

Rukmini

Hi Mike and Lynn, thank you all for being here. So great to have you both on this podcast. Could you introduce yourselves real quick to our listeners?

Michael Sabin

Sure. Good morning. My name is Michael Sabin and I am the Parks Manager for the Southwest District for Denver Parks and Recreation. My current role has me overseeing the operations, maintenance, and construction for roughly 1,100 acres of park space, which includes about 600 irrigated acres. I have been with the city for roughly 12 years and I would like to thank NRPA for having me this morning.

Lynn Fulton (02:39)

My name is Lynn Fulton and my role is a crew lead for the Water Conservation Department. I have been with the City of Denver for 14 years and I would also like to thank NRPA for having us this morning.

Rukmini

Our pleasure. Let's dive right in. We're going to talk about smart irrigation today and how y'all implement it in Denver. So could you give us some background on what this water conservation tool is and how you've been using it?

Lynn Fulton

Absolutely. For us, we consider our smart irrigation our network of Toro Sentinel satellites. We had a central control master plan. So we took out all of our standalone controllers in favor of these central control controllers and that master plan was completed in 2010. And then we've added in these new controllers since then and we're currently at over 700 controllers for 330 parks and then numerous parkways and medians throughout the city. Our central control build out was completed through capital improvement projects and Denver Parks and Recreation Water Conservation Team. So we're part of that build out too. We were created for that, and we are dedicated to maintaining, monitoring, and optimizing all features of our central control system.

Rukmini

Could you situate for us where smart irrigation and those central controls you mentioned fit into the broader conversation on water conservation?

Lynn Fulton

Yeah, just going to central control, which is a computerized control system that you have control over, it's proven to save over 15 % on parks water use just by putting it in. So you take the human element out of the equation. And then, there's other things involved in that, but one of the bigger things that we have is we also have a weather network of eight full weather stations and 13 rain cups throughout our city that allows for real time rain shutdowns, which has the potential of saving 29 million gallons over one overnight shutdown. And it not only saves time for our staff, but it also eliminates that human error risk. And what I mean by that is if you have what we call standalone controllers, someone has to go out to those controllers. If it's gonna, if you think it's gonna rain or if it's raining, someone's actually physically going out to those controllers and turning them off. And then potentially, you know, in a hot, hot part of the year you get rain, you shut something off, maybe they forget about it, and they forget to turn that back on the next day. So then they go back like a week later. Now you've gotten dry, you've got dry turf. Now you're gonna spend so much more time bringing that back to what it was. Our central control is something that helps get rid of that and reduce that.

Rukmini

Michael, I was hoping that you could talk a little bit about what it looks like to make that shift from a maintenance standpoint. So what does it look like for those folks who are going out, who would have been the people to go out there and shut off those controllers? What does it look like for them to fit into this broader conversation on smart irrigation?

Michael Sabin

So, it was a monumental shift. As Lynn alluded to, we have hundreds of controllers out there. In the past, it took an employee upwards of six hours on a rain day to go out and manually shut off every controller. That can be done with a click of a mouse button now. It has saved us an ample amount of time. It has reduced the field failure by over 90%, as

Lynn alluded to, of forgetting to turn controllers back on. So [in the past] we have missed the opportunity to not water areas.

Rukmini

It seems like smart irrigation has brought your city a lot of savings and been really useful and effective. I want to ask you about some of the challenges that Park and Recreation agencies or cities might face when they're implementing these tools of smart irrigation. Could you talk about some of the challenges you faced and how you overcame them?

Michael Sabin

Sure, great question. So I've identified two main challenges in implementing this central control. The first one will be setting expectations. What I mean by setting expectations are what are the expectations your agency expects to get out of the central control system? What are the goals that you want to achieve? Things central control can offer are efficient water usage due to precise control, uniform water distribution across the field, reduce labor costs, better monitoring of water usage, and the ability to adapt irrigation based on real-time conditions. And that leads to learning the system's capabilities. We want to empower employees on sustainable water practices through hands-on trainings and educational opportunities. So that's one way we are addressing these challenges, right? We are giving the employees the opportunity to learn from subject matter experts how to make repairs in the field, to offer the employee continual educational opportunities, whether that's through our water conservation team, whether that's through a third party vendor, whether that's through a national organization, through certifications. But we want to continue to empower our employees to get that next level of expertise to become a water manager.

And we have an internal tracking tool that I want Lynn to speak about.

Lynn Fulton

Yeah, thanks Mike. And kind of what he said too, just to reiterate that it's very challenging to leap forward with new technology. Really kind of, you know, with what you know of current technology and then employee comfort on top of that, it's a lot to deal with. But as Mike alluded to, our task tracking and e-tickets system was created for this buy-in. So we did it in a way where the employee identifies the issue in the field, puts in this, you know, sends in this e-ticket, which is essentially a work order. And then the subject matter expert,

me or someone from our team comes out to fix the issue. And if we're lucky, that person is there with us and we can train one on one right there with them. Here's what happened. Here's how I would troubleshoot this. And if they don't, know, they don't, they're busy people. But now we have a documented process for continuing education. We look at these e-tickets weekly, monthly, and we see where are we having issues in the field? What aren't people understanding about this new system? How can we now tailor our trainings to help them troubleshoot and understand this new system?

I do think in ways it's like turning a battleship where it's not something where you sit down with someone one time and you explain the electrical, this is how this works electrically and they just get it. But a few times and they start to understand it more. So it's been, I would say, a slow process, but I am seeing that battleship turn. Employees are getting it and they are understanding it and we're trying to get out there more and more with them. And we've found just kind of as an aside, it's much easier to train one-on-one than with a group of people. There's a lot of dynamics with a group of people, where maybe a newer person doesn't want to ask a question for fear of whatever. Nobody wants to ask the stupid question, as it were. So we've had a lot of success one-on-one. We try and do it as much as we can. And now this winter time is a great time to train. And we can go shop by shop then and train in the winter.

Rukmini

How long have y'all had this program for?

Lynn Fulton

We have been going since 2018.

Rukmini

Okay, so that's been a long minute now that you've been having those one-on-one trainings and doing trainings for your group. I love that metaphor that you used of it being like turning a battleship. I wanted to ask, what do you think of the future? When do you think that the battleship will be turned 180 degrees, moving in the right direction?

Lynn Fulton

I think within the next five years, because now we're getting into even newer central control systems, it's like we've gone from version 1.0 and now we're at version 3.0. And in that move, it just necessitates a lot more learning and a lot more understanding of things. And I think within the next five years or so, now we're dealing, we're dealing, we've changed our communication from one way, an old, you know, the old over the airwaves to now we're at cellular. And these guys can use their phone to run their controllers now. It's starting to take, and I think within the next five years or so, you're going to see a lot more of what Mike wants and what Mike wants and what our goal is too: our water managers, not just guys who go out and repair heads and repair pipe.

Michael Sabin

Yeah, and one thing I really enjoy about it is through our electronic ticket format as a parks manager, I am able to see each individual issue regardless of the severity. So I can dictate work plans and delegate work based on what those e-tickets read. And that empowers my supervisory staff to delegate their work plan to their field staff to save time, address needs immediately, and to not be chasing issues. It's been a very, very beneficial tool. I'm very excited to see where it goes. And I think it's only gonna be stronger used and better received throughout the whole field staff.

So, you know, as I said, I've noticed two major challenges in implementing this. The first was setting expectations and the second is utilizing technology. But how we're addressing these challenges is creating buy-in from the entire department that includes costs, labor, infrastructure, and unforeseen issues. If the directors don't see the value in this, how do you expect the field staff to see the value?

This must be accepted and encouraged through all levels of positions to have success. As I said, if the deputy directors and the top administration don't see the value and don't put the investment forth, then the work will kind of be futile because you will do everything in your power to be a smart water manager, but you won't have that support to put the infrastructure in place to become a smart water manager. I can't emphasize enough, selling that story, being the one who can show the benefits, the 50% water savings, the rain delay savings. All of those numbers play a big story in the overall picture of the benefits of central control.

Rukmini

I'm gonna ask if y'all could talk a little bit right now about what Denver's story is. Obviously, you know, you've been doing smart irrigation for a long time now. But when y'all first started, what was the story that you pitched to like your top administrators and that you pitched to your field staff to get their buy in?

Lynn Fulton

For us in water conservation, and we've seen this really over the past year, as I think corollary to the COVID issues, our distributor has been poor on warranty repairs and just general when we when we order components from them to install our central control system, they've been very bad about being diligent with their products. We've been pitching lately, we can do this ourselves. We can make our group stronger by understanding how to make components for our system. We'll find the suppliers, we'll get the stuff ourselves at a much cheaper rate than we can from our distributor and we'll create these components ourselves.

And then, two, part of it is let us come in and help your guys that are in the field right now. Let us help them with all the data that's out in the field, be it from the heads they use to the water pressure and whatnot. And let us take that data from you. We'll put it into your system for you and we'll help you program. So that's kind of what we've done with water conservation. What we're trying to do is just get more involved in it and be an integral part of the whole thing so we can also have a little bit of a say in everything.

Michael Sabin

So I can talk to past state a little bit and how we kind of got administration's buy-in. In the past, as Lynn alluded to in about 2018, we had a director who was very water conservation savvy. It was one of his main goals. It wasn't hard to sell the story. It was hard to find the funding to implement the new components to water our grass, right? So we were able to have that almost buy-in. We just needed to support it monetarily so we could get it off the ground. We were able to do that through grants and other funding sources. But in essence, we had someone who really supported the transition from standalone old irrigation controllers to a smart irrigation based system because they saw the benefits of it.

Rukmini

Do you, would you have any advice for how to approach that conversation for someone who might've been in your position but didn't have a director that was so open-minded?

Michael Sabin

Absolutely. I would do your research. I would go through your system. I would do a system audit. I would find out exactly how much water you're using. I would put a cost to that water. I would do your research to sell your story because the more numbers, the more data you have to support it, the more areas you can show you are actively having water loss. It can only look better when you present these things that will save the resource. So using the tools in your toolbox to identify areas that are costing you the most money. Using that and using that to your advantage.

Lynn Fulton

I completely agree with what Mike's saying. And really it is, it's just your due diligence. From what I've learned with supervisors and directors, they do want the data. And much like Mike said, you present the data, here's potential savings and so on and so forth.

Rukmini

Absolutely. All right. Well, so coming back around here, talking about telling your story now that you've had this program for years, I imagine you have data. I imagine you have a narrative about how it has supported your goals are in water conservation. So I would love to ask you what the benefits are for Denver, since the implementation of the Smart Irrigation Program.

Michael Sabin

Some of the benefits we have implemented since starting our smart irrigation controls is we are trying to move away from the traditional irrigation maintenance tech mindset to empowering our staff to become water managers. We are trying to accomplish this through a couple of mediums. The first is recognizing overwatering. This can be as simple as recognizing heads out of adjustment that over rotate into streets, water into bodies of water, noticing over saturated grass, excessive clippings, and this could be anywhere from a professional sports field to a recreational sports field to an outdoor concert venue or to any grassy public area. In some of these higher profile areas, the practice of visually watching the system and timing it to see how long it takes the water to infiltrate cannot be stressed enough. And we here in Denver promote a cycle soak method that allows us to

give the necessary amount of water so it's not over saturated. Making timely repairs is another benefit we have noticed.

Using central controls, we recognize alarms that it shows us such as electrical, faults, high and low flows, and power fails. This allows us to make repairs to the system that includes broken heads and laterals quicker by letting the central control tell us exactly what zone what the issue is. So we're not taking time going to the field, chasing down dry spots. We can reference our zone data and our activity maps to see that, for example, zone 34 did not water last night at X park. We know exactly where to go, what to look for, and how to troubleshoot that to make the repair. The last benefit I've noticed is using central control to manage each site independently based on zone data. What I mean there is having the water manager enter all relevant data into central control. And this is where zone data comes in. Zone data allows us to program each zone based on environmental factors, such as if the zone is in full sun, partial sun, full shade. If it's a hybrid zone that waters both turf and a shrub or flower bed, to a full flower bed, to native landscapes. Each zone requires a different amount of water and central control lets us program each of these based on their specific watering requirements.

Rukmini

Lynn, is there anything that you wanted to add?

Lynn Fulton

On Mike's watering audit, the Water Conservation Department has had identified four underperforming parks in the district. We wanted to do a trial of some of the things that we espouse. So we went out, we performed a watering audit, we got soil samples, so we understood what was out there infiltration wise for water and soil. And we did our watering audit and then we have a scheduling audit we can do too. And we take all this data and we fill this out. Using these tools, we reduced the water usage at each park by an average of 60%. And we realized an annual savings of 328,000 gallons per acre or 3 million gallons of water overall that we saved just by doing that at four parks. So, I mean, yeah, for us, it's just a matter of time, you know, getting the people out there to do those things. And we're going to see significant savings in the future.

Rukmini



That's really astounding. And I'm really grateful that you shared those numbers because what we're hoping that this conversation does also is provide an example for people in your positions that are trying to convince directors or field staff or whoever it may be that this is a good change, a necessary change. And those numbers go a long way, like you all said, it's the data that makes the difference. So thank you for sharing that.

Lynn Fulton

Thank you for giving me the time before you finish. The only thing I would say is do your due diligence upfront. In that I mean know what you want for your irrigation system. Don't let it be dictated to you what you want. You dictate to them what you want. I want my central control to do this and that. That's what I want. That would be my biggest, biggest piece of advice. Know what you want.

Michael Sabin

Great, thanks, Lynn. And in closing, I just have a couple of last statements here. My biggest tips are setting realistic expectations, performing a cost benefit analysis or a site audit (and this is an inexpensive investment), and creating buy-in at all levels. What encourages me the most as a parks manager is I can have my team continue to develop through interaction with our water conservation team. This is completed through networking, continual education, and utilizing the available technology to continue to develop into water managers. And all of these mentioned items will help continue to grow the importance of using sustainable watering techniques to conserve water in the City and County of Denver.