

November 18, 2019

2019 PRM RESULTS

Hillcrest Country Club, Boise ID



INTRODUCTION

Performance Resource Management is a premium agronomic service designed to deliver superior results. PRM improves playing conditions while saving water and other operational costs, which greatly benefits the business of operating a golf course.

Qualitative results that have been recorded this season include:

1. Improved turf density
2. Less irrigation maintenance (due to clogged sprinkler heads)
3. Reduced hand watering
4. A reduction in the severity of wet spots

PRM has monitored multiple, quantitative data points that have contributed to the qualitative results that were observed over the season.

This report highlights the agronomic improvements that have been observed at Hillcrest Country Club over the course of the 2018 season. Notable, quantitative improvements include:

1. Thatch Reduction
2. Root Zone Expansion
3. Drainage Improvement

Charts, graphs, and tables included in the '19 PRM Results Report reference data representative of trends observed across the course since PRM was first implemented in Spring 2018. Agronomic data has been gathered by PRM. We expect to see continued improvements throughout next year with the 2020 PRM program.

THATCH REDUCTION

Excess thatch is a problem many golf courses struggle with across the valley. Thatch layering creates a perched water table, limiting drainage, the effectiveness of irrigation and the efficiency of root development. Managing organic material has posed a challenge for decades, and significant progress has been recorded this year.

The first 3 prominent layers of thatch were measured in May, July, and September for both 2018 and 2019. The figures 1 and 2 (below) shows the decrease in thatch, by layer, over the course of 2 seasons. For example, the first layer of thatch decreased from 0.36 inches in the Spring to 0.16 inches in the Fall (of 2018), a 54% reduction in the first layer of thatch. PRM has continued to deliver results throughout the 2019 season, exhibiting familiar trends in thatch reduction, year after year.

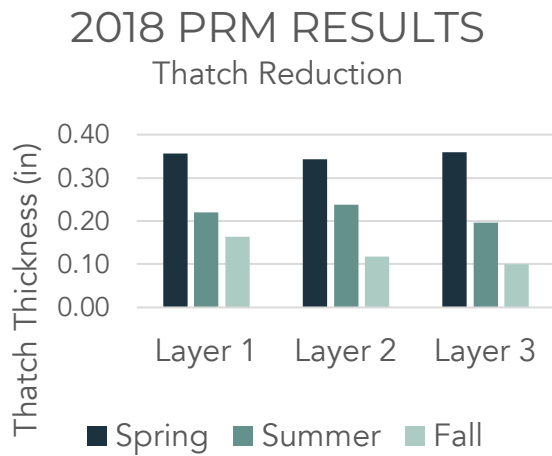


Figure 1: 2018 Thatch Reduction

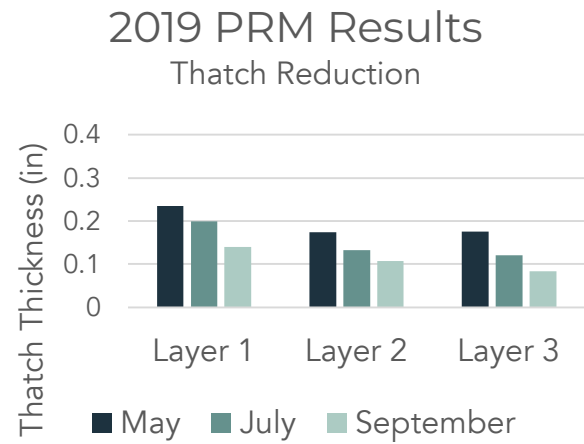


Figure 2: 2019 Thatch Reduction

We have made significant progress combatting thatch, layering, and managing organic material over the course of 2 seasons with PRM.

2018 Average Thatch Thickness (in)				
zT	Spring	Summer	Fall	% reduction
Layer 1	0.36	0.22	0.16	54%
Layer 2	0.34	0.24	0.12	66%
Layer 3	0.36	0.20	0.10	72%

Table 1: 2018 Thatch Thickness

2019 Average Thatch Thickness (in)				
zT	May	July	September	% reduction
Layer 1	0.24	0.20	0.14	40%
Layer 2	0.17	0.13	0.11	39%
Layer 3	0.18	0.12	0.08	52%

Table 2: 2019 Thatch Thickness

ROOT ZONE EXPANSION

The deeper roots can go into the soil, the more efficient the plant is in transporting nutrients and surviving extreme temperature and drought. Running PRM causes the root zone to expand course wide, on greens, tees, and fairways. Expanded root zone was observed across each consecutive season.

2018 PRM RESULTS

Root Zone Expansion

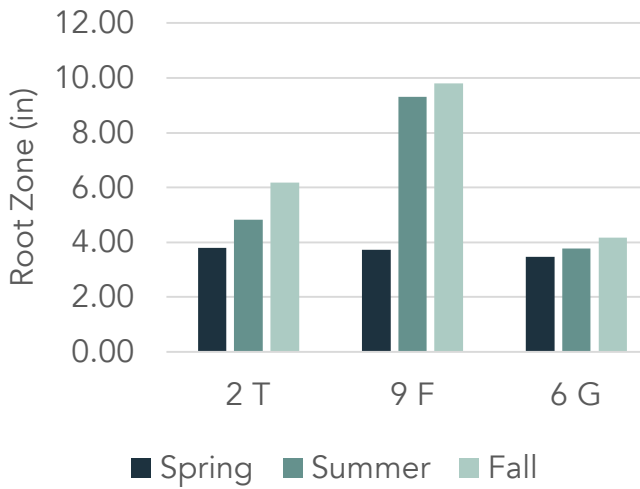


Figure 3: 2018 Root Zone Expansion

2019 PRM Results

Root Zone Expansion

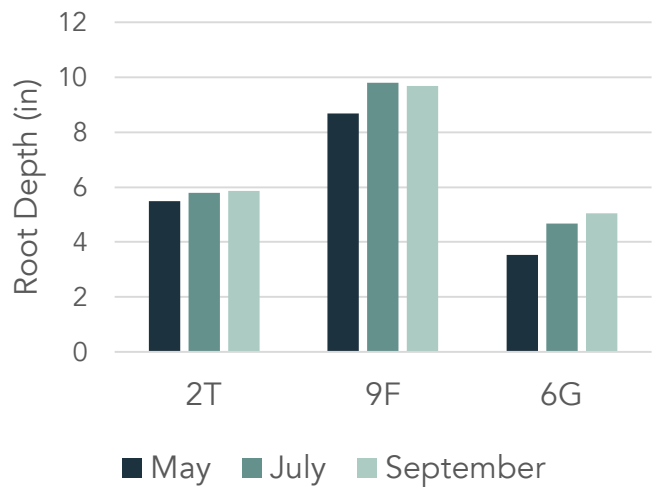


Figure 4: 2019 Root Zone Expansion

2018 Average Root Depth (in)				
Location	Spring	Summer	Fall	% increase
2 T	3.80	4.82	6.17	63%
9 F	3.72	9.31	9.79	163%
6 G	3.46	3.76	4.16	20%

Table 3: 2018 Average Root Depth

2019 Average Root Depth (in)				
2019	May	July	September	% increase
2T	5.4875	5.7875	5.875	7%
9F	8.6872	9.8	9.7	10%
6G	3.525	4.675	5.05	30%

Table 4: 2019 Average Root Depth

DRAINAGE IMPROVEMENT

Drainage is the result of a combination of agronomical factors that are interrelated. Reducing thatch and compaction allows water to flow through the soil profile and also causes increased root development. All trends have been observed over the 2018 and 2019 season.

PRM

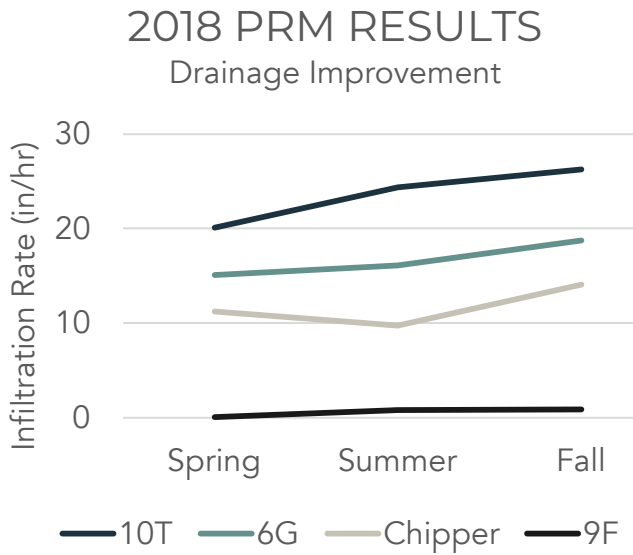


Figure 5: 2018 Drainage Improvement

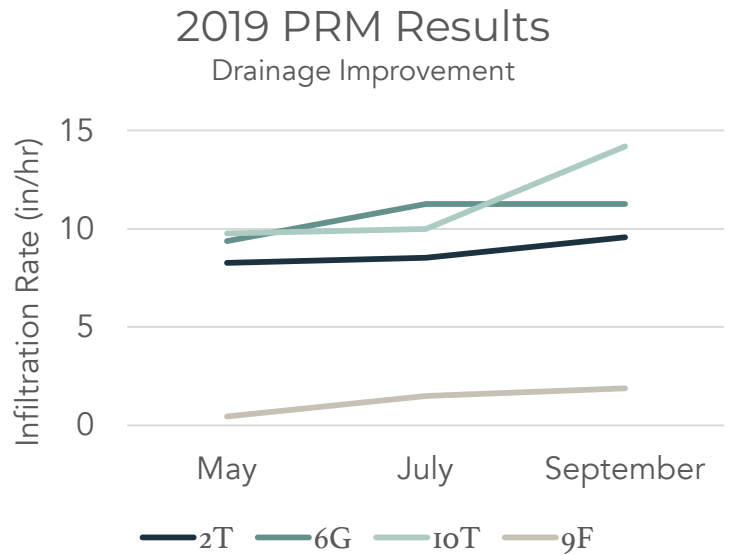


Figure 6: 2019 Drainage Improvement

2018 Drainage Improvement (in/hr)				
Location	Spring	Summer	Fall	% increase
10T	20.10	24.38	26.25	31%
6G	15.10	16.10	18.75	24%
Chipper	11.20	9.70	14.06	26%
9F	0.03	0.80	0.88	2723%

Table 5: 2018 Drainage Improvement

2019 Drainage Improvement (in/hr)				
Location	May	July	September	% increase
2T	8.25	8.52	9.57	16%
6G	9.38	11.25	11.25	20%
10T	9.75	10	14.19	45%
9F	0.44	1.5	1.87	325%

Table 6: 2019 Drainage Improvement

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