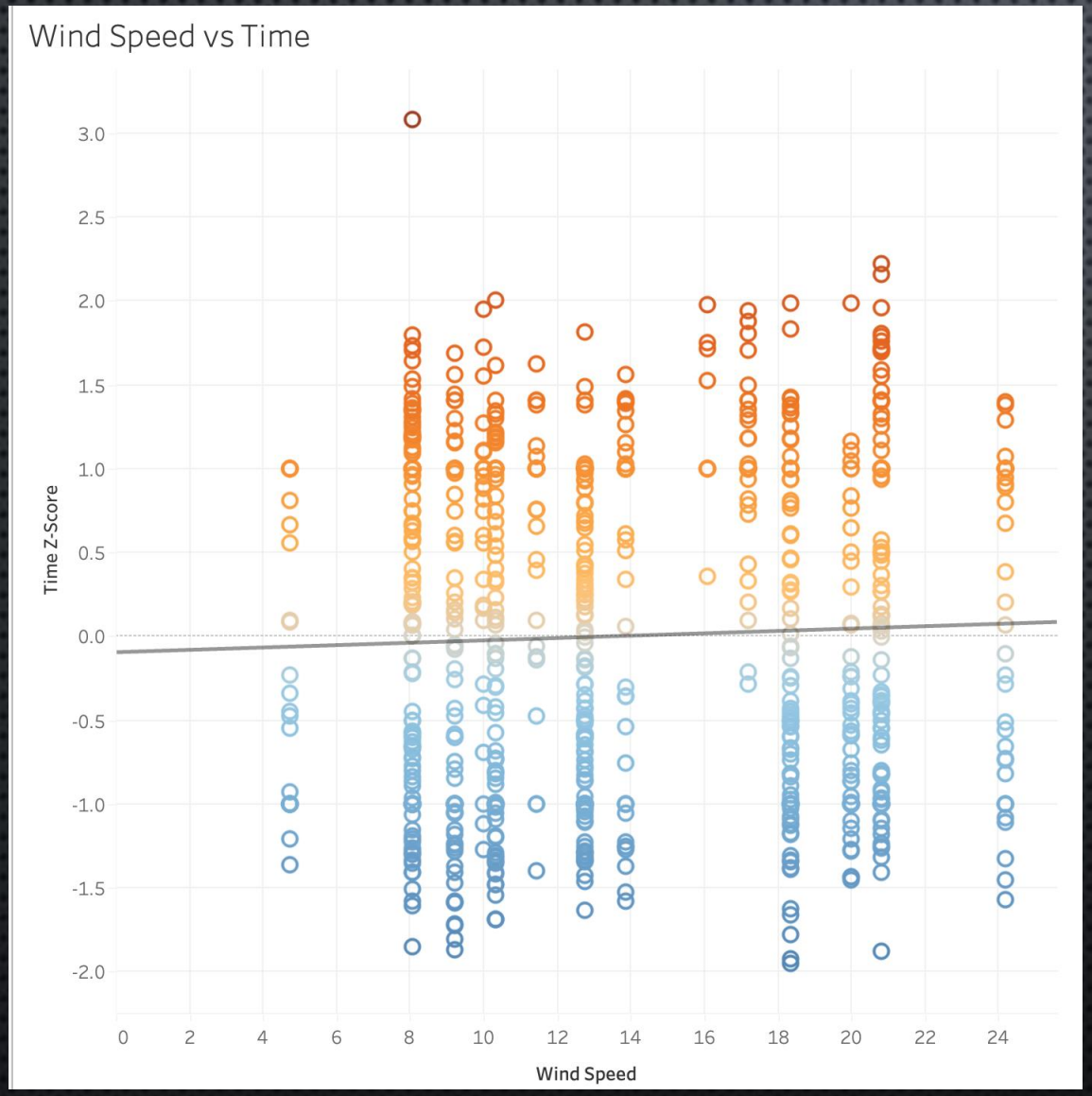


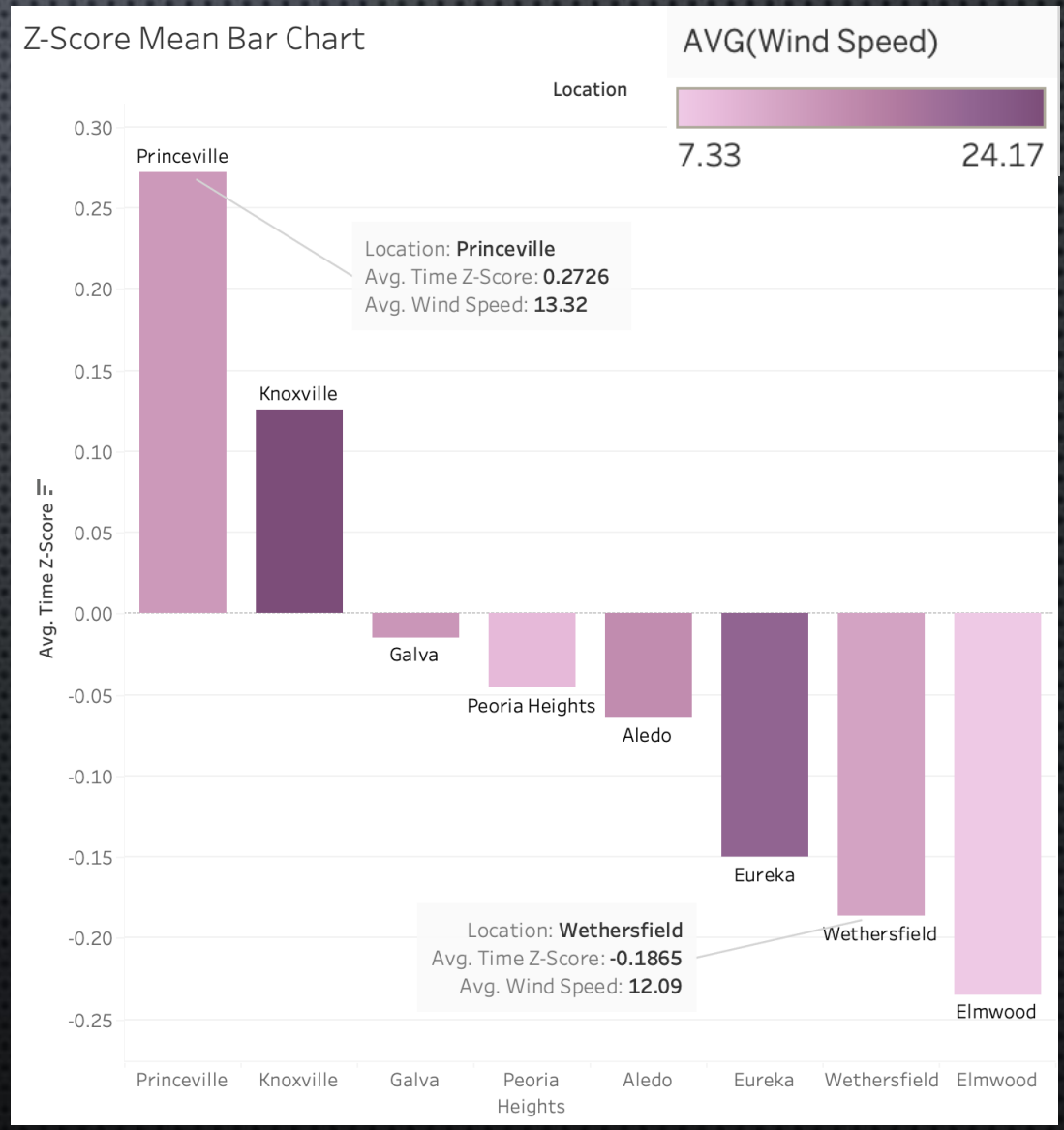
TEMPERATURE





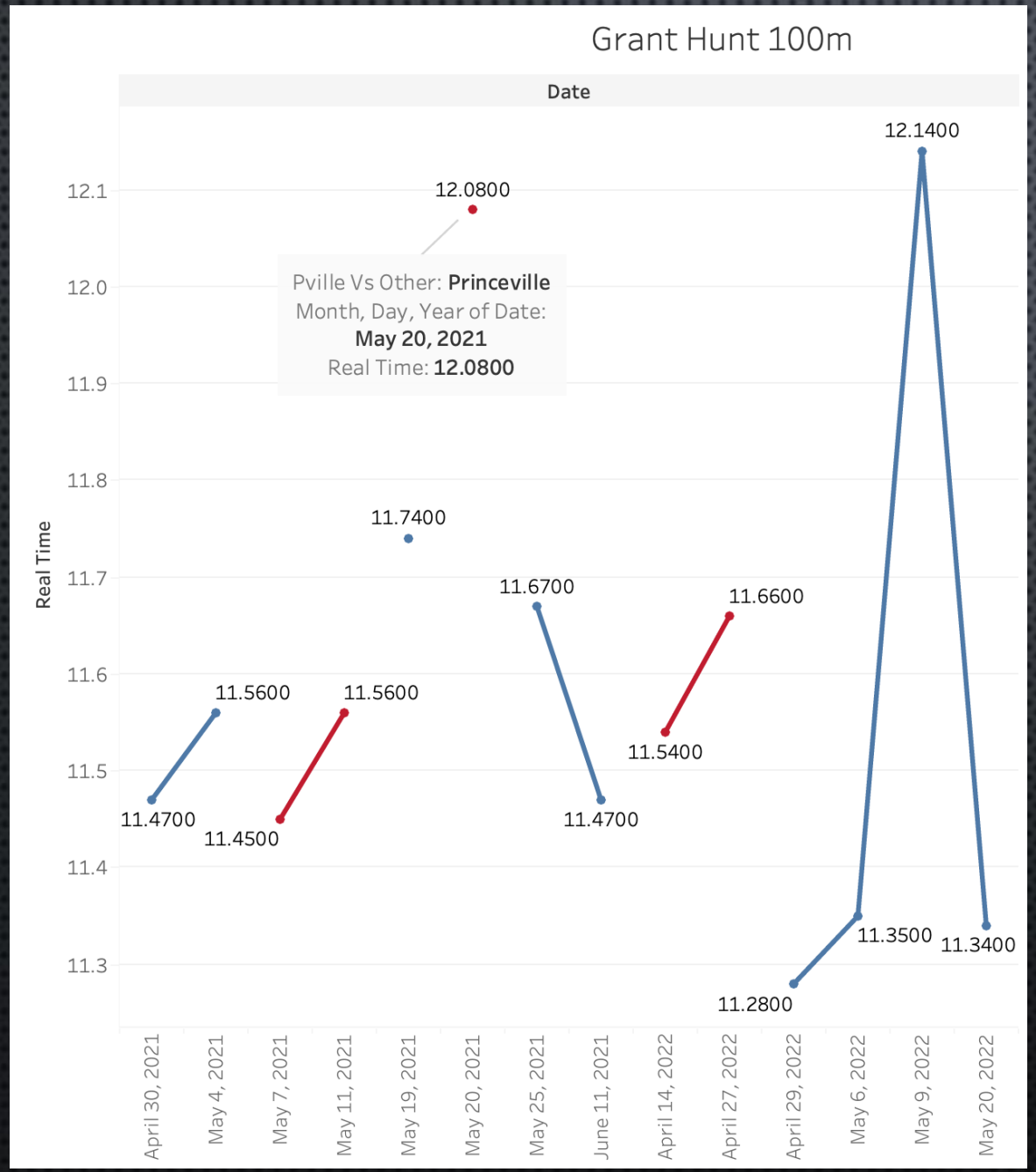
WIND SPEED


Wind Speed vs Time
Time Z-Score
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
0
2
4
6
8
10
12
14
16
18
20
22
24
Wind Speed


Z-Score Mean Bar Chart
AVG(Wind Speed)
Location
7.33
24.17
Princeville
Location: Princeville
Avg. Time Z-Score: 0.2726
Avg. Wind Speed: 13.32
Knoxville
Galva
Peoria Heights
Aledo
Eureka
Wethersfield
Location: Wethersfield
Avg. Time Z-Score: -0.1865
Avg. Wind Speed: 12.09
Elmwood
Avg. Time Z-Score
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
-0.20
-0.25
Princeville
Knoxville
Galva
Peoria Heights
Aledo
Eureka
Wethersfield
Elmwood

2021	100m	200m	400m
	Galva 0.2401	Princeville 0.1636	Princeville 0.4792
	Wethersfield 0.1467	Galva -0.0590	Wethersfield 0.0448
	Princeville -0.3546	Wethersfield -0.1627	Galva -0.4222
2022			
	Galva 1.132	Princeville 0.1596	Elmwood 1.000
	Elmwood 0.914	Elmwood 0.0589	Princeville 0.333
	Princeville -0.333	Galva -0.6174	Galva -0.500
	Wethersfield -1.029		Wethersfield -0.500
2023			
	Princeville 0.868	Galva 0.4897	Eureka 0.358
	Eureka 0.583	Princeville -0.0577	Peoria Heights 0.288
	Peoria Heights -0.216	Eureka -0.2657	Princeville 0.209
	Elmwood -0.566	Elmwood -0.3548	Galva -0.088
	Galva -0.630		Elmwood -0.727

	100m	200m	400m
2021			
Other Tracks	0.1934	-0.0996	-0.2054
Princeville	-0.3546	0.1636	0.4792
2022			
Other Tracks	0.1457	-0.2792	-0.0909
Princeville	-0.3329	0.1596	0.3333
2023			
Other Tracks	-0.397	0.04096	-0.1217
Princeville	0.868	-0.05771	0.2087


Grant Hunt 100m
Date
Real Time
12.1
12.0
11.9
11.8
11.7
11.6
11.5
11.4
11.3
12.0800
Pville Vs Other: Princeville
Month, Day, Year of Date:
May 20, 2021
Real Time: 12.0800
12.1400
11.7400
11.6700
11.6600
11.5600
11.5600
11.5400
11.4700
11.4500
11.4700
11.3500
11.3400
11.2800
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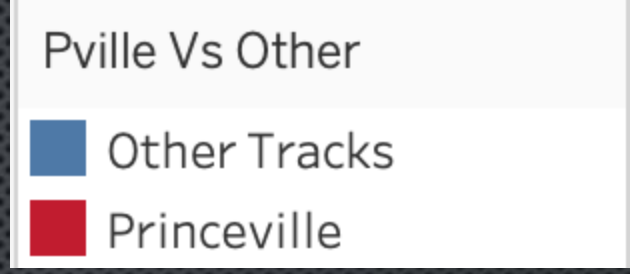
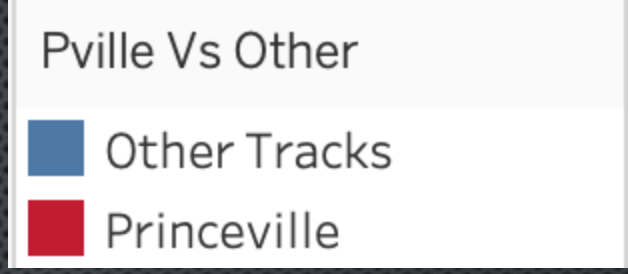
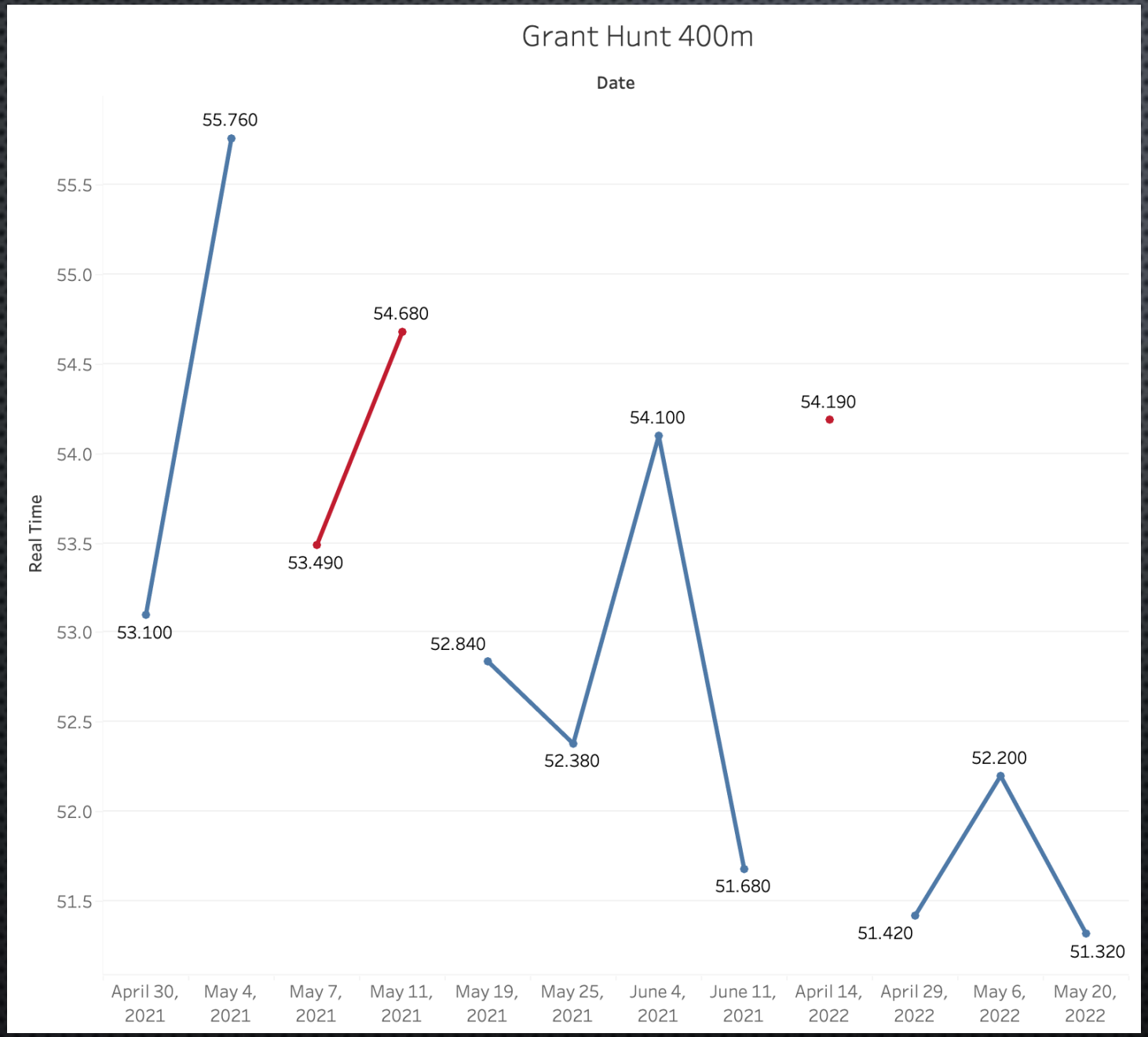

Pville Vs Other
Other Tracks
Princeville

Grant Hunt 200m
Date
Real Time
23.9
23.8
23.7
23.6
23.5
23.4
23.3
23.2
23.9100
23.8800
23.7900
23.7200
23.6400
23.6500
23.6600
23.4200
23.3200
23.2200
23.2000
23.1800
April 30, 2021
May 4, 2021
May 7, 2021
May 11, 2021
May 19, 2021
May 20, 2021
May 25, 2021
June 4, 2021
June 11, 2021
April 14, 2022
April 27, 2022
May 6, 2022


Pville Vs Other
Other Tracks
Princeville


Grant Hunt 400m
Date
Real Time
55.760
54.680
54.190
54.100
53.100
53.490
52.840
52.380
52.200
51.680
51.420
51.320
55.5
55.0
54.5
54.0
53.5
53.0
52.5
52.0
51.5
April 30, 2021
May 4, 2021
May 7, 2021
May 11, 2021
May 19, 2021
May 25, 2021
June 4, 2021
June 11, 2021
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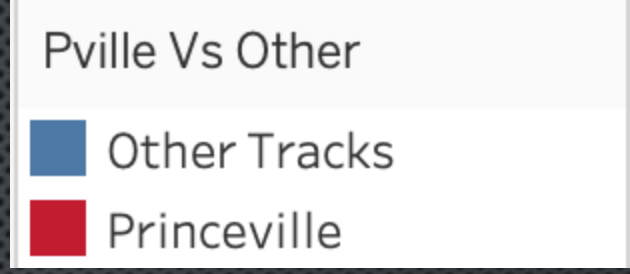
April 29, 2022
May 6, 2022
May 20, 2022


Pville Vs Other
Other Tracks
Princeville