Fairway Management at Merion Golf Club

Philosophy

My philosophy in my career is playability first and aesthetics second. After 39 years as a Superintendent, I have come to the realization that when these practices are implemented, that the grass acclimates and you get both. The problem for anyone that implements this program is the time between implementation and acclimation will require an iron will on your behalf. I can assure you that the results at the end far outweigh the angst in the beginning and in the middle.

Mission Statement for playing standards

Greens

- To produce firm fast putting surfaces on daily basis consistency isn't the main concern! Grain is good, smoothness is mandatory.

Fairways

- To produce firm fast fairways on a daily basis.

Bunkers

- Make sure they are a hazard to be avoided at all cost and not a better option than the rough.

Rough

- Golfer should be able to find his ball most of the time, but make sure that you trap grass between the club head and the ball. Minimize the shearing action of the turf!

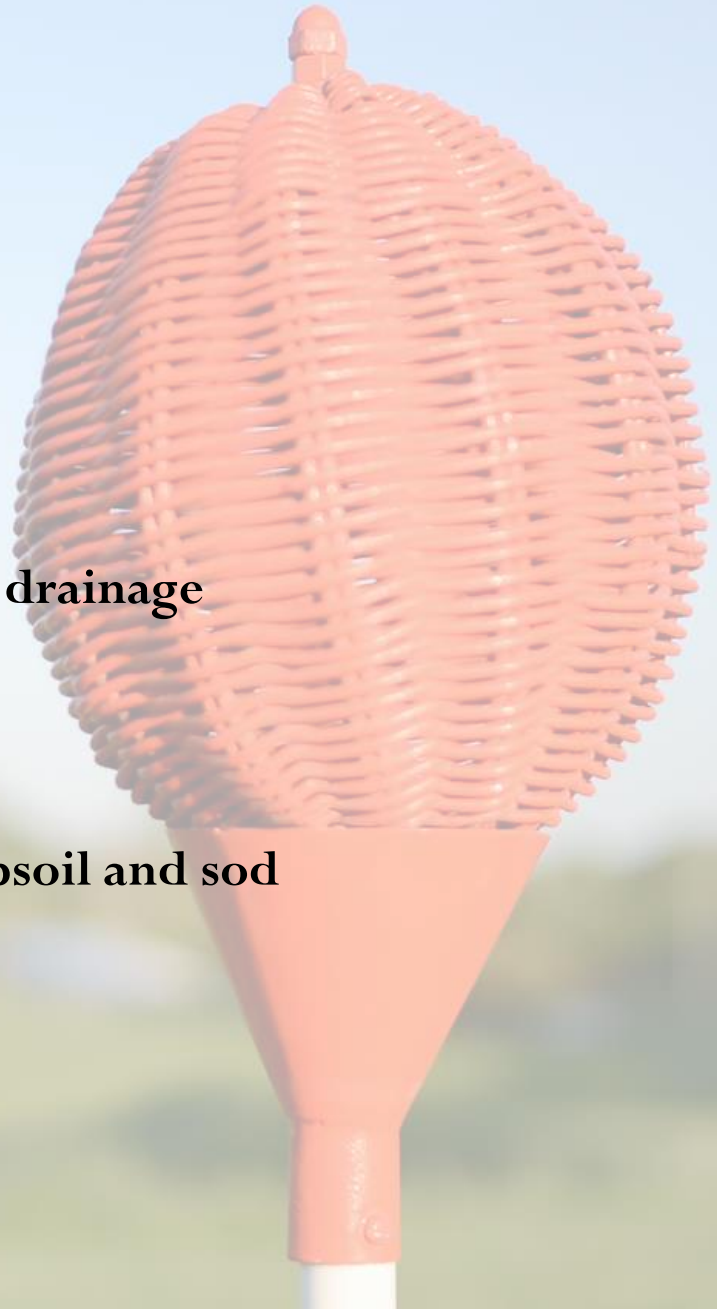
Excellent Drainage allows you to cut anytime .

When it rains head out to the course with a camera.

Drainage options:

1. Open drainage:
    - Catch basins
    - Surface Swales
    - Waterwick
    - Sand slitting (Blec, Graden, waffle drainage and sand capping.

2. Closed drainage:
    - Perforated pipe, stone, fabric? Topsoil and sod
    - XGD



During significant rain events go out on the course and take pictures of the water entering and exiting your property on each and every hole and develop a plan to do the drainage. I am a closed drainage fan, preferring suction over drains caps in landing zones. You can never have both on the same line, but if a further explanation is needed I can answer your question.

- **I have implemented a sand topdressing program at Merion. This is a program that once you start it will be quite awhile until you stop. Our program is in its seventh year and we have started to alter it slightly. In seven years we have incorporated 500 tons to the acre.**
- **It is critical to find an affordable sand mix that works consistently and a source that is going to be available long term. Testing with a reliable testing lab is also critical; we use Norm Hummel.**

Interesting side note:

I took over a club one time and during the interview they told me that the course used to be so much drier and that since their last superintendent took over it was a mushy mess. Their assumption was that he didn't know how to water. I am not sure how good he was at watering. However, I was fortunate enough to get the job and realize early on that this old classic course had clay drainage under the fairways.

The prior Superintendent would see a puddle in the fairways and dig down to the clay pipe and fabricated a stand pipe in the fairway and put a plastic oval grate on it. This was a " closed drainage system" when he put the vent in, he compromised the entire length of that pipe and everything above it quit draining.

I would bet that the pipe had broken and had he fixed the break, the system would have worked to perfection.

I took them all out the first winter I was there, put a solid section of pipe back in and Walla! we dry right out.

If there is no place to exit the water, you need to put a reclamation area where the water can be released back into the ground water by slowing down the flow and allowing it to seep back into the soil.

Drainage is always happening at Merion.
We get a wet spot ,we drain it.

Doing drainage is sloppy, muddy work unless you do it during the summer when it is dry.

Collateral damage (always track wire)

There always be challenges with drainage, but I can't over emphasize its importance.

Drainage

Make sure you do not trap water or it will back up on your fairways.

- **When it rains take your camera and head out onto the course and take pictures of all the trapped water on your fairways and rough.**
- **If the solution is not obvious in how to get the water out of there, get a topography map and look at the grades.**
- **Next get your laser transit; if you don't own one, buy one. Start shooting grades and find out how to get the water out. It takes very little fall to get water moving. We could talk about this subject all day, but I would refer you to a website that I use and will tell you everything you ever wanted to know about drainage and then some. It is called the Illinois Drainage Guide.**
- **If the most obvious place is an out of the way low area that has no obvious outlet, take it there and put in a release area.**
- **Bury a poly tank, put a flow plunger that looks like a toilet bowl float, hook it to a pump and pump it out.**

NEVER give up on drainage, when you eliminate saturated conditions you take control. I have never taken over a course that didn't need to do some drainage.

- **If you are at a place or have taken over a job that needs drainage, it could save you real time if you had a drainage study done. These consultants are so good; they will pull your topography map and have a plan in place that will require minimal changes before he ever sees the property.**
- **He will understand the flows that you may not understand.**
- **He will correctly size the out flow lines.**
- **He will lay out your piping and help you with cost so that you can then approach the board with a complete plan.**
- **He will have maps, data, and layouts that are virtually impossible for anyone to dispute.**

Open Drainage:

- **Catch basins: I am personally not a huge fan of catch basins; particularly in the middle of fairways. I think they compromise playing conditions.They are hard to get a nice cut around them as well. But if that is the best option, then that is far better than trapped water.**

- **I like swales, I know some clubs are hyper sensitive to changing architecture like that club I work at now, Merion. This is just another example of you selling the members on the importance of drainage. I used an Aerial map of the area around Merion when it was built, 90% less homes and highways. Things change and we must as well and have!**

Closed Drainage:

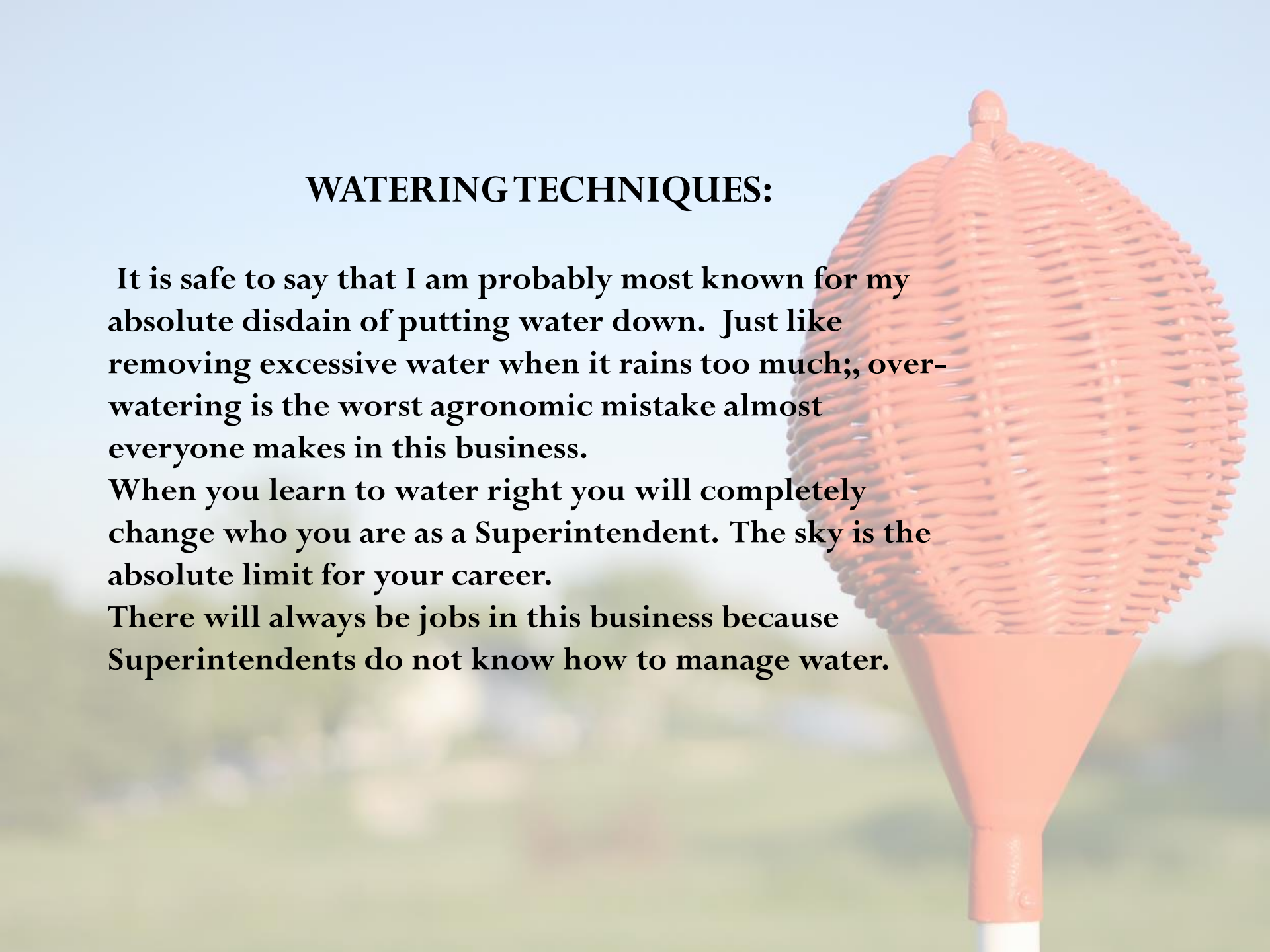
- **Once again for all instructions on proper procedures on closed systems consult with and expert or do lots of reading yourself.**

- **I know XGD is commonly thought of greens only but we have done some difficult swales on approaches at Merion and it works to perfection.**

- **This system works on suction. The water needs to get to the pipe and once the pipe starts to run it pulls the system dry.**

Most people consider XGD as greens drainage only, we utilize it on fairways.

Flo Wick



WATERING TECHNIQUES:

It is safe to say that I am probably most known for my absolute disdain of putting water down. Just like removing excessive water when it rains too much;, over-watering is the worst agronomic mistake almost everyone makes in this business.

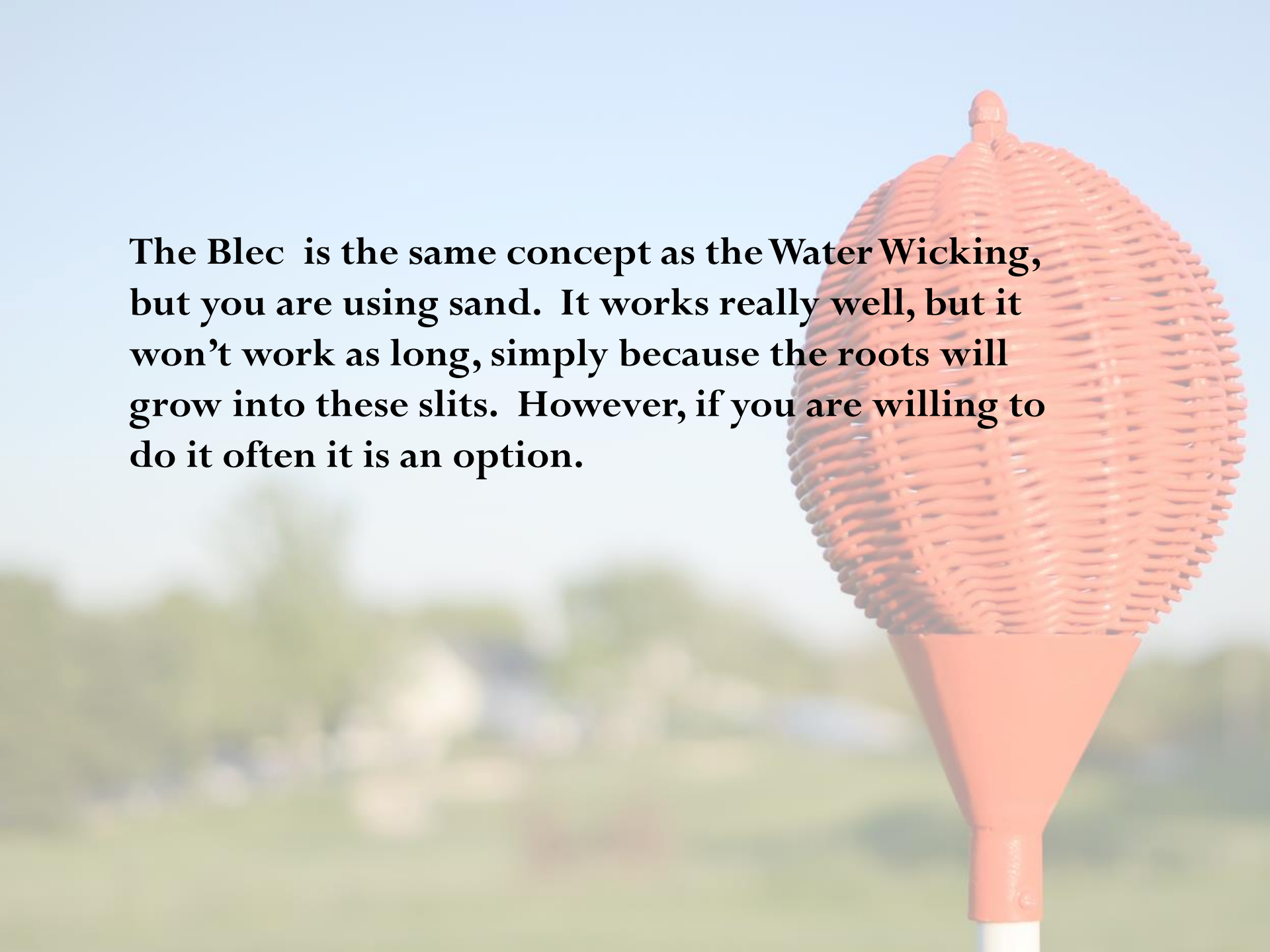
When you learn to water right you will completely change who you are as a Superintendent. The sky is the absolute limit for your career.

There will always be jobs in this business because Superintendents do not know how to manage water.

Water Wicking

- Once again you need to be able to take the water to an out flow pipe and then it works really well.
- It has minimal disruption. If your ground is heavy clay and obviously it is wet you can get some heaving on the edges, however this can be rolled down with 1 ton diesel packer that you can rent anywhere.
- Cost is .95 a foot that is installed the cost of the material which is chocker sand is only subject to freight cost to your area.
- We did numerous areas at Merion 12 years ago and they are always dry to cut in bad conditions; yet, they don't wilt under droughty conditions.

The Blec is the same concept as the Water Wicking, but you are using sand. It works really well, but it won't work as long, simply because the roots will grow into these slits. However, if you are willing to do it often it is an option.



An example of a machine that can improve drainage

This machine can really improve drainage in a fairway

This is an outstanding way to reduce organic matter as seen here.

Watering Practices

You can't manage what you can't measure

Field scout moisture sensor

Toro TurfGuard Sensor

UGMO Sensor

Purchase a soil Profiler

Nothing beats the Soil Probe

Watering Techniques

- **NEVER guesstimate your needs for watering.**
- **We have at least 30 different programs for fairways alone.**
- **We are constantly doing percentage adjustments.**
- **I only water fairways at night when they are extremely dry.**
- **Otherwise we chase fairway mowers in the morning and seal the cut.**
- **Spot water during the summer with hoses when labor available, and spot water with heads in the shoulder seasons.**
- **We will put the fairways to bed sometimes before the sun goes down with a short cycle.**
- **The best time to test where the absolute driest point is, is during the fall. I find even difficult for me to kill grass at this time of the year. It is cold, sun angles are lower, and the humidity in the Philadelphia area starts to fall out. You can get them to wilt and they will bounce back without water. This is the best time to take your moisture readings.**

- **However, thresholds are seasonal and geographical; what is acceptable in October will not work in August, at least that is the case in Philadelphia. When I worked at the Country Club in Cleveland, much colder country, I was astounded how well the grass did on very little water.**
- **If you cut your water by 50% you will be 90% better as a Superintendent!.**
- **Check dew patterns every morning. During the summer months this is one of the most critical things our superintendents do. They are here an hour before the staff starts and they or a Senior Assistant ride the course and look at greens, tees and fairways dew patterns.**
- **Ideally, there is heavy dew in the roughs and NO dew on the greens, a little on the fairways and more on the tees.**

Fertility and Soil Amendments

TECHNICAL INFORMATION

MITCHELL PRODUCTS

GC-260 Fairway Topdressing Sand

Straight Sand – USGA Specification

Particle Size Analysis		Sieve	% Retained	% Passing
Gravel	2.0 mm	#10 mesh	.1	99.9
V. Coarse	1.0 mm	#18 mesh	3.1	96.8
Coarse	.5 mm	#35 mesh	21.6	75.2
Medium	.25 mm	#60 mesh	53.5	21.7
Fine	.15 mm	#100 mesh	18.7	3.0
V. Fine	.05 mm	#270 mesh	2.0	.1

Sand: 98.9 % Silt: .3 Clay: .2

Particle Density:	2.66 g/cc
Bulk Density:	1.65 g/cc
pH:	5.9
SiO_2 > 98%	
Soluble Salts:	0.04 mmhos/ cm
# of Nematodes/250 ml soil:	None Detected

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Utilize your soil test for correcting the deficiencies

Natural organic fertilizer is critical to this program because you will want to encourage as much microbial activity as possible to break down organic matter.

95% of the time we never spray sterol inhibitors other than growth regulators, there isn't any other chemistry that is harder on microbial development than SI.

Analytical Services Provided Through…

AnaLync

SOIL ANALYSIS - WATER EXTRACTABLE TEST RESULTS

Testing Performed by Harris Labs, Lincoln, Nebraska

Line No.			Line No.	Units	A 0	B TEE02	C TEE07	D FWY04	E FWY15	F 0	G 0	H 0	I 0	J 0	Adj. Ave.
1	Report Type:	FL	48	EC - conductivity		0.51	0.51	0.57	0.52						0.53
2	Report method:	3	49	Saturation Index		1.27	1.25	1.41	1.33						1.32
3	Dealer Acct. #:	805505	50	Na - meq/ltr		1.7	1.6	1.8	1.3						1.6
4	Distributor:	Primos Products Inc.	51	Ca - meq/ltr		3.0	4.5	2.8	4.8						3.8
5	Turf Type:	T2 T7 F4 F15	52	Mg - meq/ltr		1.7	1.9	1.7	1.6						1.7
6	Report Date:	1-Apr-03	53	K - meq/ltr		2.0	2.1	1.5	2.2						1.9
7	Info. Sheet No.:	1503	54	NH_4 - N - meq/ltr		1.4	1.2	1.3	1.5						1.4
			55	NO_3- N - meq/ltr		1.7	1.3	1.9	1.3						1.6
			56	P - PO_4 - meq/ltr		0.5	0.2	0.6	0.8						0.5
			57	HCO_3 - meq/ltr		2.3	2.3	2.4	2.4						2.3
8	Laboratory No.	Client ID	58	S - SO_4 - meq/ltr		3.0	1.7	3.7	2.3						2.7
9	Line 8	Line 9	59	Cl - meq/ltr		1.5	1.8	1.2	1.7						1.5
		A	60	B - meq/ltr		0.1	0.1	0.1	0.1						0.1
	3271112	B TEE02	61	Mn - ppm		0.2	0.2	0.2	0.2						0.2
	3271113	C TEE07	62	Cu - ppm		0.2	0.2	0.1	0.2						0.2
	3271114	D FWY04	63	Zn - ppm		0.2	0.2	0.2	0.2						0.2
	3271116	E FWY15	64	Fe - ppm		5.8	7.4	6.9	4.2						6.1
		F													
		G													
		H													
		I													
		J													

Client

1	Facility	MERION EAST
2	Address	
3	City	ARDMORE
4	State	PA
5	Zip Code	
		6

Soil Testing

Correcting Soil Amendments

MECHANICAL PRACTICES

MOWERS

- It amazes me how few people realize how critical quality of cut is on their plants.
- I have seen fairways that have brown look and it is nothing more than a bad cut.
- I cannot over emphasis how critical it is to have an outstanding Equipment Manager; next to your job, it is the most important position on your staff. Robert Smith, our outstanding Equipment Manager, is a Maestro when it comes to setting up mowers. With his talents he makes Merion a lot better!
- We utilize fiveplexes and if they made a sevenplex, I would use that as well. I do not like triplexes in fairways for the following reasons:

  a) Triplexes promote thatch
  b) Triplexes are not production oriented
  c) More fuel, more operators, more engines, less mechanical life.

- I embrace compaction! Remember playability first!
- I realize this is a fairway management program, but we have unbelievable roughs at Merion as was proved by this year's Open. We do all our turning in the fairways, never in the rough.

Cutting Techniques

Heavy mowers are part of this program because I embrace compaction for thatch management and playability.

ROLLING

- Rolling really became a part of our program by accident. I realized very early on that my dollar spot and brown patch issues always began where I stopped rolling. It wasn't until I came to Merion that I entertained the idea of rolling fairways.
- We implemented rolling to control disease and reduce our dependence on chemicals.
- However after just rolling our fairways with the Tranz-formers for 6 weeks our effective height of cut dropped .15 without touching our mowers because our matted organic started to break down from the grinding action of the rolling.
- Rolling most definitely breaks down thatch if you have sand in your profile!
- We used to cut fairways seven days a week, but now we cut three days a week and roll four. As a result of this change we save labor cost, increase the life of the mowers, and reduce fuel consumption.

Our first attempt at fairway rolling

We roll to manage thatch, disease, playability and cost savings versus mowing.

I would have never considered use the fairway rollers as squeegees if I didn't have sand incorporated into the soil.

Equipment Needs for Topdressing Fairways

Two Tycrop topdressers or Dakota topdressers and large tractors to handle the weight will work great and a smaller topdresser to handle tight spots which everyone has.

- Staging areas for sand we have three locations to dump sand.
- How we implement:

  We put out 15 tons to the acre twice a year and solid tine it in "NO CORING" and work the sand in with a SISIS brush.
- Fertilize. Water and observe.
- We will also topdress and work in 5 to 7 ton applications in the off season.
- Verticutting and topdressing works really well at up to 8 tons to the acre.
- We utilize a SISIS 3 section, 3.pt hitch broom for working in the sand.


MH-400

Aerification

Brooming in topdressing

Aeration picture of the SISIS brush we use for brooming in sand.

Alternatives to incorporating sand and amendments
Dryjecting fairways

Depth a Dryject can get sand into

Ransome Verticutter

- We also utilize verticutting to incorporate sand . We topdress at a rate of 7 tons/acre

Disease Management

Dollar Spot and Brown Patch were our primary disease issues. However, once we dried out these areas thru drainage, proper water management, and rolling these diseases were dramatically reduced.

Prior to embarking on Sand topdressing Fairways, we sprayed fairways every two weeks; now, is not at all uncommon for us to go six weeks between sprays. This is due to water management, fertility with natural organics, rolling, and sand tropdressing.

Common Questions

Why did I start this program?
The reason we do not core is to bury all the crabgrass seed and poa seed.

How much does it cost? $25/ton delivered
Our goal is 40 tons/acre a year = $1,000 per acre for sand.
Some years we were able to get as high as 55 tons/acre.

Is there any problems with irrigation heads?
You must be prepared to raise the heads once every four years if you go down at 50 to 60 tons a year.

Championship conditioning

Challenges

Divots are much smaller when you sand topdress.

The divots have a tendency to explode and can not be put back

Prior to US Open we sodded 45,000 divots and the members hit off Keystone shape matts.

Additional Challenges

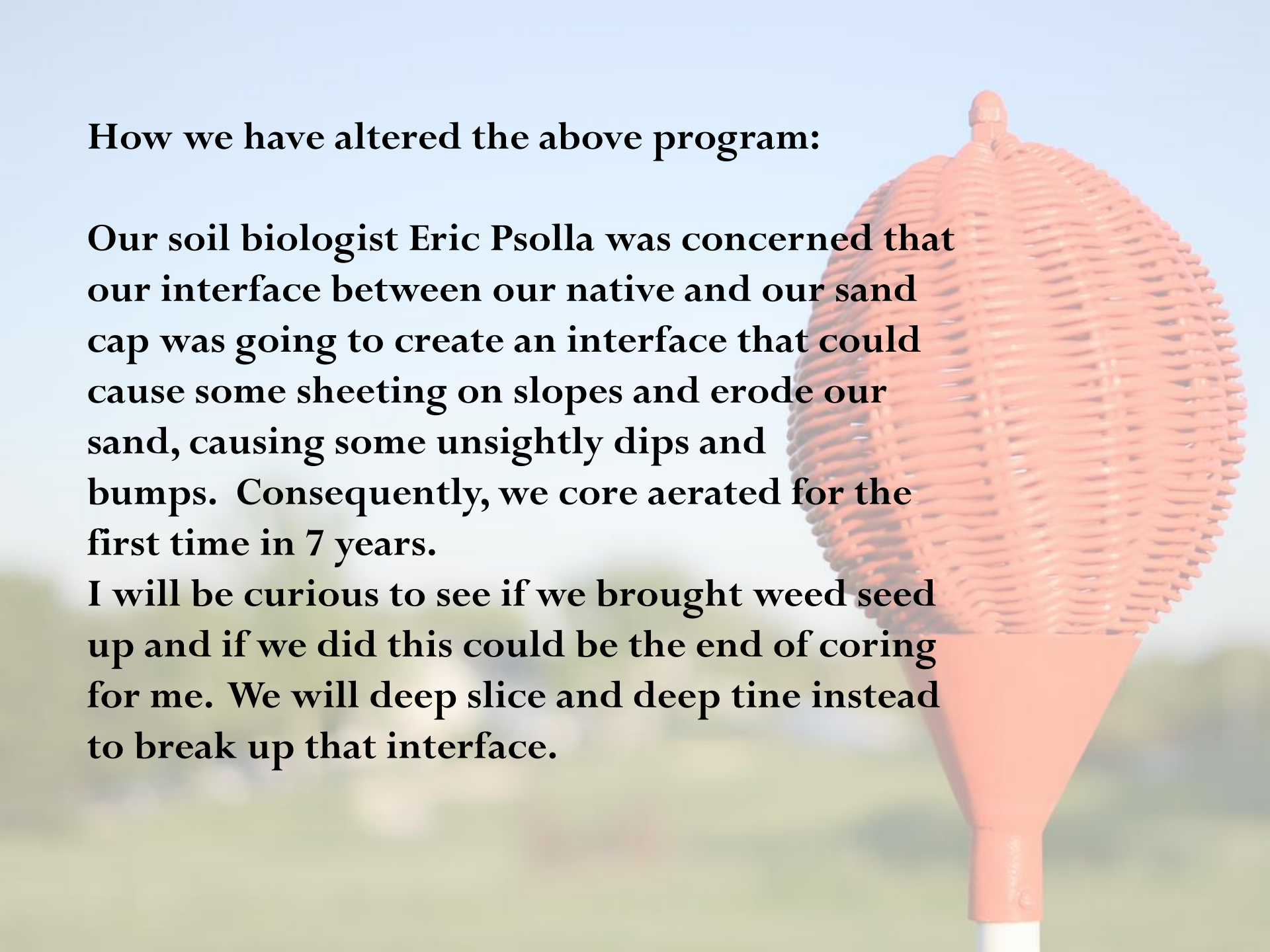
- It would be necessary to periodically raise your sprinkler heads.
- Initially, you will need to create different locations to store sand . For every acre of fairways you'll need to store 15 tons of sand per application during the aerification.
- Installation of quick couplers in your fairways, primarily in difficult areas, is mandatory.

Results

- Regardless of how much rain you get you can cut.
- Far less disease.
- Stellar root systems.
- Less disease pressure (a lot of this has to do with dew removal).
- Initially Divots tend to explode, but we have backed off on summer light topdressing. Plus the roots become better, the divots stay together better.
- Less water
- Lower heights of cut if that is desired, we have had ours down to 3/16th of inch, but currently maintain them at 3/8th.
- Less fertility, you have organic break down and I surmise that you are getting nitrification from this break down.
- You will get localized dry spot , but that can be cured with a wetting agent or incorporating Profile in these areas.

How we have altered the above program:

Our soil biologist Eric Psolla was concerned that our interface between our native and our sand cap was going to create an interface that could cause some sheeting on slopes and erode our sand, causing some unsightly dips and bumps. Consequently, we core aerated for the first time in 7 years.
I will be curious to see if we brought weed seed up and if we did this could be the end of coring for me. We will deep slice and deep tine instead to break up that interface.



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Merion Golf Club, Ardmore, PA

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Merion Golf Club, Ardmore, PA

Especial thanks to Fabi our Administrative Assistant who put this presentation together and has been sitting next to me making sure I didn't electronically to cut you all off.


USGA
113TH U.S. OPEN CHAMPIONSHIP
USGA
START LEADERS PAR HOLE 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 RD 1 RD 2 RD 3 RD 4
1 MICKELSON 1 1 1 0 2 2 2 2 2 0 0 0 1 1 2 2 2 3 67 72 70 74
0 MAHAN 0 0 0 0 0 1 1 1 1 1 1 1 1 1 3 3 4 5 72 69 69 75
0 STRICKER 0 3 4 4 5 5 5 5 5 5 5 5 4 5 6 6 6 6 71 69 70 76
0 SCHWARTZEL 1 1 0 1 2 4 5 5 6 7 6 6 6 6 7 8 8 70 71 69 78
1 6 HORSCHEL 1 2 3 3 4 3 3 3 4 4 5 4 5 5 5 5 5 5 72 67 72 74
1 ELS 5 4 5 5 7 7 6 6 6 6 6 6 6 5 5 4 5 71 72 73 69
1 2 ROSE 1 1 2 1 2 1 0 0 0 0 1 0 1 0 0 1 1 1 71 69 71 70
2 DAY 2 2 2 1 2 2 2 1 1 0 1 1 1 2 2 2 2 3 70 74 68 71
2 8 DUFNER 7 7 7 7 7 7 6 6 6 5 5 4 3 3 6 5 5 5 74 71 73 67
3 FOWLER 3 4 4 4 5 5 5 5 5 5 5 5 4 4 5 5 6 7 70 76 67 74
TODAY THRU 17 TOTAL